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Mutual HIV Status Disclosure is Associated with Consistent Condom  
Use in Public Sector ART Clients in Free State Province, South Africa

A Short Report

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**Title:**

Mutual HIV status disclosure is associated with consistent condom use in public sector ART clients in Free State province, South Africa: a short report

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**Abstract:**

Risky sexual behaviour in PLWHA on antiretroviral therapy threatens both prevention and treatment efforts, but disclosure promises to support safer sexual practices. This paper investigates the association between HIV self-disclosure and consistent condom use in a cohort of public sector patients on antiretroviral (ARV) treatment. Using data from the FEATS cohort study, logistic regression analysis shows that knowledge of your partner's HIV status is positively associated with consistent condom use (OR 2.73, 95% CI 1.37-5.43,  $p=0.004$ ) and so too mutual HIV disclosure (OR 3.38, 95% CI 1.60-7.18,  $p=0.001$ ). Prevention and treatment programmes, through couple HIV counselling and testing (CHCT) and other assistance programmes, should focus on supporting the mutual disclosure of HIV status among PLWHA on ARV treatment.

**Keywords:**

antiretroviral therapy, ART, condom use, HIV disclosure, HIV/AIDS, South Africa

**Word count:** 1,519

## **Introduction**

PLWHA on antiretroviral (ARV) treatment experience improvements in their life expectancy, health and quality of life, and concomitantly in sexual activity (Berhan & Berhan, 2012; Hanif, Bastos, Malta, Bertoni, Winch & Kerrigan, 2014; Kaye, Kakaire, Osinde, Lule & Kakande, 2013). Risky sexual behaviour in HIV-positive individuals on ART is of critical importance, given that it stands to facilitate the on-going transmission of the virus in the non-infected and the re-infection of the treated with drug-resistant strains of the HIV virus (Hanif et al., 2014; Kaye et al., 2013; Shewamene, Legesse, Tsega, Bhagavathula & Endale, 2015).

One potential avenue for impacting sexual behaviour is disclosure. In the Disclosure Processes Model (DPM), sexual practices are described as a longer-term, health-related dyadic outcome of self-disclosure (Chaudoir & Fisher, 2010). The disclosure process, therefore, stands to open avenues for negotiating condom use (Bachanas et al., 2013; Conserve et al., 2015; Deribe, Woldemichael, Wondafrash, Haile & Amberbir, 2008; Li et al., 2013), thus contributing to safer sexual practices.

Although some studies have investigated HIV disclosure by PLWHA on ART (Ebuenyi et al., 2014; Hirsch et al., 2014; Seid, Wasie & Admassu, 2012; Yaya et al., 2015) and numerous the sexual behaviour of PLWHA on ART (Akinyemi, Awolude, Adewole & Kanki, 2010; Anene, Ighodaro & Olufemi, 2014; Ayiga, 2012; Crepaz & Marks, 2004; Diabaté et al., 2013; Eisele et al., 2008; Kaida et al., 2008; Kennedy, Medley & Sweat, 2007; Mawji et al., 2012; Peltzer & Ramlagan, 2010; Sarna et al., 2008; Wilson & Minkoff, 2001), only a handful of cross-sectional studies from sub-Saharan Africa have investigated the HIV disclosure – sexual behaviour nexus (Adebayo et al., 2014; Bachanas et al., 2013; Fekadu, Addisie & Mellie, 2014). The current analysis also investigates the association between HIV self-disclosure and consistent condom use, but uses longitudinal data for a cohort of public sector patients on ARV treatment.

## **Methods**

### *Participants and procedures:*

The Effective Aids Treatment and Support in the Free State (FEATS) study is a longitudinal, cohort study. As part of the evaluation component of the study, which comprised a randomized control trial of a peer adherence and nutritional support intervention (Booyesen, De Walque, Over, Hashimoto & De Reuck, 2016), a total of 655 adult ARV patients was recruited into the study at twelve primary health care clinics in the Free State province of South Africa. Patients were questioned on their sexual behaviour and on HIV disclosure. At baseline, ninety-six percent (630) of patients completed the survey. A total of 453 (71.9%) and 413 (65.5%) of patients were re-interviewed during two follow-ups (N=1,496), conducted 14.9 [IQR 13.5-15.9] and 9.8 [IQR 8.8-10.6] months apart, respectively. The aggregate attrition was 44.1%, with the 352 patients in the analytical sample interviewed in all three survey rounds (N=1,056).

### *Ethical clearance:*

Ethical approval for the study was obtained from the Medical School of the University of the Free State (ETOVS 145/07). Written informed consent was obtained from all study participants.

### *Measures:*

Consistent condom use, the dependent variable, means reporting always using a condom during sex over the past six months. In the case of HIV disclosure, the main independent variable, a distinction is made between "*self-disclosure*"; disclosing your HIV status to your partner, "*partner disclosure*"; knowing your partner's HIV status, and "*mutual disclosure*"; both knowing your partner's HIV status and having disclosed your own HIV status to your partner. In addition, a categorical variable was constructed, where the variable takes on a value of "1" (neither partner disclosed), "2" (one partner only disclosed) or "3" (both partners disclosed). Classification is based on the response to two questions, i.e. "Does your partner know your HIV status" and "Do you know the HIV status of your partner".

Control variables include the following: sex, age (years), marital status, education, health-related quality of life (EQ-VAS), substance use (alcohol, tobacco or other drugs), ART optimism (standardised index), ARV treatment duration (months), survey round, and district.

*Analysis:*

The socio-demographic characteristics of the sample are first described. Following a bivariate analysis, logistic regression models are employed to investigate the link between HIV disclosure (independent variable) and consistent condom use (dependent variable). The criterion for statistical significance is  $p \leq 0.05$ . Analysis was conducted using *Stata14*.

## **Results**

*Participants:*

Study participants are predominantly female (76.0%) with a mean age of 37 years on average. Few patients have tertiary education (1.4%), while almost one in five persons have completed grade 12 (18.1%). Only 3.5% have no education, 30.9% primary, and 45.9% some secondary. Two thirds of study participants are single (66.6%) while 23.8% live with their spouse or partner.

*Sexual behaviour and disclosure (Table 1/2):*

Half of patients were sexually active (50.1%). Consistent condom use was high (79.2%) (Table 1). A majority of patients have disclosed their own HIV status (87.5%) or knew their partner's HIV status (75.1%). Mutual disclosure is common (74.2%). According to Table 1, the percentage of respondents reporting that they know their partner's HIV status increased significantly post-baseline ( $p=0.009$ ), while the proportion of cases where the HIV status of one partner only was known concomitantly declined ( $p=0.017$ ). Condom use was consistently higher where HIV status had been disclosed to or by a partner ( $p \leq 0.004$ ) or to both partners ( $<0.001$ ) (Table 2).

*Regression analysis (Table 3):*

Where a patient knows their partner's HIV status, the likelihood of consistent condom use increases 2.73 fold (CI 1.37-5.43, p=0.004). The association is even stronger for mutual disclosure (OR 3.38, CI 1.60-7.18, p=0.001). Age also predicts consistent condom use, but only in one regression model, model 1. An increase in age of one year, increases the likelihood of consistent condom use by a marginal 3.6% (CI 1.00-1.07, p=0.032). In the accompanying bivariate analysis, disclosure of one's own HIV status was also positive and statistically significant (OR 2.33, CI 1.20-4.51, p=0.012).

## **Discussion**

Levels of disclosure fall within the range reported in the literature: 60.9% in Togo (Yaya et al., 2015) and 93.1% in Ethiopia (Seid et al., 2012). Consistent condom use too is similar to rates reported in other studies, ranging from 60.8% in Assela, Ethiopia (Fekadu et al., 2014) to 78.9% in north-western Ethiopia (Shewamene et al., 2015). Studies generally ignore partner HIV status (Venkatesh, Flanigan & Mayer, 2011). As hypothesised in the Disclosure Processes Model (DPM) (Chaudoir & Fisher, 2010; Chaudoir et al., 2011), this study finds that knowledge of your partner's HIV status and mutual HIV disclosure are associated with safer sexual practices, as did Bachanas et al. (2013) in a study in Kenya, Namibia and Tanzania.

This finding highlights the importance of disclosure assistance. Walcott, Hatcher, Kwena and Turan (2013) emphasise that PLWHA be given different options for HIV disclosure assistance, options that promote the relationship building skills and knowledge of communication strategies necessary for mutual disclosure (Hightow-Weidman et al., 2013), including couple HIV counselling and testing (CHCT) (Walcott et al., 2013). A recent systematic review found evidence in support of media- and computer-based as well as facilitator- and group-based disclosure programmes (Conserve et al., 2015). Kennedy, Fonner, Armstrong, O'Reilly and Sweat (2015), in another systematic review, find mixed evidence and modest effects, with the strongest evidence for partner notification interventions.



This study has various limitations. Firstly, the results are not representative of the larger South African ART programme. Secondly, reports on sexual behaviour and HIV disclosure are based on self-report and subject to social desirability bias. Thirdly, partners' HIV status was not recorded. As a result, it is not possible to investigate condom use in sero-concordant and non-concordant couples. Fourth, the relationship between disclosure and condom use is bi-directional and causality cannot be inferred from this analysis. Disclosure is a complex process (Chaudoir, Fisher & Simoni, 2011) and has various positive and negative consequences (Conserve, Groves & Maman, 2015; Genet, Sebsibie & Gultie, 2015). This study, in the fifth instance, cannot reflect on the extent to which the study participants' disclosure experience was positive or negative nor can it shed light on the full complexity of the disclosure process as experienced by study participants. Sixth, disclosure, through serosorting, may also encourage risky sexual behaviour in HIV-positive sero-concordant couples. Finally, no data was collected on desire to have children, which is a key factor in explaining condom use.

### **Conclusion**

Prevention and treatment programmes, through couple HIV counselling and testing (CHCT) and other disclosure assistance programmes, should focus on supporting the mutual disclosure of HIV status among PLWHA on antiretroviral (ARV) treatment.

### **Disclosure statement**

The authors have no conflict of interest.

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**Table 1: Condom use and disclosure (%), by survey round**

	Survey round			Total	p-value
	1	2	3		
Condom use (%)	77.1	83.0	78.6	79.6	0.381
Disclosed own status (%)	88.0	88.3	89.1	88.5	0.937
Partner's status known (%)	68.4	79.5	78.1	75.7	0.044
Disclosure (%)					
Neither partner	10.7	10.5	9.4	10.2	0.054
One partner only	22.1	10.5	13.6	15.1	
Both partners	67.1	78.8	76.9	74.7	
Total	100.0	100.0	100.0	100.0	

Note: Condom use refers to consistent condom use, i.e. reportedly using a condom "every time" in the past six months.

Numbers may not add up due to rounding.

**Table 2: Consistent condom use (%), by HIV disclosure status**

	<b>Percentage (%)</b>	<b>p-value</b>
Disclosed own status:		
No	66.1	0.004
Yes	81.9	
Partner's status known:		
No	65.0	<0.001
Yes	84.7	
Disclosure:		
Neither partner	67.3	<0.001
One partner only	63.6	
Both partners	85.2	

Note: Consistent condom use refers to reportedly using a condom "every time" in the past six months.



**Table 3: Logistic regression models – consistent condom use**

	Bivariate		Model 1		Model 2	
	OR	p-value	OR	p-value	OR	p-value
Female	0.654	0.148	0.724	0.316	0.729	0.413
Age (years)	1.024	0.145	1.036	0.032	1.035	0.056
Marital status (comparison = single):						
Not cohabiting	2.466	0.139	1.956	0.205	1.962	0.334
Cohabiting	0.829	0.460	0.552	0.052	0.543	0.083
Education (comparison = none)						
Primary	1.206	0.926	1.279	0.709	1.264	0.913
Secondary	1.084	0.969	1.234	0.751	1.236	0.923
Grade 12 or higher	1.321	0.891	1.186	0.813	1.236	0.923
EQ-VAS	1.002	0.728	1.000	0.946	0.999	0.977
Substance use (yes)	0.731	0.252	0.712	0.319	0.712	0.357
ART optimism	1.086	0.571	1.063	0.712	1.075	0.660
ARV treatment duration (months)	1.004	0.733	1.038	0.529	1.044	0.414
<b>Individual disclosure:</b>						
Disclosed own status (yes)	2.332	0.012	1.419	0.426		
Knows partner's status (yes)	2.988	<0.001	2.736	0.004		
<b>Mutual disclosure:</b>						
Disclosure (comparison = neither partner)						
One partner only	0.850	0.642			0.981	0.966
Both partners	2.810	0.001			3.389	0.001
Sample (N)			488		488	
Wald chi2 (p-value)			35.77 (0.011)		39.66 (0.003)	
Pseudo R <sup>2</sup>			0.081		0.087	

Note: Results are for pooled regression models and are adjusted for district and survey round. The likelihood ratio (LR) test (not reported here) indicates that the pooled regression model in each case outperforms the random effects (RE) panel model ( $p > 0.05$ ). P-values are based on bootstrapped standard errors.