Psychological Distress and Its Correlates among Newly Diagnosed People Living with HIV in Northwest Ethiopia: Ordinal Logistic Regression Analyses

$\circledS$SAGE

Nurilign Abebe Moges[1,2] iD, Olubukola Adeponle Adesina[3,4], Micheal A Okunlola[3,4], Yemane Berhane[5] and Joshua Odunayo Akinyemi[6]

[1]Department of Public Health, College of Health Sciences, Debre Markos University, Debre Markos, Ethiopia. [2]Pan African University, Life and Earth Sciences Including Health and Agriculture Institute (PAULESI), University of Ibadan, Ibadan, Nigeria. [3]Department of Obstetrics and Gynecology, College of Medicine, University of Ibadan, Ibadan, Nigeria. [4]Department of Obstetrics and Gynecology, University College Hospital, Ibadan, Nigeria. [5]Department of Epidemiology, Addis Continental Institute of Public Health, Addis Ababa, Ethiopia. [6]Department of Epidemiology and Medical Statistics, Faculty of Public Health, College of Medicine, University of Ibadan, Ibadan, Nigeria

ABSTRACT

BACKGROUND: Although there is a high burden of HIV in sub-Saharan Africa (SSA), studies on mental health issues among people living with HIV are scarce. The study addressed the transition to "test and treat" guidelines for HIV, which makes it unique regarding its evaluation of psychological distress amongst newly initiated people living with HIV in the test and treat era.

METHODS: We conducted a cross-sectional survey of 689 people newly diagnosed with HIV. Symptoms of psychological distress were measured using the Kessler-10 psychological distress assessment scale. Factors associated with psychological distress were captured using interviewer-administered questionnaires. Ordinal logistic regression analyses were employed to identify predictors of psychological distress.

RESULTS: The magnitude of psychological distress was 58.63% (95% CI = 55.2%-62.3%). The severity of the psychological distress of which, 17.42% had severe distress. Psychological distress was observed more among female patients ($\beta = 0.47$, AOR = 1.59, 95% CI = 1.12, 2.27), patients presented with opportunistic infections ($\beta = 0.50$, AOR = 1.65, 95% CI = 1.03, 2.66) and being non-working functional status ($\beta = 0.99$, AOR = 2.70, 95% CI = 1.64, 4.45). Moreover, patients who were malnourished ($\beta = 0.46$, AOR = 1.58, 95% CI = 1.09, 2.26), having good level of knowledge on HIV prevention ($\beta = 0.59$, 95% CI = 0.55, 0.39, 0.78), presented with sexually transmitted infection ($\beta = 0.48$, AOR = 1.61, 95% CI = 1.01, 2.58), history of alcohol use ($\beta = 0.44$, AOR = 1.55, 95% CI = 1.09, 2.21), perceived stigma ($\beta = 0.08$, AOR = 1.09 95% CI = 1.04, 1.15) and treated in health centers ($\beta = 0.55$, AOR = 1.74, 95% CI = 1.25, 2.41) had higher odds of psychological distress.

CONCLUSION: The large majority of newly diagnosed HIV patients suffered from psychological distress. An increased vulnerability was observed among females, those with opportunistic and sexually transmitted infections, those having poor functional status and malnourished. Furthermore, HIV patients treated in health centers, those who had history of alcohol use and patients with high level of HIV related stigma are more negatively affected by the HIV diagnosis. Hence, all intervention strategies should target all the identified predictors.

KEYWORDS: Newly diagnosed HIV patients, psychological distress, Ethiopia

Introduction

Mental health problems are known to be common among people living with HIV in Africa.[1] In sub-Saharan Africa (SSA), the burden of depression among people living with HIV (PLWH) ranges between 9% and 32%.[2] More than 1.57 million disability-adjusted life years (DALYs) are lost among people with depression and HIV in Sub-Saharan Africa in general and about 30 000 DALYs are lost in Ethiopia in particular.[1]

Although there is a high burden of both HIV and mental health problems in SSA, there is scarce research on mental health issues among HIV positive people.[3-5]

The concept of psychological distress includes a range of emotional states with symptoms of depression and anxiety.[6] Mental health problems are higher among both people vulnerable to acquiring HIV and PLWH, compared with the general population.[1,7] Given the strong evidence for the contribution

of mental health and behavioral problems to poor HIV health outcomes, there is an obvious need for universal mental health screening and the provision of mental health treatment integrated into ongoing HIV care.[7] However, most of the studies conducted in Africa among HIV patients do not use validated tools in the study areas.[1]

In Ethiopia, expansion and strengthening ART care and treatment activities are supported by the process of task shifting: training of nurses and community health agents in prevention, treatment, care, and support activities which further strengthen community linkages and ensure availability of standard minimum packages of HIV services at primary health care level.[8] Additionally, due to insufficient mental health specialists to close the enormous treatment gap for mental disorders among HIV patients, "task-shifting" (training and supporting non-specialist health workers to deliver mental healthcare)[5] may also be implemented in the HIV clinic. Moreover, screening for and managing mental health problems and substance use is one of the key elements of chronic HIV care in Ethiopia.[8]

Newly diagnosed PLWH are exposed to multiple stressors. These include concerns of confidentiality, discrimination/stigmatization, disclosure, and fear of infecting others.[9] On the other hand, the 2017 revised World Health Organization (WHO) guidelines for managing advanced HIV disease and rapid initiation of antiretroviral therapy (ART),[10] indicated that there is a research gap on the psychological readiness of newly diagnosed HIV positive individuals. Psychological distress is a major barrier to timely ART initiation.[5,11] HIV positive people with uncontrolled depressive symptoms are more likely to have poor adherence to ART[8] and to have poor health-related quality of life.[12] Hence, documenting the magnitude, severity, and predictors of psychological distress among newly HIV diagnosed people could guide the test and treat strategy.

Previous studies on the burden of psychological distress among HIV infected people have reported a value of 33% in SSA,[1] 11.2% in Dilla-Ethiopia,[13] 7.8% in North Shewa-Ethiopia[14] and 37.6% of HIV infected people were reported to experience mild/moderate while 29.5% experienced severe psychological distress in Oromia-Ethiopia.[15] Moreover, 24.3% of patients had common mental disorders in Debre Markos referral hospital-northwest Ethiopia[16] and 24.5% of HIV positive people suffered from co-morbidity of depression and anxiety in Addis Ababa, Ethiopia.[17] Similar findings were reported in SSA with 15.3% experiencing major depressive disorder,[1] in rural Tanzania 15.5%,[3] 32.6% of depression in Nigeria,[18] 13.8% of depressive symptoms in Kenya[19] and 36.5% depressive symptoms in Africa in general.[4] These previously published studies mostly used small sample sizes, conducted in a single clinical settings, use arbitrary dichotomizations of the outcome variables and surveyed among HIV positive patients who are already on treatment. However, our study tried to address gap from the previous studies. This study included multiple clinical sites with large number of newly HIV diagnosed people and data were analyzed using ordinal logistic regression analysis.

At the time of HIV diagnosis, the level of psychological distress among newly identified HIV patients is high.[9] But it decreased over time due to an individual positive thinking and other coping behaviors.[20] Mental health affects both HIV patients' treatment uptake and clinical outcomes.[21] Hence, investigating the level of psychological distress among newly diagnosed HIV patients in the test and treat era added new information in the literature.

Factors associated with psychological distress are being female, illiterate, current use of alcohol, low social support, low socioeconomic status, immunosuppression, and perceived stigma.[2,9,13,14,22,23] Other factors associated with the level of anxiety are perception of side effects, ART drug regimen and duration on treatment.[19,24] Severe psychological distress was highly prevalent among those who were recently diagnosed and who initiated ART late.[15,25] Furthermore, concerns of confidentiality, disclosure, emotional distress, fear of infecting others, and excessive attention to physical functions were the most common source of stressors among newly diagnosed HIV positive people.[9] On the other hand, there is growing evidence that PLWH with sustained HIV viral suppression cannot transmit HIV through sex.[26] This may allow optimized messaging of undetectable=untransmittable (U=U) that will build hope in the community and contribute to a lessening of HIV-related stigma. Ultimately, this has the potential to reduce psychological distress among PLWH and their sex partners.[7] Measuring the current level of psychological distress could provide timely information to guide public health intervention along with the changing guidelines. Therefore, the aim of this study was to investigate the magnitude and predictors of psychological distress among newly diagnosed HIV positive people in northwest Ethiopia.

Methods

Design

This was a cross-sectional survey of newly diagnosed people living with HIV.

Study setting

The study was conducted in 3 administrative zones of Amhara regional state, northwest Ethiopia. These are: Bahir Dar City administration, East Gojjam zone, and West Gojjam Zone. The study period covered from December 1st, 2018 to July 30, 2019. We have recruited newly diagnosed HIV patients from 23 selected health facilities rendering ART services. Of which 2 are referral hospitals (Debre Markos and Felege Hiwot), 7 are primary hospitals and the remaining 14 are health centers. In all health facilities, integrated mental health services were available. At least 1 staff member of the HIV clinic had received training in the screening and management of common mental health disorders.

Study participants

The 3 administrative zones were selected purposefully. Then health facilities (both hospitals and health centers) were selected based on patient case load. Accordingly, those ART rendering health facilities with average monthly new patient flow of minimum 3 cases were included in the study. For this purpose, we have conducted secondary data analysis from the health facility's previous 3 months report. Study participants were recruited from health facilities that on average diagnosis 3 to 5 new HIV patients per month. All adults newly diagnosed to be HIV positive were consecutively enrolled in the study. Data were collected within 30 days of HIV diagnosis irrespective of ART initiation. Those patients who interrupted their treatment previously and re-initiated during the study period were excluded from the study.

Sample size determination

The patients enrolled for this study were part of a cohort study. The sample size was thus calculated to ensure adequacy of the sample to investigate the psychological distress and its correlations. Sample size was determined using Epi-Info (7) a total of 689 patients were required for the cohort study and we used all enrolled for this study.

Sampling technique

All newly diagnosed HIV positive individuals who intended to continue their HIV treatment in the same health facility where the diagnosis is made or those who were referred to the study health facilities from other health facilities within 7 days of diagnosis were invited to participate in the study. All eligible patients were enrolled until the required sample size was reached.

Data collection tools and procedures

Data collection tools were developed by reviewing literature in the field. The tools measured socio-demographic characteristics, clinical characteristics, behavioral and psychological characteristics. The psychological distress tool was adopted from the Kessler-10 scale[27] which has been validated in Ethiopia.[15,25] Data was collected using interviewer administered questionnaires. Data collectors were nurses working in the ART clinic. The client exit interviews were conducted in a separate quiet room.

Variables and measurement

The dependent variable was psychological distress measured using the Kessler Psychological Distress Scale (K10).[28] The K10 is a 10-item, 5-level response scale. K10 values range from 10 to 50. The outcome variables were measured using 10 questions each containing 5-point Likert scales (1 = never, 2 = a small part of the time, 3 = some of the time, 4 = most of the

times, 5 = all of the time). Values less than or equal to 19 were categorized as not clinically significant distress (well), scores between 20 and 24 as mild distress, 25 to 29 as moderate distress, and 30 to 50 as severe psychological distress.[29]

The independent variables included socio-demographic variables (age, sex, religion, ethnicity, marital status, educational status, employment status, occupation, residence) wealth status calculated based on world food program guidelines to wealth index calculation,[30] health facility related characteristics (types of health facility and distance from health facility), baseline clinical variables (opportunistic infections, body mass index—BMI, functional status, any current health complaints, and WHO clinical stage), behavioral variables (substance use, serostatus of sexual partner and HIV test history, number of sexual partner/s, condom utilization, and alcohol use. HIV and ART related Knowledge, history of STI). Level of perceived HIV-related stigma was assessed using 4 item questions with a Cronbach's alpha value ($\alpha = 0.896$), which had adequate reliability score to measure HIV-related stigma.

Data management and analyses

Data were entered into Epi-Data version 3.5 and exported to STATA version 14 and SPSS version 24 for further analysis. Descriptive analysis such as frequency and percentage was carried out. We used ordinal logistic regression analysis to predict factors associated with the outcome variable. The outcome variables were in 4 scales based on disease severity (well, mildly distressed, moderately distressed, and severely distressed). Each independent variable was fitted in the model separately and check for the assumptions of ordinal logistic regression. We excluded those independent variables with empty cells and those with small in frequency from the cross-tabulation. Then those that passed the assumptions of the model were fitted altogether to predict the outcome variables. The assumptions for ordinal regression which assuming that the effect of the independent variables is the same for each level of the outcome variables was checked via test of parallel lines. Values for the final model assumptions were as follows; model fitting information (Chi-square = 155.691, *P*-value < .001), goodness of fit (Pearson Chi-square = 1834.933, *P*-value = .170 and Deviance Chi-square = 1478.908, *P*-value = 1.000), and test of parallel lines (Chi-square = 147.372, *P*-value = .203).

Finally, the results were presented using parameter estimates (β) and adjusted proportional odds ratio (AOR). The statistical significance was declared at *P*-value less than .05 with 95% confidence interval (CI).

Ethical approval and consent

The proposal was approved by the joint University of Ibadan/University College Hospital, Ibadan Institutional Review Board (IRB) of the University College Hospital (UCH), University of Ibadan, Nigeria (reference number UI/EC/18/0463). It was also approved by IRB at Debre Markos University (reference

number HSC/30/02/2011). We obtained permission from Amhara Public Health Institute. Moreover, we obtained written informed consent from each study subject.

Results

A total of 689 newly diagnosed HIV patients were included in this study. Three hundred ninety-eight (57.8%) were females. The mean age of study participants was 33 ± 9.17 years and 316 (45.9%) were in the age group of 25 to 34 years. The majority (651, 94.5%) were Ethiopian Orthodox Christian by religion. Four hundred fifty-seven (66.3%) were employed and 282 (40.9%) were in the poorest or poorer wealth quintile (Table 1).

Health facility–related characteristics of study participants

Two hundred eighty-four (41.2%) of the study participants were from East Gojjam zone, 165 (23.9%) from West Gojjam zone and 240 (34.8%) were from Bahir Dar City administration. Attendance in the health facilities showed that 352 (51.1%) attended hospitals and 337 (48.9%) within health centers. The majority (531, 77.1%) were urban residents and 540 (78.4%) of them were located less than 1-hour walking distance from the health facility. Similarly, 490 (71.1%) were residing within the catchment area of the health facility.

Clinical characteristics of study participants

The majority (528, 76.6%) were diagnosed with their HIV status in the same health facility in which they were linked for ART service. HIV test was initiated by health care providers in 467 (67.8%) of study participants. About 196 (28.4%) had opportunistic infections at enrollment. The stages of majority (593, 86.4%) of participants were at working functional status while 515 (74.7%) were at WHO clinical stage I/II. Forty-two (6.1%) women were pregnant (Table 2).

Behavioral characteristics

The majority (677, 98.3%) had sexual experience and 402 (59.4%) had more than one-lifetime sexual partner. One hundred seventy (25.1%) reported ever use condom while 85 (50%) of them reported condom use in the most recent sexual activity. Three hundred ninety-two (57.9%) of participants reported that they did not know the HIV status of their sexual partners (Table 3).

Table 1. Socio-demographic characteristics of newly diagnosed HIV patients in Ethiopia.

CHARACTERISTICS	FREQUENCY (%)
Sex	
Male	291 (42.2)
Female	398 (57.8)

(Continued)

Table 1. (Continued)

CHARACTERISTICS	FREQUENCY (%)
Age in years	
18 to 24	95 (13.8)
25 to 34	316 (45.9)
⩾35	278 (40.3)
Marital status	
Single	211 (30.6)
Married	247 (35.8)
Divorced	185 (26.9)
Widowed	46 (6.7)
Religion	
Orthodox Christianity	651 (94.5)
Muslims	32 (4.6)
Protestant	6 (0.9)
Educational status	
No formal education	251 (36.4)
Primary education	231 (33.5)
Secondary or higher	207 (30.0)
Employed status	
Employed	457 (66.3)
Not employed	232 (33.7)
Occupation	
Farming	128 (18.6)
Private employed	80 (11.6)
Merchant/business	145 (21.0)
Government employee	92 (13.4)
Daily labor	151 (21.9)
Student	22 (3.2)
House wife	60 (8.7)
Others	11 (1.6)
Have child or children	
Yes	361 (52.4)
No	328 (47.6)
Wealth quintile status	
Poorest	157 (22.8)
Poorer	125 (18.1)
Middle	130 (18.9)
Wealthier	137 (19.9)
Wealthiest	140 (20.3)

Table 2. Baseline clinical characteristics of newly diagnosed HIV patients in Ethiopia, 2019.

CHARACTERISTICS	FREQUENCY (%)
HIV diagnosis made	
The same facility	528 (76.6)
Another facility	161 (23.4)
Testing modality	
Provider initiated	467 (67.8)
Self-initiated	222 (32.2)
Opportunistic infection	
Yes	196 (28.4)
No	493 (71.6)
BMI (N = 630)	
<18.5	161 (25.6)
≥18.5	469 (68.1)
Functional status	
Working	593 (86.4)
Non-working	96 (13.9)
Symptomatic presentation	
Yes	439 (63.7)
No	250 (36.3)
WHO clinical stage	
I/II	515 (74.7)
III/IV	174 (25.3)

Table 3. Behavioral characteristics of newly diagnosed HIV patients in Ethiopia, 2019.

CHARACTERISTICS	FREQUENCY (%)
Living arrangement	
Living with someone	441 (64)
Living alone	248 (36)
Ever had sexual intercourse	
Yes	677 (98.3)
No	12 (1.7)
Partner HIV status	
HIV positive	210 (31)
HIV negative	75 (11.1)
Unknown	392 (57.9)

(Continued)

Table 3. (Continued)

CHARACTERISTICS	FREQUENCY (%)
Life time sexual partner	
One	275 (40.6)
More than 1	402 (59.4)
Ever use condom	
Yes	170 (25.1)
No	507 (74.9)
Frequency of condom use	
Most of the time	28 (16.5)
Often	42 (24.7)
Sometimes	100 (58.8)
Condom in the most recent sex	
Yes	85 (50)
No	85 (50)
Sex out of regular partner	
Yes	141 (20.8)
No	536 (79.2)
Current STI	
Yes	43 (6.2)
No	634 (92)
Ever use alcohol	
Yes	497 (72.1)
No	192 (27.9)
Current use of alcohol	
Yes	150 (30.2)
No	347 (69.8)
HIV prevention knowledge	
Poor	220 (31.9)
Good	469 (68.1)
Perceived stigma	
High	547 (79.4)
Low	142 (20.6)

Magnitudes of psychological distress

About 404 out of 689 patients (58.64%, 95% CI = 55.2%–62.3%) had different level of psychological distress symptoms. These included: mildly distressed (23.07%), moderately distressed (18.14%), severely distressed (17.42%) and 41.36% were well or not distressed.

Predictors of psychological distress

Before conducting ordinal logistic regression, we checked the frequency of each variable and excluded those with empty cells and those with small frequency using cross-tabulations. Ordinal logistic regression fitted with each independent variable and the outcome variables to test the assumption of the model. Then all independent variables were fitted into ordinal logistic regression. Proportional adjusted odds ratio and parameters estimates (coefficients) were reported to indicate the strength and directions of association.

HIV patients attending their treatment in health centers, we would expect 0.55 increase on the odds of having psychological depressive symptoms compared to those in hospitals, (β = 0.55, AOR = 1.74, 95% CI = 1.25, 2.41). Psychological depressive symptoms among females increased by 0.47 compared with male counterparts (β = 0.47, AOR = 1.59, 95% CI = 1.12, 2.27). Presence of opportunistic infections at enrollment to care increase by 0.50 (β = 0.50, AOR = 1.65, 95% CI = 1.03, 2.66). Similarly, baseline non-working (ambulatory or bedridden) functional status a 0.99 increase in the odds of having psychological depressive symptoms (β = 0.99, AOR = 2.70, 95% CI = 1.64, 4.45). Moreover, patients who were malnourished (β = 0.46, AOR = 1.58, 95% CI = 1.09, 2.26), having good level of knowledge on HIV prevention (β = 0.59, 95% CI = 0.55, 0.39, 0.78), presented with STI symptoms (β = 0.48, AOR = 1.61, 95% CI = 1.01, 2.58), history of alcohol use (β = 0.44, AOR = 1.55, 95% CI = 1.09, 2.21) and perceived stigma (β = 0.08, AOR = 1.09 95% CI = 1.04, 1.15) had higher odds of psychological depressive symptoms (Table 4).

Table 4. Ordinal logistic regression on predictors of psychological depressive symptoms among newly diagnosed people living with HIV in Northwest Ethiopia, 2019.

PREDICTOR VARIABLES	ESTIMATES (β)	STD. ERROR	*P*-VALUE	AOR AT 95% CI
Health facility type				
Hospital	0.55	0.16	**<.001**	1
Health center				1.74 (1.25, 2.41)
Age	0.015	0.01	.113	1.01 (0.99, 1.03)
Sex				
Male	0.47	0.18	**.009**	1
Female				1.59 (1.12, 2.27)
Marital status				
Single	−0.05	0.19	.806	1
Married	−0.14	0.21	.516	0.95 (0.65, 1.39)
Divorced	−0.16	0.35	.648	0.87 (0.57, 1.32)
Widowed				0.85 (0.43, 1.68)
Educational status				
Not educated	0.77	0.19	.688	1
Primary school	−0.23	0.22	.285	1.08 (0.74, 1.57)
High school or above				0.78 (0.51, 1.20)
Employment status				
Employed	0.24	0.17	.174	1
Not employed				1.27 (0.90, 1.77)
History of HIV test				
Yes	−0.28	0.17	.101	1
No				0.76 (0.54, 1.05)
Opportunistic infection				
Yes	0.50	0.24	**.039**	1.65 (1.03, 2.66)
No				1

(Continued)

Table 4. (Continued)

PREDICTOR VARIABLES	ESTIMATES (β)	STD. ERROR	*P*-VALUE	AOR AT 95% CI
HIV test type				
PICT	−0.10	0.18	.570	1
VCT				0.90 (0.62, 1.29)
Present with symptoms				
Yes	0.03	0.19	.859	1.03 (0.72, 1.49)
No				1
Malnourished				
Yes	0.46	0.18	**.013**	1.58 (1.09, 2.26)
No				1
Functional status				
Working	0.99	0.25	**<.001**	1
Non-working				2.70 (1.64, 4.45)
WHO clinical staging				
I	0.61	0.44	.171	1.83 (0.76, 4.38)
II	−0.36	0.44	.419	0.69 (0.28, 1.67)
III	0.35	0.41	.393	1.42 (0.63, 3.17)
IV				1
Wealth status				
Poorest	0.19	0.24	.436	1
Poorer	0.14	0.24	.543	1.21 (0.74, 1.96)
Medium	−0.03	0.25	.913	1.15 (0.72, 1.86)
Wealthier	−0.29	0.25	.244	0.97 (0.59, 1.59)
Wealthiest				0.74 (0.45, 1.22)
Knowledge on HIV				
Good	−0.59	0.17	**<.001**	0.55 (0.39, 0.78)
Poor				1
Presented with STI				
Yes	0.48	0.24	**.048**	1.61 (1.01, 2.58)
No				1
Alcohol				
Yes	0.44	0.18	**.015***	1.55 (1.09, 2.21)
No				1
Stigma				
High	0.08	0.03	**<.001**	1.09 (1.04, 1.15)
Low				1

Bold indicated significant values.

Discussion

This study aimed to examine the magnitude of psychological distress and predictors among newly diagnosed persons living with HIV in northwest Ethiopia.

The large majority of newly diagnosed HIV patients suffered from psychological distress. An increased vulnerability was observed among females, those with opportunistic and sexually transmitted infections, those patients having poor functional status and malnourished. Furthermore, HIV patients treated in health centers, those who had history of alcohol use and patients with high level of HIV related stigma are more negatively affected by the HIV diagnosis. The prevalence of psychological distress (58.6%) among newly diagnosed HIV positive people was similar to some studies in Ethiopia.[11,15] But much higher than other studies in Ethiopia.[13,14] The discrepancies may be attributed to the difference in tools used to assess psychological distress. The latter 2 studies used self-reported questionnaires (SRQ-20) and Hospital Anxiety and Depression Scale (HADS) tools, respectively while the current study used the Kessler-10 psychological distress scale to measure the level of psychological distress. Several tools are used to screen different mental health problems among people living with HIV and in the general population.[2,28,31] Validating the most accurate tools according to the population of origin (language, education) as well as ART status is necessary.[2] This finding implies that there is a need to a nationally validated mental health screening tools for both research and public health intervention purpose in Ethiopia. Moreover, the current finding (58.6%) was higher than a value (33%) reported in systematic review and meta-analysis in Sub-Saharan Africa.[1] Such differences may be attributed to inter-scale variations in the measuring of psychological distress.

In the current finding, the severity of psychological distress symptoms was lower than previously published reports in Ethiopia[15,25] but higher than a study in Malawi.[32] In addition to the tool differences used among the studies, the current study was conducted among newly diagnosed HIV positive patients may be with profound concerns of confidentiality, disclosure, emotional distress, and fear of infecting others.[9] This was supported by previous literature in which HIV patients who were stable and on ART may have benefited from intervention by healthcare workers that lead to decreased HIV related stressors over time.[9,15,32,33] Indeed, it is necessary to provide ongoing mental health monitoring of HIV patients at different levels of the healthcare intervention, and special emphasis is recommended for those newly identified HIV positive people.

As we compare females with males, the odds of severity versus the combined mild and moderate level of psychological distress was increased among females. This result was in agreement with the previous findings from Ethiopia,[13,14,17,34,35] Houston-Texas[22] and elsewhere in SSA[2,23] in which females had higher odds of psychological distress and or depression. The gender disparity may be attributed due to females' greater reactivity compared with men's has been attributed to gender differences in biological responses, self-concepts, masculinity issues, and coping styles.[36,37] So that, clinicians working in HIV clinics should considered gender-sensitive care.

This study deepens the knowledge on the influence of HIV related stigma on the development of psychological distress. Thus, one-unit increase in a score of perceived HIV related stigma scale, 1.09 times greater in experiencing psychological distress. The finding was in agreement with many studies in the field.[9,11,14,16,17,19-21,34,36,38,39] Stigma and discrimination are major barriers to testing, treatment uptake, and adherence.[40] Patients who suffered from depression as a result of stigma are more likely to experience worsening disease states and, thus, poorer health outcomes.[41,42] The finding further reinforces policymakers, clinicians and people living with HIV to consider high impact interventions against discrimination and stigma based on HIV positive test result.

Patients who had good knowledge of HIV prevention were less likely to develop psychological distress. This may be due to improved understanding of HIV treatment and prevention.[7] Furthermore, the odds of having psychological distress among those patients with a history of alcohol use was increased compared with their counterparts. The finding was supported by previous studies that reported patients who use alcohol were affected by depressive symptoms.[5,14,43] However, due to the cross-sectional nature of the study design, we could not provide the causal associations between depression and alcohol use. A similar study reported that patients had increased alcohol use when they are experiencing higher depressive symptoms than usual, while those with higher average depressive symptoms over time report less alcohol use.[44] So that does the psychological distress caused an increased alcohol uptake or alcohol use caused the psychological distress is not answered by this study. Nevertheless, prevention of alcohol consumption should be continued as 1 arm of intervention in the HIV care, support and treatment services. Hence, restriction of alcohol use among people living with HIV should be strengthened.

Baseline clinical characteristics of people living with HIV were found to be the predictors of psychological distress. Of these, non-working functional status (ambulatory or bedridden), being malnourished, presented with opportunistic infection and sexually transmitted infections. This was in line with previous studies in Ethiopia and Sub-Saharan Africa.[2,14,19,38,45,46] Such findings can be explained as physical and or functional changes as a result of a disease process may cause stressful events[9] which in turn caused a significant level of psychological distress. This implies clinicians should give focus to treat physical health conditions in addition to HIV treatment. Provisions of prophylaxis against opportunistic infections and treating sexually transmitted infections should be integrated with mental health interventions. A recent study on the impact of micronutrients on the psychological well-being of HIV infected individuals revealed that supplementing of a micronutrient can reduce the experience of

distress, anxiety, and depression among HAART naïve HIV infected patients.[47] This is important to understand the 3 critical junctions of service integrations among HIV, mental health, and nutritional interventions which would enhance the HIV treatment outcomes.

In addition to those predictors from socio-demographic, behavioral, and clinical characteristics of HIV patients, healthcare settings were also known to be one of the contextual predictors of psychological distress. In this study, the odds of psychological distress symptoms were higher among HIV patients who were attending their treatment at primary healthcare settings compared to those treated in hospitals. This may be due to lack of integrated mental health services at lower primary care level.[4,48] Therefore, training of healthcare workers on mental health services integration with HIV care, support and treatment in the primary healthcare settings should be a policy priority.

Limitations of the study

Though the study was the first to investigate the magnitude and predictors of psychological distress using ordinal logistic regression analyses in Ethiopia, there were limitations inherited to the study design and data collection tools. The Kessler psychological distress scale (K-10) is not 100% sensitive and specific. The sensitivity and specify of the tool was 86% and 83% respectively.[49] Hence, this may underestimate the magnitude of the problem. Due to the nature of the study design we did not know whether or not the present distress was triggered by HIV diagnosis. Moreover, we did not use a validated social support scale to measure the level of social support.

Conclusion

The magnitude of psychological distress was high among newly diagnosed people living with HIV. Predictor variables emerged from socio-demographic factors (being female), behavioral factors (perceived HIV related stigma, HIV related knowledge and alcohol use), clinical factors such as being in non-working functional status, being malnourished, having opportunistic, and sexually transmitted infections. Furthermore, contextual factors of the healthcare setting played an important role in predicting the level of psychological distress. Hence, all intervention strategies should target the 4 layers of challenges.

Author Contributions

NAM, OAA, MAO, YB, and JOA contributed equally to the design of the study. NAM and YB involved in the data collection. NAM and YB, JOA, OAA, and MAO involved in the data analysis. NAM and OAA drafted the manuscript and all the authors revised and approved the manuscript.

ORCID iD

Nurilign Abebe Moges [iD] https://orcid.org/0000-0001-5912-1905

REFERENCES

1. Lofgren S, Bond DJ, Nakasujja N, Boulware DR. Burden of depression in outpatient HIV-infected adults in sub-Saharan Africa; systematic review and meta-analysis. *AIDS Behav*. 2020;24:1752-1764.
2. Bernard C, Dabis F, de Rekeneire N. Prevalence and factors associated with depression in people living with HIV in sub-Saharan Africa: a systematic review and metaanalysis. *PLoS One*. 2017;12:e0181960.
3. Marwick KFM, Kaaya SF. Prevalence of depression and anxiety disorders in HIV positive outpatients in rural Tanzania. *AIDS Care*. 2010;22:415-419.
4. Bigna JJ, Tounouga DN, Kenne AM, et al. Epidemiology of depressive disorders in people living with HIV in Africa: a systematic review and meta-analysis: burden of depression in HIV in Africa. *Gen Hosp Psychiatry*. 2019;57:13-22.
5. Mayston R, Kinyanda E, Chishinga N, Prince M, Patel V. Mental disorder and the outcome of HIV/AIDS in low-income and middle-income countries: a systematic review. *AIDS*. 2012;26(suppl 2):S117-S135.
6. Benoit AC, Light L, Burchell AN, et al. Demographic and clinical factors correlating with high levels of psychological distress in HIV-positive women living in Ontario, Canada. *AIDS Care*. 2014;26:694-701.
7. Remien RH, Stirratt MJ, Nguyen N, Robbins RN, Pala AN, Mellins CA. Mental health and HIV/AIDS: the need for an integrated response. *AIDS Engl*. 2019;33:1411-1420.
8. FMOH Ethiopia. *National Guidelines for Comprehensive HIV Prevention, Care and Treatment*. AAMO Health Editor; 2017.
9. Huang Y, Luo D, Chen X, Zhang D, Huang Z, Xiao S. HIV-related stress experienced by newly diagnosed people living with HIV in China: a 1-year longitudinal study. *Int J Environ Res Public Health*. 2020;17:2681.
10. WHO. *Guidelines for Managing Advanced HIV Disease and Rapid Initiation of Antiretroviral Therapy, July 2017*. WHO; 2017.
11. Parcesepe A, Tymejczyk O, Remien R, et al. HIV-related stigma, social support, and psychological distress among individuals initiating ART in Ethiopia. *AIDS Behav*. 2018;22:3815-3825.
12. Huang Y, Luo D, Chen X, Zhang D, Huang Z, Xiao S. Role of psychosocial status in predicting health-related quality of life at 1-year followup among newly diagnosed people living with HIV. *PLoS One*. 2019;14:e0224322.
13. Tesfaye SH, Bune GT. Generalized psychological distress among HIV-infected patients enrolled in antiretroviral treatment in Dilla University Hospital, Gedeo zone, Ethiopia. *Glob Health Action*. 2014;7:23882.
14. Basha EA, Derseh BT, Haile YGE, Tafere G. Factors affecting psychological distress among people living with HIV/AIDS at selected hospitals of North Shewa zone, Amhara region, Ethiopia. *AIDS Res Treat*. Published online July 22, 2019. doi:10.1155/2019/8329483
15. Parcesepe AM, Tymejczyk O, Remien R, et al. Psychological distress, health and treatment-related factors among individuals initiating ART in Oromia, Ethiopia. *AIDS Care*. 2018;30:338-342.
16. Zewdu S, Abebe N. Common mental disorder among HIV infected individuals at comprehensive HIV care and treatment clinic of Debre Markos Referral Hospital, Ethiopia. *J AIDS Clin Res*. 2015;6:420.
17. Tesfaw G, Ayano G, Awoke T, et al. Prevalence and correlates of depression and anxiety among patients with HIV on follow up at Alert Hospital, Addis Ababa, Ethiopia. *BMC Psychiatry*. 2016;16:368.
18. Sule HM, Gyang MD, Agbir MT, Okonoda KM. Perceived social support and its association with depression among patients infected with HIV: a hospital based study in Jos, Nigeria. *Depression*. 2019;15:16.
19. Moses K, Nyongesa PM, Wanjala SW, Mutua AM, Newton CRJC, Abubakar A. Prevalence and correlates of depressive symptoms among adults living with HIV in rural Kilifi, Kenya. *BMC Psychiatry*. 2019;19:333.
20. Garrido-Hernansaiz H, Alonso-Tapia J. Predictors of anxiety and depression among newly diagnosed people living with HIV: a longitudinal study. *Scand J Psychol*. 2020;61:616-624.
21. Ngocho JS, Watt MH, Minja L. Depression and anxiety among pregnant women living with HIV in Kilimanjaro region, Tanzania. *PLoS One*. 2019;14: e0224515.
22. Bhatia R, Hartman C, Kallen MA, Graham J, Giordano TP. Persons newly diagnosed with HIV infection are at high risk for depression and poor linkage to care: results from the Steps Study. *AIDS Behav*. 2011;15:1161-1170.
23. Olley B, Seedat S, Nei DG, Stein DJ. Predictors of major depression in recently diagnosed patients with HIV/AIDS in South Africa. *AIDS Patient Care STDs*. 2004;18:481-487.
24. Shukla M, Agarwal M, Singh JV, Srivastava AK. Anxiety among people living with HIV/AIDS on antiretroviral treatment attending tertiary care hospitals in Lucknow, Uttar Pradesh, India. *Int J Res Med Sci*. 2016;4:2897.
25. Nash D, Tymejczyk O, Gadisa T, et al. Factors associated with initiation of antiretroviral therapy in the advanced stages of HIV infection in six Ethiopian HIV clinics, 2012 to 2013. *J Int AIDS Soc*. 2016;19:20637.
26. Patel RR, Curoe KA, Chan PA. Undetectable equals untransmittable: a game changer for HIV prevention. *Clin Chem*. 2020;66:406-407.

27. Kessler. *Kessler Psychological Distress Scale (K10)*. Harvard Medical School; 2001.

28. Yvonne S, Kaplan I, Szwarc J. Clinical use of the Kessler psychological distress scales with culturally diverse groups. *Int J Methods Psychiatr Res*. 2014;23: 161-183.

29. Andrews G, Slade T. Interpreting scores on the Kessler psychological distress scale (K10). *Aust N Z J Public Health*. 2001;25:494-497.

30. Rutstein SO. *Steps to Constructing the New DHS Wealth Index*. ICF International; 2015.

31. Obiajulu VO, Abiola T, Izehinosen CO, et al. Psychometric validity of the distress thermometer and problem check list in ART-naïve HIV infected patients in Northern Nigeria. *Afr Health Sci*. 2019;19:3172-3180.

32. Stockton MA, Udedi M, Kulisewa K, et al. The impact of an integrated depression and HIV treatment program on mental health and HIV care outcomes among people newly initiating antiretroviral therapy in Malawi. *PLoS One*. 2020;15:e0231872.

33. Deribew A, Deribe K, Reda AA, Tesfaye M, Hailmichael Y, Maja T. Do common mental disorders decline over time in TB/HIV co-infected and HIV patients without TB who are on antiretroviral treatment? *BMC Psychiatry*. 2013;13:174.

34. Belete A, Andaregie G, Tareke M, Birhan T, Azale T. Prevalence of anxiety and associated factors among people living HIV/AIDS at debretabor general hospital anti retro viral clinic Debretabor, Amhara, Ethiopia, 2014. *Am J Psychiatry Neurosci*. 2014;2:109-114.

35. Ambaw F, Mayston R, Hanlon C, Alem A. Burden and presentation of depression among newly diagnosed individuals with TB in primary care settings in Ethiopia. *BMC Psychiatry*. 2017;17:57.

36. Okoror TA, Falade CO, Walker EM, Olorunlana A, Anaele A. Social context surrounding HIV diagnosis and construction of masculinity: a qualitative study of stigma experiences of heterosexual HIV positive men in southwest Nigeria. *BMC Public Health*. 2016;16:507.

37. Abate KH. Gender disparity in prevalence of depression among patient population: a systematic review. *Ethiop J Health Sci*. 2013;23:283-288.

38. Abebe H, Shumet S, Nassir Z, Agidew M, Abebaw D. Prevalence of depressive symptoms and associated factors among HIV-positive youth attending ART follow-up in Addis Ababa, Ethiopia. *AIDS Res Treat*. Published online January 2, 2019. doi:10.1155/2019/4610458

39. Deribew A, Tesfaye M, Hailmichael Y, et al. Common mental disorders in TB/HIV co-infected patients in Ethiopia. *BMC Infect Dis*. 2010;10:201.

40. Odimegwu CO, Akinyemi JO, Alabi OO. HIV-stigma in Nigeria: review of research studies, policies, and programmes. *AIDS Res Treat*. 2017;2017:5812650.

41. Tran BX, Roger C. Depression among patients with HIV/AIDS: research development and effective interventions (GAP$_{RESEARCH}$). *Int J Environ Res Public Health*. 2019;16:1772.

42. Logie CH, Lacombe-Duncan A, Wang Y, et al. Pathways from HIV-related stigma to antiretroviral therapy measures in the HIV care cascade for women living with HIV in Canada. *J Acquir Immune Defic Syndr*. 2018;77:144-153.

43. Tola HH, Shojaeizadeh D, Garmaroudi G, et al. Psychological distress and its effect on tuberculosis treatment outcomes in Ethiopia. *Glob Health Action*. 2015;8:29019.

44. Hershow RB, Gottfredson NC, Ha TV, et al. Longitudinal analysis of depressive symptoms, perceived social support, and alcohol use among HIV-infected men who inject drugs in northern Vietnam. *Subst Use Misuse*. 2020;55:1237-1245.

45. Beyene Gebrezgiabher B, Huluf Abraha T, Hailu E, et al. Depression among adult HIV/AIDS patients attending ART clinics at Aksum town, Aksum, Ethiopia: a cross-sectional study. *Depress Res Treat*. 2019;2019:3250431.

46. Tareke M, Addisu F, Abate A. Depression among patients attending antiretroviral treatment program in public health facilities in Bahir Dar City, Ethiopia. *J Affect Disord*. 2018;232:370-374.

47. Olisah VO, Abiola T, Okpataku CI, Obiako RO, Audu IA. Impact of micronutrients on the psychological well-being of highly active antiretroviral therapy-naïve human immunodeficiency virus-infected patients. *Sahel Med J*. 2020;23:29-35.

48. Sanchez C, Moges NA. Level of mental health service integration in primary health care units in Debre Markos Town, Ethiopia, 2014. *Science*. 2015;3: 181-190.

49. Sampasa-Kanyinga H, Zamorski MA, Colman I. The psychometric properties of the 10-item Kessler Psychological Distress Scale (K10) in Canadian military personnel. *PLoS One*. 2018;13:e0196562.