

Correlates of HIV status non-disclosure by pregnant women living with HIV  
to their male partners in Uganda: a cross-sectional study

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**Abstract**

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**Background:** HIV status disclosure by pregnant women living with HIV (PWLHIV) to their male partners is associated with improved maternal and infant outcomes. Understanding relationship factors associated with non-disclosure of HIV status by PWLHIV to their partners can inform the design of interventions to facilitate status disclosure.

**Methods:** We conducted a cross-sectional study using enrollment data from 500 PWLHIV participating in a randomized controlled trial assessing secondary distribution of HIV self-testing kits in Kampala, Uganda. HIV status non-disclosure was the primary outcome of interest. We conducted univariate and multivariate binomial regressions to assess the association between socio-demographic, HIV history, and relationship characteristics and non-disclosure of HIV status.

**Results:** Overall, 68.2% of women in our sample had not disclosed their HIV status to their partners. Factors that increased the likelihood of non-disclosure included shorter relationship duration <1 year (adjusted prevalence ratio (aPR)=1.25; 95% CI: 1.02-1.54), being in a polygamous relationship (aPR=1.21; 95% CI: 1.07-1.36), not married (aPR=1.20; 95% CI: 1.07-1.35), reporting uncertainty about whether their partner had ever HIV-tested (aPR=1.55; 95% CI: 1.28-1.88), and reporting lack of social support from people aware of their status (aPR=1.32; 95% CI: 1.18-1.49).

**Conclusion:** Relationship factors, including shorter-term, unmarried, and polygamous relationships, and uncertainty about the partner's HIV testing history, were associated with increased likelihood of non-disclosure of HIV status by pregnant women to their partner. Interventions that facilitate couples' disclosure, provide counseling messaging to reduce relationship dissolution in sero-discordant couples, and provide opportunities for women to benefit from peer support may help improve disclosure.

## **Correlates of HIV status non-disclosure by pregnant women living with HIV to their male partners in Uganda: a cross-sectional study**

Running Head: HIV status non-disclosure in pregnant women

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## **BACKGROUND & SIGNIFICANCE**

In sub-Saharan Africa (SSA), the success of prevention of mother-to-child transmission of HIV (PMTCT) programs is improved when pregnant women living with HIV (PWLHIV) disclose their HIV status to their male partners. Studies have shown that HIV status disclosure is associated with six times higher odds of adhering to antiretroviral therapy (ART),<sup>1</sup> achieving viral suppression on ART, receiving social support, practicing safer sexual behaviors, and improved child health outcomes.<sup>2-4</sup> High fertility rates in SSA coupled with high antenatal care (ANC) attendance (98.4% in Uganda) has resulted in the majority of women receiving HIV testing and care during antenatal care.<sup>5,6</sup> A systematic review of over 570 studies found that fear of status disclosure and stigma were the most frequently cited barriers overall and across time for utilizing PMTCT programs.<sup>7</sup> Qualitative studies show that PWLHIV fear being seen taking medications or attending PMTCT services<sup>8,9</sup> The detrimental consequences of non-disclosure during pregnancy are well documented: lack of disclosure contributes to 9.8 times higher odds of infant HIV acquisition, ART non-adherence for both the mother and infant, and 2.8 times higher likelihood of loss to follow up from ART care.<sup>10-12</sup> A case-control study found that mothers living with HIV who had uninfected infants were 14 times more likely to have disclosed their status to their male partners than mothers with HIV-infected infants.<sup>13</sup> Similarly, a national survey in Kenya found that non-disclosure during pregnancy was associated with 12.8 times higher odds of MTCT of HIV.<sup>14</sup> The 2019 Uganda Population-Based HIV Impact Assessment (UPHIA) identified the improvement of disclosure as a critical unmet need in the strive to achieve its 90-90-90 targets.<sup>6</sup>

Studies evaluating relationship and socio-demographic factors as predictors of female status disclosure in PMTCT settings have found that being married/cohabitating, being in a longer-duration relationship, having an individual income, currently adhering to ART, knowing the HIV-positive status of male partner, current contraceptive use, and male involvement in pregnancy were significantly associated with disclosure.<sup>9,10,15,16</sup> Furthermore, low levels of education and living below the poverty line (\$2/day) were predictors of non-disclosure.<sup>10,17</sup> Since PWLHIV with male partners of unknown status are less likely to disclose to their partners, studies evaluating this particular subset of HIV-infected pregnant women can provide additional insight into factors associated with non-disclosure.

We sought to identify relationship factors associated with non-disclosure of HIV status by pregnant women living with HIV to their male partners among women accessing antenatal care in Kampala, Uganda. The findings can inform tailored counseling messages and interventions to facilitate HIV status disclosure to their partners and improved retention to care.

## **METHODS**

### **Study population**

The current study was nested within an ongoing randomized clinical trial (RCT) among PWLHIV being conducted at Kitebi Health Centre, a public antenatal care clinic in Kampala, Uganda (Obumu, [www.ClinicalTrials.gov](http://www.ClinicalTrials.gov) NCT03484533). The primary aims of the Obumu study are to evaluate the effect of secondary distribution of HIVST kits from PWLHIV on 1) male partner's testing and linkage to pre-exposure prophylaxis (PrEP) or anti-retroviral therapy (ART), depending on his status, and 2) women's

post-partum ART continuation and viral suppression at 12 months post-partum. Eligibility criteria include pregnant women living with HIV, regardless of their date of diagnosis, age  $\geq 18$  years old, participating in PMTCT B+ programs in Kampala, having a male partner of unknown HIV status, and being at low risk of intimate partner violence. Women were randomized in a 2:1 ratio to receive an HIV self-test (HIVST) kit or invitation letter to give to their partner for fast-track testing at the antenatal clinic. Recruitment for this study was completed in February 2020, and participating women are being followed for 12 months post-partum.

### **Study design**

Using enrollment data from the Obumu clinical trial, we conducted a cross-sectional study to assess women's self-reported non-disclosure of HIV status to male partner and factors associated with non-disclosure.

### **Data collection**

Data were collected by trained study nurses through case report forms and visit summaries and entered into the study's Research Electronic Data Capture (REDCap) Database using laptops and tablets during the enrollment visit. Interviewer-administered questionnaires included questions about demographics, sexual behavior, relationship characteristics and dynamics, and HIV and medical history. Participants were reimbursed for time and/or travel based on local standards.

### **Data analysis**

Descriptive statistics were tabulated to summarize participant characteristics. Univariate and multivariate log-link binomial regression models were conducted to evaluate the association between sociomeasures of relationship stability and HIV status disclosure. We report estimates as prevalence ratios (PR) with 95% confidence intervals (CI). Final models included adjustment for age, employment status, education level and having an individual income, based on *a priori* knowledge of the effect of these factors on HIV status disclosure. Additionally, we considered other potential explanatory variables and included them in the final model if we observed a change in the effect estimate of 10% or greater. If two variables were collinear, we included only the most influential variable.

### **Ethical Approvals**

This study was approved by the University of Washington Human Subjects Review Committee (STUDY00002257), National HIV/AIDS Research Committee (ARC 200) and Uganda National Council for Science and Technology (SS 4501). All participants provided written informed consent.

## **RESULTS**

### **Description of study population**

Between May 2018 and February 2020, 500 pregnant women living with HIV with a partner of unknown status were enrolled into the study (*Table 1*). Approximately two-thirds of the study population (68.2%) had not disclosed their HIV status to their partners by the time of study enrollment. Over half of all study participants had completed primary school. The majority of women were younger than their male partners. Over half (57.4%) of all study participants started ART before learning about their current

pregnancy, and 42.6% started ART during their current pregnancy. Half of the study participants were in their third trimester, 44.0% were in their second trimester, and 5.2% were in their first trimester.

The proportion of women who started ART before their current pregnancy was higher among women who had disclosed than among those who had not (66.7% vs. 53.1%, respectively). Approximately 24% of women had an individual income; 30.2% among those who had disclosed and 20.5% among those who had not disclosed. Women who had not disclosed their HIV status to their partners were more likely to be in their first pregnancy, newly diagnosed with HIV, on ART for a shorter amount of time or not on ART, have poorer self-reported ART adherence, and report less social support from people who know their status compared to those who had disclosed. Women who had not disclosed their status who were under 20 years old were less likely to report knowing their partner's age.

### **Correlates of HIV status non-disclosure**

In multivariate regression, increased likelihood of non-disclosure was significantly associated with being in the relationship for less than a year ( $PR^a=1.25$  (1.02-1.54)), being in a polygamous relationship ( $PR^a=1.21$ ; 95 CI: 1.07-1.36)), and not being married ( $PR^a=1.20$ ; 95 CI: 1.07-1.35)) (*Table 2*). Women who reported that their partners had never HIV-tested were 46% less likely to disclose their status (95% CI: 1.20-1.77), and women who did not know whether their male partners had ever tested for 55% less likely to disclose (95% CI: 1.28-1.88), compared to women who reported that their partners had ever tested for HIV. Women who reported not receiving social support from people who were aware of her status were 32% less likely to disclose compared to women receiving social support (95% CI: 1.18-1.49).

Several variables were not included in the multivariate model. Variables found to be not associated with non-disclosure univariately included partner's age, whether she was currently living with her partner, whether she is currently on ART, trimester of current pregnancy, and number of previous live births. Age difference between women and their male partners, and whether she started ART during this current pregnancy or before, were associated with non-disclosure univariately but not after adjustment for other variables. Whether she was aware of her HIV status during her last pregnancy was associated with non-disclosure univariately, but because this was the first pregnancy for some women in the sample, this variable was not included in the multivariate model.

### **DISCUSSION**

In this study among 500 pregnant women living with HIV in Kampala, Uganda, increased likelihood of non-disclosure was associated with being in the relationship for less than a year, being in a polygamous relationship, and not being married. Furthermore, women who reported not receiving social support from others regarding their HIV status were less likely to have disclosed to their male partners. These relationship characteristics represent barriers to HIV status disclosure by PWLHIV, and can be used by healthcare providers and lay counselors to provide targeted counseling messages in clinic visits and disclosure support groups.

Previous studies show that women who do not know their male partner's HIV status are less likely to disclose their own status. Since none of the women in our sample were aware of their partner's HIV status, we could not assess this association. However in this study, women who did not know if their partner had ever tested for HIV were less likely to disclose their status. Qualitative studies show that a male partner's unwillingness to test and/or disclose his HIV status are barriers to a woman's disclosure of her HIV infection, in part reflecting fear from both men and women of being blamed for bringing the virus into the relationship.<sup>18</sup> These findings suggest that interventions to increase HIV testing among male partners may help facilitate women's disclosure. One potential strategy to increase men's testing uptake is HIV self-testing (HIVST), which can serve as a discrete alternative to facility-based testing. HIVST may overcome men's barriers to facility testing, including time and transport costs, stigma, and confidentiality concerns. A study in Malawi found that HIVST achieved 76% testing coverage among men and was reported as the preferred option for future HIV testing.<sup>19</sup>

In particular, secondary distribution of HIV self-test kits (HIVST) from pregnant women to male partners is a strategy that can be implemented in antenatal settings to increase the proportion of partners who learn their HIV status. In a study in Kenya, 91% of pregnant women attending ANC reported successfully distributing HIVST kits to their partners, which increased couples testing and disclosure as well as safer sexual behaviors.<sup>20</sup> However, HIV testing outcomes among men in this study were ascertained by self-report via their female partner. Further, most of the women were HIV-negative so disclosure of their HIV status was not a barrier to delivery of HIVST to their partners. More studies are needed to evaluate HIVST distribution and male testing outcomes among women living with HIV.

Our finding that women who do not have their own income are less likely to disclose their HIV status is consistent with previous studies.<sup>2,10</sup> Women are particularly vulnerable during pregnancy, since relationship separation, physical and financial abuse, economic vulnerability, and social stigma could severely impact their wellbeing and ability to care for their children.<sup>18</sup> Women who earn their own income may be less concerned with potential loss of financial security in the case of relationship dissolution and therefore may be more likely to disclose. Messaging that ART restores one's health and eliminates transmission to sexual partners when used with high adherence, such as "U=U or undetectable is uninfected" may reduce the probability of relationship dissolution by alleviating men's concerns that they may become infected with HIV from their female partner. This can facilitate women's disclosure, and increase men's support of their partners' ART adherence. However, there remains a widespread lack of awareness of the U=U concept across SSA.<sup>21</sup> In a qualitative study conducted in Kenya, many health providers reported lacking confidence to counsel people on the U=U concept and also feared it would encourage people to engage in multiple sexual partnerships.<sup>21</sup> Strategies to help healthcare providers, individuals and communities understand the protection from viral suppression are needed in order to optimize the effectiveness of U=U messaging. Furthermore, implementing peer support groups for women to gain insight on effective strategies they used to disclose their HIV status can increase women's confidence and motivation to share their HIV status with their partner. Peer support groups have been shown to improve retention in care, ART access, ART adherence, HIV-related somatic and mental health symptoms, and have become a hallmark of successful PMTCT programs.<sup>22</sup>

We find that women in polygamous relationships were less likely to disclose than women in monogamous relationships, which may indicate that women feel less secure in a polygamous

relationship, and warrants further research. The association between polygamy and HIV is not well studied in Africa, where polygamy is legal in several countries. In Uganda where this study was conducted, there are no restrictions to the number of wives a man can have in a union,<sup>23</sup> and a greater proportion of men have multiple sexual relationships than women.<sup>24</sup> Approximately 30% of our study population of PWLHIV reported being in a polygamous relationship (over triple the national average of 8%)<sup>25</sup>, polygamy should be studied as a potential contributing factor for HIV transmission in addition to concurrent or extra-marital relations.<sup>26</sup>

Limitations of this study include the cross-sectional analysis of baseline data, which limits causal inferences and assessment of temporality between HIV status disclosure and explanatory variables. In addition, women in this sample were recruited from a clinical trial and may not be fully representative of the general population of PWLHIV. The study enrolled pregnant women with a partner of unknown status, so these observations are not generalizable to women who already know their partner's status. Women at risk of intimate partner violence were excluded from participation, and thus it is not possible to assess the association of past HIV status disclosure with intimate partner violence. Women were not questioned if their partner had tested before or after she was diagnosed with HIV, or whether women who had disclosed their status to their male partner had intentionally disclosed or if it was accidental or forced, as a result of finding her pills or being told by someone else.

In conclusion, we found that relationship characteristics, including duration of relationship and polygamy, as well as lack of knowledge about partner HIV testing history were associated with HIV status non-disclosure. Since non-disclosure by PWLHIV can lead to poorer clinical outcomes for both mothers and infants<sup>10</sup>, it is crucial to assess factors associated with disclosure to inform targeted interventions for PWLHIV in PMTCT programs. However, disclosure of HIV status is a complex challenge and some PWLHIV may not realistically be able to disclose their status to their male partners due to relationship power imbalances and fear of abandonment. Interventions to promote HIV status disclosure should monitor for adverse events including intimate partner violence and relationship dissolution and provide individual and couples counseling to mitigate potential negative impacts of HIV status disclosure. Qualitative research is needed to understand women's perspectives, including barriers and facilitators of HIV status disclosure to their male partners. Interventions that facilitate male partner testing and mutual disclosure, messaging to prevent relationship dissolution in serodiscordant couples (i.e. U=U), and provision of peer support groups or peer leaders may provide women tools to safely disclose.

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## **TABLES**

**Table 1:** Socio-demographics, relationship characteristics, and HIV history of PWLHIV who have and have not disclosed their HIV status to their male partner of unknown status, at the time of study enrollment

	<b>Disclosed (N=159)</b>	<b>Undisclosed (N=341)</b>
<b><u>SOCIO-DEMOGRAPHICS</u></b>		
<b>Age</b>		
<25	55 (34.6)	116 (34.0)
25-29	56 (35.2)	120 (35.2)
30+	48 (30.2)	105 (30.8)
<b>Highest education level</b>		
<7 <sup>th</sup> grade	52 (32.7)	115 (33.7)
7 <sup>th</sup> grade – 12 <sup>th</sup> grade	78 (49.1)	159 (46.6)
Higher education	29 (18.2)	67 (19.7)
<b>Employment status</b>		
Unemployed	82 (51.5)	155 (45.5)
Salaried	9 (5.7)	31 (9.1)
Self-employed	51 (32.1)	126 (36.9)
Regular hourly work	9 (5.7)	23 (6.7)
Irregular hourly work	8 (5.0)	6 (1.8)
<b>Has an individual income</b>	<b>48 (30.2)</b>	<b>70 (20.5)</b>
<b>Number of household members</b>		
0-1	3 (1.9)	18 (5.3)
2-4	128 (80.5)	282 (82.7)
5+	28 (17.6)	41 (12.0)
<b>Possible clinically significant depression <sup>a</sup></b>	<b>0 (0.0)</b>	<b>12 (3.5)</b>
<b><u>HIV AND ANTENATAL HISTORY</u></b>		
<b>Number of previous live births</b>		
0	22 (13.8)	67 (19.7)
1-2	86 (54.1)	190 (55.7)
3+	51 (32.1)	84 (24.6)
<b>Knew she was HIV+ in last pregnancy</b>		
Yes	83 (52.2)	127 (37.2)
No	45 (28.3)	112 (32.9)
Does not know or no answer	31 (19.5)	102 (29.9)
<b>Knew she was HIV+ when she became pregnant with this baby</b>	<b>107 (67.3)</b>	<b>185 (54.3)</b>
<b>Time since starting ART</b>		
Less than a year ago	68 (42.7)	178 (52.2)
1-3 years ago	36 (22.7)	78 (22.9)
4+ years ago	52 (32.7)	77 (22.6)

Missing	3 (1.9)	8 (2.3)
<b>Started ART before learning about this pregnancy</b>	106 (66.7)	181 (53.1)
<b>Current pregnancy trimester</b>		
Third trimester	81 (50.9)	171 (50.1)
Second trimester	66 (41.5)	154 (45.2)
First trimester	12 (7.5)	16 (4.7)
<b>Currently on ART</b>	156 (98.1)	322 (94.4)
<b>Self-reported ART adherence</b>		
Poor to fair	30 (18.9)	56 (16.4)
Good to excellent	122 (76.7)	235 (68.9)
No answer	7 (4.4)	50 (14.7)
<b>Most people who know her status provide support to her adherence</b>		
Agree	130 (81.8)	192 (56.3)
Disagree	28 (17.6)	130 (38.1)
No answer	1 (0.6)	19 (5.6)
<b><u>RELATIONSHIP CHARACTERISTICS</u></b>		
<b>Age difference (years)</b>		
She is older than him or they are the same age	16 (10.1)	51 (15.0)
He is 1-4 years older than her	47 (29.6)	109 (32.0)
He is 5-9 years older than her	52 (32.7)	79 (23.1)
He is 10+ years older than her	32 (20.1)	56 (16.4)
Missing	12 (7.5)	46 (13.5)
<b>Length of relationship (years)</b>		
<1	17 (10.7)	48 (14.1)
1-4	70 (44.0)	199 (58.4)
5-9	51 (32.1)	69 (20.2)
10+	21 (13.2)	25 (7.3)
<b>Being married</b>	151 (95.0)	285 (83.6)
<b>Relationship is:</b>		
Monogamous	122 (76.7)	213 (62.5)
Polygamous	33 (20.8)	114 (33.4)
No answer	4 (2.5)	14 (4.1)
<b>Reports that partner has had HIV test in the past</b>		
Yes	70 (44.0)	63 (18.5)
No	52 (32.7)	137 (40.2)
Don't know	37 (23.3)	141 (41.3)
<b>Experiences at least one form of abuse in relationship<sup>b</sup></b>	24 (15.1)	37 (10.9)
<b>Partner has more power than her on whether to use condoms</b>	90 (56.6)	150 (44.0)

<sup>a</sup> Presents symptoms suggestive of depression as calculated using a Mental Health Score, defined as having reported little interest or pleasure in doing things, feeling down, depressed, and hopeless.

<sup>b</sup> Experiencing abuse was defined as having reported at least one of the following: verbal abuse, economic abuse, being threatened, kicked, slapped, or forced into sex.

<sup>c</sup> Elevated relationship power scale was defined as having reported that male partner has more control than she does in at least one of the following: making important decisions that affect the relationship, whether or not to have sex, and whether or not condoms are used.

**Table 2:** Relationship characteristics and associations with HIV status non-disclosure

	Frequency of Non-Disclosure	PR (95% CI)	P-value	Adjusted PR <sup>a</sup> (95% CI)	P-value
<b>Length of relationship (years)</b>					
<1	48/65 (73.8)	<b>1.30 (1.07-1.59)</b>	<b>0.008</b>	<b>1.25 (1.02-1.54)</b>	<b>0.001</b>
1-4	199/269 (74.0)	<b>1.31 (1.12-1.52)</b>	<b>&lt;0.001</b>	<b>1.29 (1.11-1.50)</b>	<b>0.037</b>
5+	94/166 (56.6)	Ref		Ref	
<b>Relationship type</b>					
Married	285/436 (65.4)	Ref		Ref	
Live-in partner or other	56/64 (87.5)	<b>1.34 (1.01-1.78)</b>	<b>&lt;0.001</b>	<b>1.20 (1.07-1.35)</b>	<b>0.002</b>
<b>Relationship is:</b>					
Monogamous	213/325 (65.5)	Ref		Ref	
Polygamous	114/147 (77.6)	<b>1.22 (1.08-1.37)</b>	<b>0.001</b>	<b>1.21 (1.07-1.36)</b>	<b>0.002</b>
No answer	14/18 (77.8)	1.22 (0.94-1.59)	0.13	1.12 (0.84-1.47)	0.45
<b>Reports that partner has had HIV test in the past</b>					
Yes	63/133 (47.4)	Ref			
No	137/189 (72.5)	<b>1.53 (1.25-1.87)</b>	<b>&lt;0.001</b>	<b>1.46 (1.20-1.77)</b>	<b>&lt;0.001</b>
Don't know	141/178 (79.2)	<b>1.67 (1.38-2.03)</b>	<b>&lt;0.001</b>	<b>1.55 (1.28-1.88)</b>	<b>&lt;0.001</b>
<b>Partner has more power than her on whether to use condoms</b>					
Yes	150/240 (62.5)	Ref		Ref	
No	191/260 (73.5)	<b>1.18 (1.04-1.33)</b>	<b>0.009</b>	<b>1.17 (1.04-1.31)</b>	<b>0.008</b>
<b>Knew she was HIV+ in last pregnancy</b>					
Yes	127/210 (60.5)	Ref		Ref	
No	112/157 (71.3)	<b>1.18 (1.02-1.37)</b>	<b>0.028</b>	1.07 (0.92-1.24)	0.365
Does not know or no answer	102/133 (76.7)	<b>1.27 (1.10-1.46)</b>	<b>0.001</b>	<b>1.17 (1.01-1.36)</b>	<b>0.038</b>
<b>She receives adherence support from people aware of her status</b>					
Agree	192/322	Ref		Ref	
Disagree	130/158	<b>1.38 (1.10-1.72)</b>	<b>&lt;0.001</b>	<b>1.32 (1.18-1.49)</b>	<b>&lt;0.001</b>
No answer	19/20	<b>1.59 (0.99-2.55)</b>	<b>&lt;0.001</b>	<b>1.56 (1.36-1.78)</b>	<b>&lt;0.001</b>

<sup>a</sup> Adjusted for age, employment status, education level, individual income, and for each other.