



# Disclosure Events and Psychosocial Well-Being Among Young South African Adults Living with HIV

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## Abstract

**Background** Poor psychological well-being is both prevalent among South Africans living with HIV and has been associated with poor HIV clinical outcomes. However, the relationship between disclosure and psychological well-being remains unclear. This analysis sought to examine the relationship between two disclosure-related variables, disclosure status and reaction received, and psychosocial well-being among a sample of young adults living with HIV (YALWH) in urban South Africa.

**Method** This was a secondary analysis using observational data from Standing Tall, a randomized controlled trial that recruited 100 participants ages 18–24 who tested positive for HIV after initially presenting to two well-established mobile clinics for HIV testing. Interviews investigating primary and secondary outcomes of interest were done at baseline and 6 months following recruitment.

**Results** About half (51%) of participants disclosed their HIV status within 6 months after recruitment. Simple linear regression analyses revealed that disclosure of HIV status within 6 months after study enrollment predicted significantly lower levels of disclosure concerns and internalized stigma ( $p < 0.05$ ). Reactions to disclosure were not significantly associated with any of the measures of psychosocial well-being considered in this analysis ( $p > 0.05$ ).

**Conclusion** The results suggest that the act of disclosure among newly diagnosed YALWH may be associated with reductions in internalized stigma. In addition, the finding that the act of disclosure may be a more important determinant of psychosocial well-being than the reaction to disclosure has important implications for interventions designed to promote disclosure and psychosocial well-being in YALWH.

**Keywords** Antiretroviral adherence · Disclosure · Stigma · Psychosocial outcomes · HIV/AIDS · YALWH

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## Introduction

With 8.5 million people affected and over 150,000 new infections per year, South Africa's HIV epidemic is by far the largest in the world [1]. This high burden of disease falls largely on adolescents and young adults, who account for both a disproportionate percentage of new infections [2, 3] and a persistently high HIV-related mortality [4]. Moreover, despite ostensible access to the world's largest antiretroviral (ART) program, young adults living with HIV (YALWH) often face both significant difficulties in adhering to their ART [5–7] as well as high levels of psychological distress [8, 9].

Poor psychological well-being, including major depression and high levels of internalized stigma, is both prevalent among people living with HIV (PLWH) [10–13], and associated with reduced adherence to antiretroviral therapy (ART) [14–18], including among young South Africans [19, 20]. Indeed, several past studies have highlighted significant associations between psychosocial constructs, such as levels of self-efficacy, depressive symptoms, and HIV-related stigma, and clinically relevant markers such as CD4<sup>+</sup> T lymphocyte count and HIV viral load [21–25]. While the relationship between psychosocial well-being and clinical markers of HIV disease management is likely to be partially mediated by nonadherence to ART [25–29], there has been conflicting data with regard to risk factors, such as an individual's disclosure experience, that might contribute to suboptimal psychosocial well-being in PLWH [22, 30–32].

Disclosure has been previously identified as a factor that might be associated with both adherence to ART and depression, anxiety, and internalized stigma in PLWH [17, 18, 31, 33–35]. However, past findings on associations between the intentional disclosure of one's serostatus and psychosocial well-being have been mixed. In fact, while several studies have suggested a positive relationship between disclosure and psychosocial outcomes such as self-esteem [36], improved psychosocial well-being [37], and self-efficacy [24], others have pointed toward a more mixed or even negative association [33, 38–41]. Moreover, relatively few studies have interrogated how the nature of the disclosure event, such as the type of reaction a person receives, might differentially affect the theorized relationship between disclosure status and psychosocial well-being. Consequently, the exact relationship between the disclosure of one's HIV status and key psychosocial outcomes remains inconclusive, including in the context of urban South Africa.

The disclosure processes model (DPM) provides one framework for understanding how disclosure of a stigmatized identity, such as HIV status, might yield both

psychosocial benefits and harms via multiple unique but integrated mediating processes [42]. In particular, the DPM predicts that disclosure may promote psychological and physiological well-being when certain favorable conditions are met, that is, when disclosure alleviates the psychological stress associated with inhibition, aligns with an individual's focus on achieving positive relationships with others, and improves one's capacity to receive social support. In addition, the DPM holds that certain characteristics of the disclosure event, such as the confidant's reaction, the depth of the disclosure event, and the emotional content of the act, may all shape the long-term consequences of disclosure. Taken in the context of our study population of young South African adults recently diagnosed with HIV, the DPM thus suggests that disclosure can engender psychological well-being when specific outcomes, such as a positive reaction by the confidant, are achieved.

Young adults who possess a stigmatized identity such as HIV serostatus may also be uniquely vulnerable to negative experiences of disclosure-related stigma as compared to the older adults [43, 44]. Thus, it is critical to understand how disclosure in this specific population relates to psychosocial well-being which in turn impacts one's ability to adhere to medications. Specifically, this secondary analysis of a larger randomized controlled trial sought to illuminate the manner in which two disclosure-related constructs, the presence of disclosure and the reaction received by the individual disclosing, are associated with measures of psychosocial well-being in South African YALWH. Based on the DPM's premise that disclosure can improve social support and alleviate psychosocial stress, it was hypothesized that relative to those who did not disclose, those that did would have better psychosocial well-being, such as lower disclosure concerns, depression, and internalized, enacted, and anticipated stigma. In addition, since the characteristics of the disclosure event are thought to partially mediate the impact of disclosure on well-being, it was hypothesized that among those who disclosed, disclosure events in which an individual received a positive reaction were expected to have a beneficial impact on indicators of psychosocial well-being compared to disclosure events that were negatively received.

## Methods

### Participants

This secondary analysis utilizes data from Standing Tall, a randomized controlled trial that recruited 100 participants ages 18–24 who tested positive for HIV after initially presenting to two well-established mobile clinics for HIV testing. Baseline interviews investigating primary and

secondary outcomes of interest were conducted at time of study enrollment and at 6 months following recruitment. Those randomized to the treatment arm were enrolled into a 1-month, weekly sociobehavioral peer-based intervention meant to improve ART initiation by improving HIV and ART education and fostering goal setting to start treatment. Those randomized to the treatment as usual arm were immediately referred for ART at a local clinic.

To be eligible for participation in the parent study, individuals had to be ART naive, speak English and/or isiXhosa, and reside in the Cape Town, South Africa metro area. Women who were currently pregnant, positive with HIV and TB, and persons under the age of 18 were excluded from the parent study.

## Measures

### Baseline Demographic Characteristics

Demographic characteristics were collected in the baseline survey and included reported gender identity (female, male, other), school level (completed high school, did not complete high school), employment status (employed, unemployed), and living status (living alone, living with others). In this analysis, baseline levels of health knowledge were measured using total scores from a 4-item scale developed by Bogart et al. [45] in which responses to all items ranged from 1 (“strongly disagree”) to 5 (“strongly agree”), with 1 reflecting the correct answer for each item.

### Primary Predictors: Disclosure Status and Disclosure Reaction

In this analysis, self-reported disclosure data at the 6-month time point were used to stratify study participants based on two sets of dichotomous predictor variables. First, all study participants were classified into two groups according to disclosure status (disclosure/non-disclosure). Participants were stratified based on their responses to the following two questions: “Have you told any person in your household that you are HIV-positive?” and “Have you told any person outside of your household that you are HIV-positive?” Participants who responded “yes” to at least one of these questions were classified into the disclosure group whereas participants who responded “no” to both questions were classified into the non-disclosure group.

Subsequently, all participants who reported one or more disclosure events at the 6-month follow-up were then further dichotomized into two groups according to the reaction they received when disclosing their HIV status (positive/negative disclosure reaction). Specifically, participants who reported disclosure were stratified based on their answers to the following question: “How did they [the person you disclosed

to] react when you told them you are HIV-positive?” Participants who reported that at least one person reacted by “feeling sad,” “being angry,” “feeling surprised or shocked,” “being afraid of me,” “having no reaction,” or “feeling afraid of me” were classified as having a negative disclosure experience. Those that reported that the person(s) to whom they disclosed reacted by “being supportive and understanding” or “being caring and sympathetic” were classified as having a positive disclosure experience.

## Study Outcomes

Five psychosocial outcomes were assessed at the 6-month time point:

1. *Self-Reported Depression.* The 9-item Patient Health Questionnaire (PHQ-9) was used to measure the severity of depressive symptoms at the 6-month post-enrollment time point. The PHQ-9 has validity and reliability when used in PLHA in sub-Saharan Africa [46]. The 9 items reflect symptoms assessed in the diagnosis of clinical depression. Responses to each item ranged from 0 (“not at all”) to 3 (“nearly every day”). Summed item scores of 5–9 reflect minor depression, whereas a score of 10 or greater correlates significantly with major depression [47]. In analyses, we utilized both the continuous PHQ-9 total score and a binary variable representing the presence of at least moderate depression ( $\text{PHQ-9} \geq 10$ ). Cronbach’s alpha for this 9-item scale was 0.883.
2. *Self-Reported Generalized Anxiety.* The 7-item Generalized Anxiety Disorder (GAD-7) was utilized to identify generalized anxiety disorder (GAD) and assess the severity of symptoms associated with GAD. The GAD-7 has demonstrated construct validity and reliability when used in the South African context [48]. Responses to each item ranged from 0 (“not at all”) to 3 (“nearly every day”), with total scores ranging from 0 to 21. Summed GAD-7 scores  $\geq 10$  have demonstrated specificity and sensitivity in identifying cases of GAD [49]. This cutoff was used to create a binary variable representing the presence of at least moderate generalized anxiety. Continuous GAD-7 scores were also utilized in some analyses. Cronbach’s alpha for this 7-item scale was 0.851.
3. *Individual Self-Esteem.* The Rosenberg Self-Esteem Scale (RSES) was used to evaluate individual self-esteem. The 10 items reflect measures of both positive and negative feelings about the self [50]. All items are answered using a 4-point Likert scale format with scores ranging from strongly disagree (1 point) to strongly agree (4 points). Five of the items, reflecting measures of negative feelings about the self, are reverse scored and summed with the positive feelings items to create a total score. In our analyses, we used total RSES scores

as a continuous outcome variable, with higher scores reflecting higher self-esteem. Cronbach's alpha for this 10-item scale was 0.882.

4. *Disclosure Concerns.* In this study, a 7-item measure adapted from the disclosure concerns subsection of the HIV Stigma Scale (HSS) was utilized to assess the degree of concern or worry with regard to disclosing one's HIV status. Responses to each item were dichotomous ranging from 1 ("no") to 2 ("yes"). Total scores ranged from 7 to 14, with higher scores reflecting a greater degree of concern with respect to disclosure of one's HIV status. Cronbach's alpha for this 7-item scale was 0.959.
5. *Stigma.* This study utilized the HIV Stigma Framework Scale developed by Earnshaw et al. [51] to quantify the degree to which three distinct mechanisms of stigma (internalized, anticipated, and enacted) manifest in the lives of participants living with HIV. The internalized stigma scale consisted of 6 items, whereas both the anticipated and enacted stigma scales consisted of 9 items. Responses to all items ranged from 1 ("strongly disagree") to 5 ("strongly agree"), with higher scores on each scale reflecting a greater degree of internalized, anticipated, or enacted stigma. In this secondary analysis, total stigma scores for each mechanism were used as continuous outcome variables. Cronbach's alpha for this 24-item scale was 0.916.

## Covariates

In regression analyses, covariates were selected based on directed acyclic graph analysis. Covariates included in gender (female, male [reference]), baseline GAD-7 scores, baseline PHQ-9 scores, and baseline internalized stigma, anticipated stigma, and enacted stigma scores.

## Statistical Analyses

First, we examined the study participants' disclosure characteristics descriptively. We then performed chi-square tests and independent sample *t*-tests using disclosure/non-disclosure as one grouping variable and positive disclosure/negative disclosure as a second grouping variable. Subsequently, two separate linear regression analyses were conducted to examine the association of two dichotomous predictor variables (disclosure vs. no disclosure [reference]; negative vs. positive disclosure [reference]) with six continuous psychosocial outcomes. Both sets of regression analyses controlled for gender, baseline GAD-7 scores, baseline PHQ-9 scores, and baseline internalized, anticipated, and enacted stigma. All analyses were conducted using SPSS 28.0.1.1.

## Results

### Sample and Disclosure Characteristics

All 100 participants identified as Black African and nearly all participants (98%) spoke isiXhosa as their home language. Ninety percent of participants identified as female. The ages of participants at baseline ranged from 18 to 24 (mean, 21.18; SD = 1.96). Eighty-one percent of participants reported being unemployed at baseline. Fifty-six percent of participants reported completing at least grade 12 and/or some secondary education. In this sample, levels of depression and anxiety as defined by PHQ-9 and GAD-7 scores were low, with only 7% and 3% demonstrating moderate-to-severe depressive and moderate anxiety symptoms at baseline, respectively, and 0% demonstrating these symptoms at 6 months.

Six months following their initial HIV testing and baseline interviews, 51% of participants reported disclosing to at least one individual (Table 1), with 20% reporting two or more disclosures. Of these participants who had disclosed by the 6-month time point, 27 reported a positive disclosure experience, defined as having had all disclosures met by reactions that were either "supportive and understanding" or "caring and sympathetic." On the other hand, 24 participants who disclosed were defined as having a negative-mixed disclosure experience, or a history characterized by at least one reaction that was "sad," "angry," ambivalent ("no reaction"), or "afraid" within 6 months after testing. Of participants who did disclose, 49 reported disclosing to someone with

**Table 1** Disclosure characteristics at 6 months ( $N=100$ )

Disclosure type at 6 months	<i>N</i>
<b>Disclosed</b>	<b>51</b>
<b>Did not disclose</b>	<b>49</b>
<b>Positive disclosures</b>	<b>27</b>
<b>Negative-mixed disclosures</b>	<b>24</b>
<b>Inside home</b>	<b>49</b>
Spouse/partner	3
Child	0
Sibling	4
Parent	42
Grandparent	1
Non-relative	0
Other relative	0
<b>Outside home</b>	<b>22</b>
Other family member(s)	4
Friend	14
Neighbor	0
Church leader	1
Colleague	1
Community elder	0
Other	2

whom they lived, most often (85.7%) a parent, whereas 22 disclosed to someone outside the home.

### Disclosure Status and Reaction and Associated Characteristics

Table 2 depicts the comparison between groups who disclosed ( $n = 51$ ) and those who did not disclose at 6 months ( $n = 49$ ) in relation to selected baseline characteristics as well as baseline characteristics of the entire group of newly

diagnosed young adults. Chi-square tests revealed no significant associations between dichotomous baseline characteristics such as gender, employment status, school level, and living status and disclosure status (yes or no). In our independent sample  $t$ -test analyses, however, there was a significant difference in mean internalized and enacted stigma between those who reported disclosures and those that did not, with those reporting no disclosures at six months expressing significantly greater degrees of internalized and enacted stigma at baseline ( $p < 0.05$ ).

**Table 2** Baseline characteristics of patients by disclosure status (Yes/No;  $N = 100$ )

Sociodemographic Characteristics at Baseline	Disclosing group at 6 months ( $n = 51$ )	Non-disclosing group at 6 months ( $n = 49$ )	Both groups ( $n = 100$ )	$p$ -value
<b>Mean age, years (SD)</b>	21.02 (1.954)	21.35 (1.974)	21.18 (1.961)	$P = 0.407$
<b>Gender Identity</b>				
Male	3 (5.9%)	7 (14.3%)	10 (10.0%)	$P = 0.161$
Female	48 (94.1%)	42 (85.7%)	90 (90.0%)	
<b>Employment Status</b>				
Employed	9 (17.6%)	10 (20.4%)	19 (19.0%)	$P = 0.725$
Unemployed	42 (82.4%)	39 (79.6%)	81 (81.0%)	
<b>Education Level</b>				
Did not complete high school	18 (35.3%)	26 (53.1%)	44 (44.0%)	$P = 0.724$
Completed high school	33 (64.7%)	23 (46.9%)	56 (56.0%)	
<b>Living Status</b>				
Living alone	8 (15.7%)	7 (14.3%)	15 (15.0%)	$P = 0.845$
Living with others	43 (84.3%)	42 (85.7%)	85 (85.0%)	
<b>HIV Knowledge at Baseline</b>				
Mean Score (SD)	5.80 (2.94)	5.37 (2.69)	5.59 (2.81)	$P = 0.441$
<b>Disclosure Concerns</b>				
Mean Score (SD)	12.65 (2.31)	13.10 (1.91)	12.87 (2.12)	$P = 0.207$
<b>Depression (PHQ-9 Scores)</b>				
Mean Score (SD)	4.66 (4.49)	4.35 (3.93)	4.51 (4.22)	$P = 0.713$
< 10 on PHQ-9 (Minimal to mild depression)	46	46	92 (92.93%)	
≥ 10 on PHQ-9 (Moderate to severe depression)	4 <sup>a</sup>	3	7 (7.07%)	$P = 0.716$
<b>Generalized Anxiety (GAD-7 scores)</b>				
Mean score (SD)	3.62 (3.04)	3.97 (2.99)	3.79(3.02)	
< 10 on GAD-7 (Minimal to mild anxiety)	49	47	96 (96.97%)	$P = 0.554$
≥ 10 on GAD-7 (Moderate to severe anxiety)	1 <sup>a</sup>	2	3 (3.03%)	$P = 0.546$
<b>Internalized Stigma</b>				
Mean Score (SD)	17.49 (4.51)	19.35 (4.31)	18.40 (4.41)	$P = 0.033^*$
<b>Anticipated Stigma</b>				
Mean Score (SD)	20.33 (7.32)	21.84 (5.21)	21.07 (6.37)	$P = 0.241$
<b>Enacted Stigma</b>				
Mean Score (SD)	19.69 (6.31)	22.48 (7.80) <sup>a</sup>	21.04 (7.07)	$P = 0.026^*$
<b>Self-esteem (Rosenberg Self-Esteem Scale, REES)</b>				
Mean Score (SD)	20.20 (2.60)	20.55 (1.54) <sup>a</sup>	20.37 (2.15)	$P = 0.411$
<b>Community Support</b>				
Mean Score (SD)	11.31 (4.03)	10.41 (4.23)	10.87 (4.13)	$P = 0.27$

\*Results were statistically significant by chi-square or  $t$ -test analysis,  $p < 0.05$

<sup>a</sup>Participants with missing data ( $N = 1$ ) were excluded from the analysis

When disclosure reaction (positive or negative) was considered, chi-square analyses produced no significant associations between categorical baseline characteristics, such as gender, employment, education level, and living status and the reaction received to disclosure. However, the mean anticipated and enacted stigma scores at baseline were significantly lower among those who had a negative reaction to disclosure at 6 months as compared to those who reported a completely positive reaction to disclosure ( $p < 0.05$ ). Thus, compared to those that subsequently experienced negative disclosures, those who experienced positive disclosures had

endorsed significantly greater degrees of reported enacted and anticipated stigma immediately after testing positive for HIV (Table 3).

### Disclosure Status and Reaction as Factors Influencing Psychosocial Outcomes

Table 4 depicts the results of the simple linear regression analyses examining the association between the dichotomous disclosure status variable (yes/no) and the eight continuous psychosocial outcomes. Each linear regression analysis

**Table 3** Baseline characteristics of patients by reactions to disclosure (positive/negative;  $N = 51$ )

Sociodemographic characteristics at baseline	Positive disclosure ( $n = 27$ )	Negative disclosure ( $n = 24$ )	$p$ -value
<b>Mean age, years (SD)</b>	20.67 (2.08)	21.42 (1.77)	$P = 0.174$
<b>Gender identity</b>			
Male	2 (7.4%)	1 (4.2%)	$P = 0.623$
Female	25 (92.6%)	23 (95.8%)	
<b>Employment status</b>			
Employed	22 (81.5%)	20 (83.3%)	$P = 0.863$
Unemployed	5 (18.5%)	4 (16.7%)	
<b>Education level</b>			
Did not complete high school	8 (29.6%)	10 (41.7%)	$P = 0.369$
High school or above	19 (70.4%)	14 (58.3%)	
<b>Living status</b>			
Living alone	6	2	$P = 0.173$
Living with others	21	22	
<b>Depression (PHQ-9 scores)</b>			
Mean score (SD)	4.77 (4.62)	4.54 (4.44)	
<10 on PHQ-9 (minimal to mild depression)	24	22	$P = 0.860$
≥10 on PHQ-9 (moderate to severe depression)	2 <sup>a</sup>	2	$P = 0.933$
<b>Generalized anxiety (GAD-7 scores)</b>			
Mean score (SD)	3.19 (2.79)	4.08 (3.28)	
<10 on GAD-7 (minimal to mild anxiety)	26	23	$P = 0.305$
≥10 on GAD-7 (moderate to severe anxiety)	0 <sup>a</sup>	1	$P = 0.293$
<b>HIV knowledge at baseline</b>			
Mean score (SD)	5.52 (2.85)	6.13 (3.07)	$P = 0.468$
<b>Disclosure concerns</b>			
Mean score (SD)	12.52 (2.31)	12.79 (2.34)	$P = 0.677$
<b>Internalized stigma</b>			
Mean score	17.15 (5.36)	17.88 (6.07)	$P = 0.652$
<b>Anticipated stigma</b>			
Mean score	22.00 (9.33)	18.46 (3.31)	$P = 0.037^*$
<b>Enacted stigma</b>			
Mean score (SD)	21.48 (7.71)	17.67 (3.35)	$P = 0.025^*$
<b>Self-esteem (Rosenberg Self-Esteem Scale, REES)</b>			
Mean score (SD)	20.37 (3.36)	20.00 (1.35)	$P = 0.617$
<b>Community support</b>			
Mean score (SD)	11.19 (3.75)	11.46 (4.40)	$P = 0.81$

\*Results were statistically significant by chi-square or  $t$ -test analysis,  $p < 0.05$

<sup>a</sup>Participants with missing data ( $N = 1$ ) were excluded from the analysis

**Table 4** Linear regression results for the association between disclosure (Yes/No) and psychosocial outcomes at 6 months ( $N=100$ )

Outcome variable	Intercept	Beta for disclosure status (Y/N)	SE	95% CI for beta	$R^2$	$T$ value	$p$ -value
<b>PHQ-9</b>	-3.282	0.747	0.478	(-0.203, 1.696)	0.109	1.563	0.122
<b>GAD-7</b>	-2.813	0.554	0.425	(-0.292, 1.399)	0.128	1.301	0.197
<b>RSES scores</b>	20.365	0.247	0.320	(-0.711, 0.558)	0.061	-0.239	0.811
<b>Disclosure concerns</b>	11.231	-1.979	0.465	(-2.903, -1.054)	0.283	-4.251	<0.001*
<b>Enacted stigma</b>	18.029	0.995	0.958	(-0.908, 2.898)	0.147	1.039	0.301
<b>Anticipated stigma</b>	22.883	0.429	1.136	(-1.827, 2.685)	0.078	0.378	0.706
<b>Internalized stigma</b>	13.123	-2.186	0.931	(-4.035, -0.336)	0.161	-2.348	0.021*

\*Results were statistically significant,  $p < 0.05$

adjusted for potential confounders, including gender, baseline GAD-7 scores, baseline PHQ-9 scores, and baseline internalized stigma, anticipated stigma, and enacted stigma scores. Disclosure status was a significant predictor of lower levels of disclosure concerns and internalized stigma ( $p < 0.05$ ).

When adjusted for gender and baseline psychosocial characteristics, disclosure reaction (positive/negative) was not found to be significantly associated with any of the eight psychosocial outcomes examined in the simple regression analyses (Table 5).

## Discussion

The primary goal of this analysis was to examine the relationship between two disclosure-related predictors, disclosure status and reactions, and psychosocial well-being among a sample of YALWH in urban South Africa. The results partially confirmed our hypotheses. Simple linear regression analyses revealed that disclosure of HIV status within 6 months after study enrollment predicted significantly lower levels of disclosure concerns and internalized stigma. Unlike several other studies [52, 53], however, our

results showed that among those who disclosed their serostatus, reactions to disclosure were not significantly associated with any of the measures of psychosocial well-being considered in this analysis. That is, only disclosure status, and not the reaction received, was found to be related to psychosocial well-being in this population.

Fifty-one percent of participants in our sample reported disclosures at 6 months, a finding consistent with previous studies conducted in the South African context [54–56]. Our analysis also identified certain baseline characteristics that differed on the basis of disclosure status and/or disclosure type. However, while baseline internalized and enacted stigma scores were higher in those who disclosed at 6 months, the results of our regression analysis remained significant when these baseline characteristics were added as covariates. Taken as a whole, these results not only support previously identified associations between stigma levels and disclosure status [57], but also suggest that baseline levels of stigma do not fully explain the relationship between disclosure status and disclosure concerns and internalized stigma identified in our study.

These results contribute to the extant literature surrounding HIV self-disclosure by showing that in our sample, disclosure was associated with fewer disclosure concerns and

**Table 5** Linear regression results for the association between disclosure reactions (positive/negative) and psychosocial outcomes at 6 months ( $N=51$ )

Outcome variable	Intercept	Beta for disclosure reactions (positive/negative)	SE	95% CI for beta	$R^2$	$T$ value	$p$ -value
<b>PHQ-9</b>	-3.692	1.350	0.854	(-0.374, 3.073)	0.181	1.581	0.121
<b>GAD-7</b>	-5.014	0.890	0.768	(-0.374, 3.073)	0.159	1.159	0.253
<b>RSES scores</b>	20.126	-0.861	0.624	(-2.120, 0.398)	0.119	-1.380	0.175
<b>Disclosure concerns</b>	3.396	-0.853	0.976	(-2.822, 1.116)	0.202	-0.874	0.387
<b>Enacted stigma</b>	21.097	-1.691	1.586	(-4.893, 1.512)	0.270	-1.066	0.293
<b>Anticipated stigma</b>	23.193	0.187	1.778	(-3.401, 3.776)	0.161	0.105	0.917
<b>Internalized stigma</b>	2.129	1.362	1.266	(-1.192, 3.916)	0.263	1.076	0.288

\*Results were statistically significant,  $p < 0.05$

lower degrees of internalized stigma, a result consistent with several other previous studies in non-South African contexts [22, 37, 57]. In addition, while this analysis did not itself evaluate the relationship between disclosure and HIV clinical outcomes such as viral load or CD4 count, these findings could possibly provide context to other studies that have suggested pathways by which disclosure concerns and suboptimal psychological well-being may be associated with poorer HIV clinical outcomes [17, 18, 58–61]. However, though disclosure was not necessarily associated with some of the negative psychosocial outcomes identified in other studies [62–64], disclosure also did not have a globally positive effect. As the disclosure processes model (DPM) suggests [42], this may be because the relationship between disclosure and long-term psychological well-being is itself likely to be multiply mediated by many factors not examined in this study.

Nevertheless, this study's finding that the act of disclosure may be a more important determinant of psychosocial well-being than the reaction to that disclosure has important implications. For one, these results may lend further support for facilitating disclosure as a target for interventions [65, 66]. While the psychological risks of disclosure, including social ostracism and harm [67], must be considered, our results also suggest that internalized stigma, a clinically detrimental psychosocial outcome [68, 69], may be alleviated by the act of disclosure itself. Indeed, the fact that this positive effect of disclosure on both internalized stigma and disclosure concerns held true despite disclosure experience and baseline psychosocial characteristics is encouraging, as it suggests that some beneficial effects of disclosure may not be confined to only certain subgroups of YALWH. Contextualized within the DPM [42, 70], our results thus suggest that interventions designed to help newly diagnosed PLWH navigate the disclosure process may improve well-being and future disclosure experiences, by both reducing internalized stigma and disclosure concerns, respectively.

This study has several important limitations. First, this secondary analysis did not investigate HIV clinical outcomes such as viral load and CD4 count, and caution must be taken to avoid overinterpretation of the results in the context of these clinical measures. Moreover, questions related to stigmatized conditions, such as HIV, depression, and generalized anxiety, are often sensitive and may be influenced by social desirability bias [71, 72]. Social desirability bias, which may be particularly prevalent among the young adult population that participated in this study, could in part account for the surprisingly low rates of depressive and generalized anxiety symptoms in our sample, which were notably lower than those reported by other studies conducted among older HIV-positive adults in South Africa [73–75]. In addition, the disclosure questions used to stratify participants have not, to our knowledge,

been tested for construct validity in the South African setting. In particular, it is possible that our question asking about disclosure reactions may not have accurately measured the degree to which the reaction experience was “positive” or “negative” for the participant. Along those lines, our categorization of disclosure reactions as being either “positive” or “negative” may belie the complexity of and interaction between both the reactions received upon disclosure and the emotions experienced thereafter by individuals doing the disclosing [76].

Second, the findings of this analysis are preliminary. Though disclosure was a significant predictor of lower internalized stigma and fewer disclosure concerns in our specific sample of YALWH, the magnitude of these relationships was relatively modest. Moreover, the sample analyzed was small, particularly in the regression model examining the relationship between reactions to disclosure and psychosocial well-being. While the results of our study suggested that the reaction received during a disclosure had no significant effect on psychosocial well-being, some studies [52, 53], as well as the DPM [42, 70], do suggest mechanisms by which positive disclosures should indeed have a positive effect on outcomes in PLWH. Finally, in large part because of the small sample size, our study considered disclosure status and disclosure reaction to be dichotomous predictors, neglecting the fact that disclosure is a continuous and dynamic psychosocial process that can vary significantly both in the strategies utilized by individuals and the reactions received [77, 78]. Future research with larger samples is needed to further evaluate whether specific disclosure experiences might be protective or harmful both in terms of psychosocial and clinical well-being in PLWH.

## Conclusions

In summary, the results of this analysis indicated that in our sample of South African YALWH, disclosure status was a significant predictor of some psychosocial outcomes, including lower disclosure concerns and internalized stigma, 6 months after HIV diagnosis. These results remained significant even when baseline psychosocial characteristics were controlled for in our models. Whether an individual received a positive or negative reaction was not a significant predictor of any psychosocial outcome investigated in this study. Our findings expand the understanding of the relationship between disclosure and psychosocial outcomes known to be correlated with clinically relevant outcomes, which could be crucial in the implementation of future interventions designed to help newly positive individuals improve their psychological and physical well-being.



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## Declarations

**Ethical Approval** All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards.

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

**Conflict of Interest** The authors declare no competing interests.

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