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HIV-Related Stigma, Social Support, and Psychological Distress Among Individuals Initiating ART in Ethiopia

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Abstract

Recent World Health Organization HIV treatment guideline expansion may facilitate timely antiretroviral therapy (ART) initiation. However, large-scale success of universal treatment strategies requires a more comprehensive understanding of known barriers to early ART initiation. This work aims to advance a more comprehensive understanding of interrelationships among three known barriers to ART initiation: psychological distress, HIV-related stigma, and low social support. We analyzed cross-sectional interview data on 1175 adults initiating ART at six HIV treatment clinics in Ethiopia. Experience of each form of HIV-related stigma assessed (e.g., anticipatory, internalized, and enacted) was associated with increased odds of psychological distress. However, among those who reported enacted HIV-related stigma, there was no significant association between social support and psychological distress. Interventions to improve mental health among people living with HIV should consider incorporating components to address stigma, focusing on strategies to prevent or reduce the internalization of stigma, given the magnitude of the relationship between high internalized stigma and psychological distress. Interventions to increase social support may be insufficient to improve the mental health of people living with HIV who experienced enacted HIV-related stigma. Future research should examine alternative strategies to manage the mental health consequences of enacted HIV-related stigma, including coping skills training.

Keywords Psychological distress · Social support · Stigma · Ethiopia

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Introduction

UNAIDS has identified ambitious treatment targets of having 90% of people living with HIV (PLWH) know their HIV status, 90% of those diagnosed with HIV receiving antiretroviral therapy (ART), and 90% of those on ART virally suppressed by 2020 [1]. Despite these goals, gaps across the HIV testing and treatment cascade persist. According to 2016 estimates from UNAIDS, 70% of PLWH worldwide knew their status, 53% were on ART, and 44% were virally suppressed [2]. Delayed ART initiation and disengagement from HIV care are common, particularly in low-resource settings [3]. Drop-off between HIV diagnosis and ART initiation (i.e., affecting the second 90%) has been consistently documented, particularly in low-resource settings [4, 5]. The World Health Organization (WHO) recommendation to treat all PLWH regardless of clinical or immunological status may facilitate more timely ART initiation. Large-scale success of universal treatment strategies requires a more comprehensive understanding of known barriers to early ART initiation, ART adherence, and retention in care. This work aims to advance a more comprehensive understanding of the interrelationships among three known barriers to ART initiation or adherence: psychological distress, HIV-related stigma, and low social support among individuals initiating ART.

Mental disorders are among the most common comorbidities among PLWH across the world and are more prevalent among PLWH than in the general population [6–8]. It has been estimated that 50% of PLWH meet criteria for one or more mental or substance use disorders. Psychological distress and mental disorders have been consistently associated with suboptimal HIV treatment outcomes including late ART initiation and lack of timely viral suppression [8–12].

HIV-related stigma is also highly prevalent among PLWH and consistently associated with suboptimal HIV treatment outcomes and barriers to treatment, including non-disclosure of HIV status and poor ART adherence [13–15]. HIV-related stigma has been associated with poor mental health among PLWH, including symptoms of depression and post-traumatic stress disorder (PTSD) [16–19]. Low levels of social support have similarly been identified as a risk factor for poor engagement in HIV treatment and poor mental health among PLWH [20].

Ethiopia has a generalized HIV epidemic with 590,000 PLWH aged 15 or older, for an estimated HIV prevalence among adults of 1.1%, although estimates vary substantially across the country [21]. The Government of Ethiopia has adopted the UNAIDS 90-90-90 targets and is making progress towards attaining these goals [22]. Among Ethiopian PLWH, 67% know their HIV status, 59% have initiated ART, and 51% are virally suppressed [21]. In recent years, Ethiopia has enacted laws and regulations to prevent HIV-related stigma in various spheres, including employment, education, healthcare, and housing [23]. For example, Ethiopian law and policy prohibit mandatory employment-related HIV testing and HIV-related employment discrimination [23]. In addition, human rights protections for PLWH have been incorporated into Ethiopian HIV/AIDS policy [23]. Despite such regulations and similar to research from other countries, both PLWH and healthcare providers in Ethiopia report that HIV-related stigma persists [23]. As has been found elsewhere, high HIV-related stigma and low social support have been significantly associated with depressive symptoms among PLWH in Ethiopia [18, 24].

While psychological distress, HIV-related stigma, and low levels of social support are each independent barriers to ART initiation and adherence, the interrelationships between these three risk factors remain poorly understood, particularly among individuals enrolling in HIV care or initiating ART in low-resource settings, a population key to the successful implementation of universal test and treat strategies. The objective of this research was to investigate: (1) if HIV-related stigma or social support was associated with psychological distress, (2) if social support modified the relationship between HIV-related stigma and psychological distress, and (3) if relationships among psychological distress, HIV-related stigma and social support varied by type of stigma (e.g., anticipatory, internalized, or enacted HIV-related stigma) among individuals initiating ART in Oromia, Ethiopia.

Methods

The analysis is based on the Multilevel Determinants of Starting ART Late (LSTART) study, a prospective cohort of patients initiating ART at HIV clinics in the Oromia region of Ethiopia [25]. Participants were recruited from six public-sector HIV clinics that received support from ICAP at Columbia University through funding from the President's Emergency Plan for AIDS Relief (PEPFAR). Individuals were eligible for enrolment into the parent study if they were at least 18 years of age, initiated ART between June 2012 and April 2013, and spoke Amharic or Oromiffa. All clinics are secondary health facilities in urban areas. In-person interviews were conducted with 1,180 PLWH aged 18 or older newly initiating ART. The structured questionnaire was administered within 2 weeks of ART initiation and included questions on sociodemographics, psychological distress, HIV-related stigma, and social support. The study

was approved by the Institutional Review Boards of the Oromia Regional Health Bureau, Columbia University, and City University of New York. Written informed consent for the interview was obtained from participants prior to study enrolment.

Measures

Psychological Distress

Psychological distress was assessed with the Kessler Psychological Distress Scale (K10) [26], which has been previously validated in Ethiopia [27]. The K10 is a 10-item questionnaire designed to assess psychological distress by asking about anxiety and depressive symptoms in the past 4 weeks [26]. Scores range from 10 to 50. Scores between 10 and 16 were coded as no or low psychological distress, scores between 17 and 29 were categorized as mild or moderate psychological distress, and scores between 30 and 50 were categorized as severe psychological distress [27].

HIV-Related Stigma

Anticipatory Stigma

Study investigators knew of no scales validated in sub-Saharan Africa to measure anticipatory HIV-related stigma at the time of data collection. Thus, anticipatory stigma was assessed with 12 yes/no items created in accordance with the concept described by Earnshaw and Chaudoir (e.g., *If others know or suspect you are HIV positive, your partner might get violent; your children might be abused or discriminated against; family members might treat you differently*) (Cronbach's alpha = 0.76). A total anticipatory stigma score was constructed as the proportion of endorsed items from among all questions the participant was eligible to answer (i.e., participants without children or without a partner were not eligible to answer those respective items). Anticipatory stigma scores were categorized into tertiles based on distribution in the sample population. Formal validation of this scale is warranted and forthcoming.

Recent Internalized Stigma

Internalized stigma in the past three months was measured with the 5-item negative self-perception subscale (e.g. *You felt that you did not deserve to live, You felt that you were no longer a person)* of the HIV/AIDS Stigma Instrument, PLWHA (HASI-P) [28], developed in sub-Saharan Africa. An additional item not from this scale (*You thought someone had cursed you)* also was included. Response options ranged

from *Never* (1) to *Most of the time* (4) and were recoded so that higher scores represented higher internalized stigma (Cronbach's alpha = 0.95). Because responses on this scale were skewed (mean = 1.55, median = 1.33), responses were categorized into tertiles.

Recent Enacted Stigma

Enacted stigma in the past three months was measured with nine items selected from HASI-P [28] subscales (verbal abuse, fear of contagion, and social isolation); items inquired about how often the participant had experienced rejection due to their HIV status (e.g., *You were told that you have no future, You were told that God is punishing you, Someone stopped being your friend*), with response options ranging from *Never* (4) to *Most of the time* (1) (Cronbach's alpha = 0.99). Because the reported frequency of occurrence of all items was low, the summary measure was re-coded as a dichotomous variable with response categories of *any* recent enacted stigma and *no* recent enacted stigma.

Social Support

Social support was assessed using a scale developed by Wortman, et al. for the Coping and Change Study, a psychosocial supplement to the Chicago site of the Multicenter AIDS Cohort Study [29, 30]. Social support was assessed with nine questions concerning whether the participant has someone to: (1) talk to if upset or depressed, (2) talk about an important problem, (3) take care of her if she had to stay in bed for several weeks, (4) borrow money, get help getting to the doctor or other small immediate help, (5) borrow money for a medical emergency, (6) give information or guidance (7) ask for advice, (8) take care of her children if she got sick, and (9) accompany her to the clinic if needed. Response options for each item ranged from 1 (Definitely not) to 5 (Definitely). Scores were summed and categorized into tertiles.

Sociodemographic Characteristics

Sociodemographic variables included age, sex, education, religion, relationship status, type of living environment (i.e., urban or rural), employment status, and household food insecurity in past year. The urban/rural variable was derived by dichotomizing a self-reported three-level variable that asked participants if they lived in a rural area, the town where study site was located, or another town. Individuals who reported that they lived in a rural area were categorized as rural. Individuals who reported that they lived in the town where the study site was located or in another town were categorized as urban. Household food insecurity in the past year was assessed by asking participants how often their

households had trouble satisfying food needs in the past year. Response options included never, seldom, sometimes, often, or always.

Time Since Diagnosis

Individuals were asked when they first received their HIV diagnosis. First diagnosis within the past 90 days was categorized as recently diagnosed.

Analysis

Univariate analyses were conducted to assess the prevalence of psychological distress, HIV-related stigma, and social support. Analyses of the associations between social support, stigma, and psychological distress were conducted using Pearson Chi squared tests. Logistic regression was used to model the association of HIV-related stigma and social support with psychological distress (moderate or severe as compared to none or low). All analyses accounted for clustering by health facility using surveylogistic options of SAS Version 9.3. Based on previous literature, adjusted analyses controlled a priori for age, sex, relationship status, and time since HIV diagnosis [31, 32]. Because internalized stigma was highly correlated with anticipated (rho = 0.422, p < 0.0001) and enacted stigma (rho = 0.196; p < 0.0001), multivariable regression models were run separately to examine the relationship between each type of HIV-related stigma and psychological distress.

To test whether the association between HIV-related stigma and psychological distress was modified by social support the magnitude and statistical significance of product terms between each type of HIV-related stigma and social support were examined. Because the interaction term between enacted stigma and low social support reached statistical significance, multivariable analyses of the association between enacted stigma and psychological distress were stratified by level of social support. Effect modification was also assessed graphically by plotting mean psychological distress scores at each tertile of HIV-related stigma, stratified by tertiles of social support.

Results

Of the 1,180 participants assessed, five were missing psychological distress data and excluded from further analysis. The sociodemographic characteristics of this sample have been previously reported [25]. Briefly, the majority of the sample was female and had attended school (61.1

and 68.5%, respectively) (Table 1). Approximately half (57.1%) reported being in a relationship, and three-quarters lived in an urban setting (78.1%).

Psychological Distress

Over one-third (37.6%) of study participants were classified as having mild or moderate psychological distress at ART initiation and 29.5% were classified as having severe psychological distress at this time (Table 2).

HIV-Related Stigma

Considering anticipatory stigma, almost two-thirds (62.2%) of respondents indicated concern that people might gossip about them if they knew or suspected that they were HIV-positive. Half (52.6%) of respondents with children worried that their children might become upset or fearful if they knew or suspected that the respondent was HIV-positive and 42.8% of respondents with children reported that they were concerned that their children would be abused or discriminated against if people knew or suspected that they were HIV-positive. Internalized HIV-related stigma was also common. Approximately one-half of participants reported having felt ashamed of being HIV-positive, completely worthless, and as though they brought a lot of trouble to their family (50.4, 48.0, and 46.4%, respectively). Sixteen percent of respondents reported having experienced enacted HIV-related stigma in the preceding three months. The most common type of enacted stigma was having been told that God is punishing you, with 9.2% of respondents reporting this type of enacted stigma.

Social Support

Social support varied by scenario. Most (85.2%) participants indicated that they probably or definitely had someone who could accompany them to the clinic if necessary. Similarly, 80.0% of participants indicated that they probably or definitely had someone who could take care of their children if they got sick. Social support was lowest in relation to financial assistance. Just over half of participants reported that they probably or definitely had someone they could turn to for small, immediate help, like getting to the doctor or borrowing money (52.6%), or to borrow money specifically for a medical emergency (54.7%).

Psychological Distress, Stigma, and Social Support

Psychological distress was significantly associated with all forms of HIV-related stigma assessed (Table 2). There was a positive dose–response relationship between anticipatory stigma and psychological distress. Approximately 18.5%

Table 1 Sociodemographic characteristics and HIV-related stigma of the sample population

	Total sample (n = 1175) n (%)
Age	
18-29	374 (31.8)
30-39	479 (40.8)
40+	322 (27.4)
Sex	
Male	457 (38.9)
Female	718 (61.1)
Ever attended school[a]	
Yes	804 (68.5)
No	370 (31.5)
Highest level of school completed[a]	
None	370 (31.6)
Primary	473 (40.4)
Secondary	236 (20.1)
Tertiary	82 (7.0)
Vocational/other	11 (0.9)
Religion[a]	
Ethiopian orthodox	821 (69.9)
Protestant	238 (20.3)
Muslim	107 (9.1)
None/other	8 (0.7)
Relationship status[a]	
In a relationship	671 (57.1)
Not in a relationship	504 (42.9)
Type of living environment	
Rural	257 (21.9)
Urban	917 (78.1)
Employment status[a]	
Working for cash or in-kind	899 (76.6)
Not working for cash or in-kind	274 (23.4)
Frequency of food insecurity in past year[a]	
Never	419 (35.8)
Seldom	157 (13.4)
Sometimes	344 (29.4)
Often	239 (20.4)
Always	12 (1.0)
Health facility	
Ambo	238 (20.3)
Bishoftu	307 (26.1)
Fitche	166 (14.1)
Goba	129 (11.0)
Nekemte	194 (16.5)
Shashmene	141 (12.0)
HIV-related stigma[a]	
Enacted stigma	
None	978 (83.6)
Any	192 (16.4)

Table 1 (continued)

	Mean (Range)
Anticipatory stigma	26.88 (0–100%)
Bottom tertile (least stigma)	1.68 (0–10)
Middle tertile	22.9 (11–36)
Top tertile (most stigma)	54.9 (43–100)
Internalized stigma	1.55 (1.0–4.0)
Bottom tertile (least stigma)	1.03 (1.0–1.2)
Middle tertile	1.46 (1.3–1.7)
Top tertile (most stigma)	2.24 (1.8–4.0)

[a]Missing data by variable: Ever attended school n = 1; Highest level of school completed n = 3; Religion n = 1; Type of living environment n = 1; Employment status n = 2; Food insecurity n = 4

Table 2 Associations between HIV-related stigma, social support, and psychological distress

	Total	Psychological distress			χ^2	p value
		Low n = 386 n (%)	Moderate n = 442 n (%)	Severe n = 347 n (%)		
Anticipated stigma[a]					103.6	<0.0001
Bottom tertile (least stigma)	352 (30.0)	178 (46.1)	109 (24.7)	65 (18.8)		
Middle tertile	456 (38.8)	145 (37.6)	186 (42.1)	125 (36.1)		
Top tertile (most stigma)	366 (31.2)	63 (16.3)	147 (33.3)	156 (45.1)		
Internalized stigma[a]					340.3	<0.0001
Bottom tertile (least stigma)	468 (40.0)	258 (67.2)	161 (36.5)	49 (14.2)		
Middle tertile	308 (26.4)	104 (27.1)	138 (31.3)	66 (19.2)		
Top tertile (most stigma)	393 (33.6)	22 (5.7)	142 (32.2)	229 (66.6)		
Enacted stigma[a]					17.3	0.0002
None	978 (83.6)	340 (88.3)	373 (84.6)	265 (77.0)		
Any	192 (16.4)	45 (11.7)	68 (15.4)	79 (23.0)		
Social support					49.9	<0.0001
Bottom tertile (least support)	404 (34.4)	79 (20.5)	181 (41.0)	144 (41.5)		
Middle tertile	403 (34.3)	156 (40.4)	138 (31.2)	109 (31.4)		
Top tertile (most support)	368 (31.3)	151 (39.1)	123 (27.8)	94 (27.1)		

[a]Missing data by variable: Anticipated stigma n = 1; Internalized stigma n = 6; Enacted stigma n = 5

of those with low anticipatory stigma screened positive for severe psychological distress compared to 27.4% of those with medium and 42.6% of those with high levels of anticipatory stigma (p < 0.0001). A similar positive relationship was observed between internalized stigma and psychological distress. More than half (58.3%) of respondents with high levels of internalized stigma reported severe psychological distress compared to 21.4 and 10.5% of those with medium and low internalized stigma, respectively (p < 0.0001). Those who reported having experienced enacted HIV-related stigma had significantly higher prevalence of severe psychological distress compared to those who did not report enacted stigma (41.2 vs. 27.1%) (p = 0.0002). Social support was also significantly associated with psychological distress. Those who reported low

social support were more likely to have severe psychological distress compared to those who reported medium or high social support (35.6, 27.1, and 25.5%, respectively) (p < 0.0001).

Multivariable Analyses

In adjusted analyses, relative to those with low anticipatory stigma, odds of elevated psychological distress (moderate or severe) were highest among those with high anticipatory stigma (aOR 4.3 [95% CI 2.5, 7.2]) followed by those with medium anticipatory stigma (aOR 2.1 [95% CI 1.4, 3.3]) (Table 3). Similarly, in adjusted analyses, relative to those with low internalized stigma, odds of psychological distress were highest among those with high

Table 3 Bivariate and multivariable associations between anticipated stigma, internalized stigma, social support and psychological distress

	Psychological distress OR (95% CI)	Psychological distress[a,b] aOR (95% CI)	Psychological distress[b,c] aOR (95% CI)
	Bivariate	Multivariable	Multivariable
Anticipatory stigma			
Low	1.00	1.00	
Medium	2.21 (1.51, 3.23)*	2.11 (1.36, 3.28)*	
High	4.96 (3.08, 8.00)*	4.25 (2.51, 7.21)*	
Internalized Stigma			
Low	1.00		1.00
Medium	2.42 (1.71, 3.42)*		2.20 (1.58, 3.05)*
High	20.85 (11.57, 37.57)*		19.00 (10.70, 33.74)*
Enacted stigma			
No	1.0		
Yes	1.74 (1.03, 2.95)*		
Social support			
Low	2.87 (2.01, 4.09)*	2.11 (1.53, 2.92)*	1.99 (1.18, 3.35)*
Medium	1.10 (0.63, 1.94)	0.95 (0.58, 1.53)	0.89 (0.57, 1.38)
High	1.00	1.00	1.00

The grey shade is used in to indicate variables that are not included in each model

[a]Model includes anticipatory stigma, but not internalized or enacted stigma

[b]Model adjusted for sex, age, relationship status, and recent diagnosis

[c]Model includes internalized stigma, but not anticipatory or enacted stigma

*$p < 0.05$

Table 4 Bivariate and multivariable associations between enacted stigma, social support and psychological distress

	Psychological distress OR (95% CI)	Psychological distress[a,b] aOR (95% CI)	Psychological distress[a,c] aOR (95% CI)
	Bivariate	Multivariable	Multivariable
Enacted stigma			
No	1.0	1.0	1.0
Yes	1.74 (1.03, 2.95)*	0.93 (0.36, 2.41)	2.76 (2.13, 3.57)*

[a]Model adjusted for sex, age, relationship status, and recent diagnosis

[b]Among those with low social support

[c]Among those with medium or high social support

*$p < 0.05$

internalized stigma (aOR 19.0 [95% CI 10.7, 33.7]) followed by those with medium internalized stigma (aOR 2.2 [95% CI 1.6, 3.1]) (Table 3).

Low social support was associated with significantly increased odds of psychological distress after controlling for anticipatory or internalized stigma.

Effect Measure Modification Among HIV-Related Stigma, Social Support and Psychological Distress

There were no statistically significant interactions between anticipatory or internalized HIV-related stigma and social support on psychological distress at the $p < 0.10$ level of significance (data not shown). Similarly, when examined graphically, social support did not appear to modify the relationship between anticipatory stigma and psychological distress (Fig. 1a) or the relationship between internalized stigma and psychological distress (Fig. 1b).

However, effect modification by social support was present when examining the relationship between enacted stigma and psychological distress. Among individuals with low social support, there was no significant difference in the mean psychological distress score between those who reported enacted stigma and those who did not (Fig. 2). However, at medium and high levels of social support, the mean psychological distress score of those who reported enacted HIV-related stigma was significantly greater compared to those who did not report enacted stigma. Similarly, among those who did not report enacted stigma, greater social support was associated with lower psychological distress scores. However, among those who reported enacted stigma, no such relationship was observed.

Fig. 1 Mean psychological distress score and level of **a** HIV-related anticipatory stigma and **b** HIV-related internalized stigma, stratified by tertiles of social support
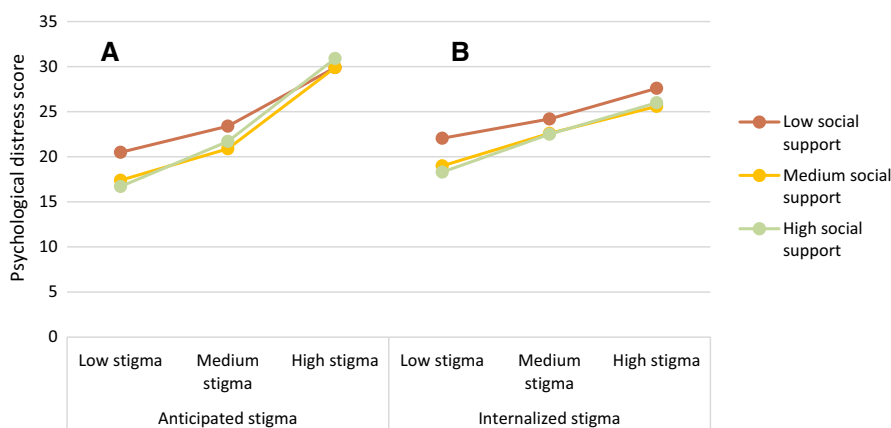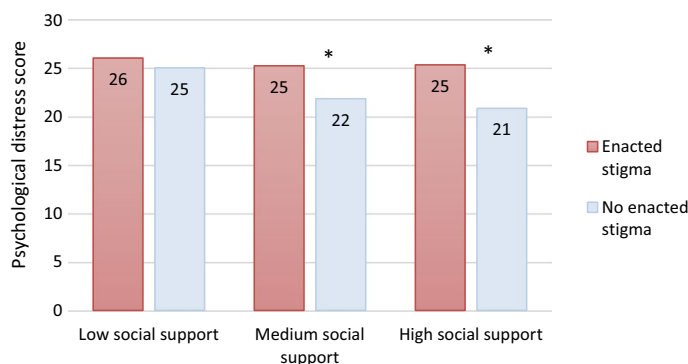

Fig. 2 Mean psychological distress score and enacted HIV-related stigma, stratified by level of social support. *p < 0.05

In subsequent stratified multivariable analyses, enacted stigma was associated with increased odds of psychological distress among those with medium or high social support (aOR 2.8 [2.1, 3.6]) (Table 4). There was no significant association between enacted stigma and psychological distress among those with low social support. Similarly, in multivariable analyses, a product interaction term of low social support and enacted stigma was statistically significant (p = 0.012; data not shown). In subsequent multivariable analyses stratified by enacted stigma, low social support was associated with greater odds of psychological distress among those who did not report enacted stigma (aOR 2.8 [1.8, 4.4]). However, there was no significant association between social support and psychological distress among those who reported enacted stigma (data not shown).

Discussion

All forms of HIV-related stigma, as well as low levels of social support, were associated with increased odds of psychological distress. Although high levels of internalized stigma were relatively rare in this sample population, high levels of internalized stigma appeared to have a substantial psychological impact on those who reported experiencing

it. Effect modification between enacted stigma and social support was present such that, among those who did not experience enacted stigma, greater social support was associated with lower psychological distress scores. However, among those who experienced enacted stigma, greater social support was not associated with lower psychological distress scores. In this way, among those who experienced enacted HIV-related stigma, greater social support did not serve as a protective mechanism from the psychological impact of having experienced enacted HIV-related stigma.

Previous evidence of interrelationships between social support, HIV-related stigma, and mental health among PLWH remains equivocal. Research with PLWH in South Africa found that social support did not modify the relationship between HIV-related stigma and depression or PTSD [16]. However, research with HIV-infected pregnant women in South Africa found that HIV-related stigma did modify the relationship between social support and depression [33]. The current study is among the first to examine effect modification disaggregated by type of HIV-related stigma (anticipatory, internalized or enacted). This is significant, as modification was present only in relation to enacted HIV-related stigma. Additional research is needed to better understand to what extent the relationship between HIV-related stigma, social support, and psychological distress varies by type of

HIV-related stigma assessed. More nuanced understanding of the interrelationships between psychological distress, HIV-related stigma, and social support among individuals initiating ART in sub-Saharan Africa can inform the adaptation and implementation of interventions to improve mental health and HIV treatment outcomes for this population and may contribute to more successful implementation and scale-up of universal treatment strategies throughout low-resource settings. Understanding whether social support modifies the relationship between stigma and psychological distress can also help identify populations that may be particularly vulnerable to poor mental health outcomes and may illuminate promising intervention strategies for further study.

Integrating evidence-based mental health interventions into HIV care in sub-Saharan Africa has been identified as a key strategy to improve mental health, and it may also improve outcomes of universal treatment policies in low-resource settings where the burden of HIV and untreated mental disorders is greatest [34]. Interventions to improve mental health among PLWH should consider incorporating components to assess, address, and reduce stigma as all forms of HIV-related stigma were associated with greater psychological distress. Such interventions should particularly focus on strategies to prevent or reduce the internalization of HIV-related stigma, given the magnitude of the relationship between high internalized stigma and psychological distress. Promising strategies to reduce internalized stigma have incorporated educational components to counter misinformation about HIV and PLWH, and training to enhance coping strategies, providing tools to manage stigmatizing attitudes or behaviors that PLWH may encounter [35]. Such information-based and counseling approaches should be incorporated into interventions to reduce internalized HIV-related stigma and improve the mental health of PLWH. While internalized stigma likely affects PLWH throughout the HIV care cascade, interventions to reduce internalized HIV-related stigma may be particularly well suited to those newly diagnosed who are still adjusting to accepting their HIV status or to those newly initiating ART, who are adapting to treatment and long-term engagement with the health care system.

Strategies to manage anticipatory and enacted HIV-related stigma may be particularly relevant around disclosure of one's HIV status to family and friends or at ART initiation [36]. Such interventions should include coping skills training, as this strategy has demonstrated promise in managing and mitigating the consequences of enacted HIV-related stigma. Additional strategies to accomplish this, for example by fostering resilience among PLWH, should be investigated. Future research should examine the trajectories of various types of HIV-related stigma throughout the HIV care cascade in order to more appropriately target stigma reduction interventions to periods when PLWH may be most vulnerable to internalized, anticipatory, or enacted HIV-related stigma.

Interventions to increase social support are also important, as low levels of social support were associated with greater odds of elevated psychological distress. However, interventions to enhance social support may be insufficient to counteract the harmful psychological effects of enacted HIV-related stigma, as social support was not significantly associated with psychological distress among those who experienced enacted HIV-related stigma. It is possible that social support is not protective in the presence of enacted stigma when stigmatizing actions are perpetrated by individuals within one's social support network. It is possible that even when stigmatizing actions are perpetrated by those outside one's support network, social support may be insufficient to protect individuals from the harmful psychological effects of such stigma.

Structural interventions to reduce HIV-related stigma at a community level are critically needed. While stigma towards PLWH has been widely documented, evidence-based, community-level interventions to reduce HIV-related stigma are lacking. Such interventions should be developed and tested, and public health practitioners should consider incorporating components that have been consistently associated with lower levels of stigmatizing beliefs towards other stigmatized groups, such as individuals with serious mental illness. Such components include positive personal contact with stigmatized individuals, targeting key groups in positions of power (e.g., employers, health care providers), and focusing on the deleterious ways in which stigma affects one's capacity to achieve their goals [37]. These strategies should be adapted and incorporated into interventions to prevent and reduce stigma towards PLWH. Research should investigate whether these strategies are similarly effective at reducing stigmatizing beliefs towards PLWH.

Potential mediators of the relationship between HIV-related stigma and psychological distress should be examined. Such research could help elucidate promising intervention strategies or targets, address pathological mechanisms from HIV-related stigma to psychological distress, reduce the negative effects of HIV-related stigma, and improve the mental health of PLWH.

This study has limitations worth noting. All data were cross-sectional and thus temporality cannot be established. It is possible that psychological distress increases HIV-related stigma, particularly internalized HIV-related stigma, or reduces one's perception of social support. In addition, all data were collected at ART initiation. It is possible that the relationship between HIV-related stigma, social support, and psychological distress may be different at different points throughout the care cascade. In addition, the relationship between psychological distress, social support and

HIV-related stigma may be substantially different among those who refuse ART, are not yet eligible for it, or those who initiated ART some time ago. It is also possible that psychological distress and HIV-related stigma share a common cause. Longitudinal research is needed to better understand the causal relationships between HIV-related stigma, social support, and psychological distress. Participants were recruited from six urban clinics in Oromia, Ethiopia, at the time of ART initiation, and may not be generalizable to populations in other parts of Ethiopia or sub-Saharan Africa, or to patients not yet on ART or already established on ART.

Conclusion

Psychological distress was common among individuals initiating ART in Ethiopia. Additional research to further understand the interconnections between HIV-related stigma, social support and psychological distress is needed. Evidence-based interventions to reduce the occurrence and impact of HIV-related stigma are needed at individual and community levels. Evidence-based interventions that address HIV-related stigma and psychological distress should be integrated into HIV care.

Compliance with Ethical Standards

Conflict of interest The authors declare they have no conflict of interest.

Ethical Approval All procedures performed in this study 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 participants included in the study.

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