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Coping strategies for depression among HIV-positive women in Gondar town health facilities, Northwest, Ethiopia: A cross-sectional study

Tadele Amare Zeleke[1*], Kassahun Alemu[2], Tadesse Awoke Ayele[2], Zewditu Abdissa Denu[3], Lillian Mwanri[4] and Telake Azale[5]

Abstract

Background Most women living with HIV in low- and middle-income countries remain undiagnosed and untreated for depression. Even though depression has an adverse effect on treatment outcome and disease progression, less attention is given. The progression of depression is influenced by coping mechanism. The aim of this study was to identify the coping strategies used by depressed women living with HIV in Gondar town health facilities, north west, Ethiopia.

Methods Health institution based cross-sectional study was conducted in Gondar town health facilities, in north-western Ethiopia. All women living with HIV ($n=1043$) were screened for depression symptoms using the validated Patient Health Questionnaire, 9 item version (PHQ-9). Those who scored ten or more, "moderate depression among women living with HIV," ($n=435$) were included in this study. The BRIEF Coping with Problem Experienced (COPE-28) scale was used to assess coping strategies. Construct validity of the brief COPE was evaluated using confirmatory factor analysis with AMOS 23 software. Linear regression model was fitted and beta coefficients were used to interpret the significant factors for coping strategies at p- values <0.05 with 95% confidence interval.

Results Dysfunctional coping strategy was more widely practiced than emotional focused or problem focused coping strategies. From the emotional coping strategy, spiritual believes and praying coping were the most frequently used coping strategies in the study group. Time taken to initiate antiretroviral therapy (ART) less than 5 years and the increment of viral load were significantly associated with dysfunctional coping strategy. Having 1–2 children and fear of COVID-19 were the significant factors for problem focused coping strategy. An increment in emotion focused coping was associated with food insecurity. Social support and distance from health institutions 5 km or more were found to have a positive association with problem and emotion-focused coping strategies. Conversely, time taken to initiate antiretroviral therapy (ART) 5 years and more negatively correlated with both problem and emotion-focused coping mechanisms.

*Correspondence:
Tadele Amare Zeleke
tadeleamare14@gmail.com

Full list of author information is available at the end of the article

Conclusion The study revealed that all coping strategies were utilized by depressed women living with HIV (WLWHIV). Strengthening spiritual coping styles proved beneficial in reducing depression among these individuals. It is recommended that depressed WLWHIV practice problem and emotion-focused coping strategies. Additionally, social support enhances both problem and emotion-focused coping approaches. Factors contributing to dysfunctional coping included having started ART less than five years ago and high viral load levels. Therefore, providing holistic support for depressed WLWHIV is essential to improve their mental health.

Keywords Coping strategies, Depression, WLWHIV, Spirituality

Introduction

Depression is a global burden of disease among people living with HIV. It is a well-known, prevalent, chronic condition and a significant cause of disability worldwide, particularly affecting women [1–3]. In the general population, the lifetime prevalence of depression among women is approximately 20% [4]. However, women living with HIV (WLWHIV) are significantly more vulnerable, experiencing depression at rates four times higher than seronegative women. Additionally, women with HIV are more likely to experience depression compared to men living with the virus [5, 6]. There are intercountry differences in the reported incidence of depression among WLWHIV worldwide. In North America, the prevalence of depression among WLWHIV ranged from 15.9% [7] to 67% [8, 9]. In South America, the distribution of depression in WLWHIV ranged from 25.8% [10] to 68% [11]. In Asia, reported depression rates varied from 25% [12] to 51.1% [13]. In Africa, the prevalence of depression among WLWHIV ranged from 23.7% in Uganda [14] to 81% in Rwanda [15], with 32.5% in Ethiopia [16].

Depression is common in the general population; however, women are particularly vulnerable due to hormonal changes associated with the endocrine regulation of the reproductive system. These changes often occur during the menstrual cycle, childbirth, and menopause [17]. While the exact reasons for women's disproportionate vulnerability to depression remain unclear, several factors have been proposed: (a) women often prioritize caregiving for family members over their own well-being, (b) they may lack adequate social support, (c) they typically have lower household incomes compared to men, (d) they tend to have less access to education, and (e) they are more frequently subjected to abuse by their partners [18].

Comorbidities are prevalent among individuals living with HIV. Women with HIV are particularly susceptible to co-occurring conditions, including mental health issues, physical health challenges, and limited participation in social activities [19], These factors collectively exacerbate their overall health condition [20], especially in comparison to HIV-negative women and men living with HIV [21]. WLWHIV who are depressed have a higher probability of being unemployed [22], and premature deaths [9, 23, 24] than among their counterparts. As the result, depression negatively impacts the social support and increase suicidal ideation of women living with HIV [25]. The effect of depression on PLWHIV are poor treatment outcome, and low CD4 count [26]. Undiagnosed clinical depression and untreated depression worsens the HIV progression [26].

People living with HIV use various coping mechanisms to manage the chronic nature of the disease and its associated stressors. These include both avoidant coping strategies and problem-focused or emotion-focused (adaptive) coping strategies. Certain coping mechanisms help reduce stress and foster positive psychological outcomes [27], while others exacerbate stress and contribute to negative psychological effects [28]. Commonly utilized strategies include problem-focused, emotion-focused, and avoidant coping approaches [29]. Among women living with HIV (WLWHIV), avoidant coping strategies are particularly prevalent among those experiencing psychological distress [30].

Women living with HIV (WLWHIV) employ a variety of coping strategies. Compared to men living with HIV, women often prefer religious coping, venting (emotional expression), and seeking social support. However, depressed women with HIV are more likely to rely on avoidant coping strategies [31]. Spiritual coping strategies, such as prayer, can positively impact both physical and mental health [32] by providing psychological relief from challenging experiences [33]. However, some WLWHIV engage in negative religious coping strategies, such as self-blame, attributing their illness to divine punishment or personal failings. This approach often leads to feelings of shame and guilt. Additionally, denial a form of avoidant coping can emerge, contributing to poor medical outcomes and increased psychological distress [34]. Additionally, fear of stigma or judgment from faith communities may cause some WLWHIV to avoid religious practices, leading to self-isolation, worsening depression, and a loss of vital social support [35]. Seeking social support helped WLWHIV reduce both physical and emotional distress [36]. A study in India showed that depressed WLWHIV frequently used avoidant coping mechanisms. Although WLWHIV with depression often preferred coping strategies such as religion, venting, and seeking support, higher levels of depression were

associated with a greater reliance on avoidant coping, and vice versa [31].

People often respond to depression and anxiety by adopting avoidant coping strategies, which can either (1) lead to negative behaviors that worsen the problem and intensify negative moods or (2) hinder them from taking constructive actions to address the stressor [37]. A study conducted in India found that women living with HIV (WLWHIV) and experiencing major depression commonly relied on self-blame, rumination, particularly brooding, and limited positive reframing [38]. Similarly, in the United States, women with HIV and depression frequently used avoidance, denial, or withdrawal as coping strategies [39]. In New York, avoidant or dysfunctional coping strategies were particularly prevalent among WLWHIV in cases of trauma and depression [40]. In the external environment, denial is a dysfunctional coping strategy used for behavioral management, while internal stress is managed through emotion-focused coping strategies. Both coping strategies are often used simultaneously, though one may be more dominant [41]. Emotional and problem-focused coping strategies have been linked to depressive symptoms, whereas strong family support has been associated with reduced depressive symptoms. Since emotion-focused coping provides immediate relief from depression and anxiety, it is frequently utilized by depressed women living with HIV (WLWHIV) [42].

In WLWHIV, poor mental health and a lower quality of life were associated with the use of emotion-focused coping strategies [43], sometimes individuals used denial or disengagement from stressful situations that results in avoiding discussion about their health status or medication adherence [44]. Women living with HIV often rely on emotion-focused and avoidant coping strategies to manage depressive symptom [12]. Stigma aggravates depression. Women can use avoidant coping strategies to protect themselves from social consequences of their condition [45]; however, it leads to further emotional consequences in the long run [46]. WLWHIV experience poor social support if they may use emotional or avoidant coping strategies as a means of self-calming when social support is not available [27].

Coping strategies are influenced by various factors. Avoidant coping strategies have been linked to low income, limited education, and unemployment [40]. In North Carolina, risk factors for faster progression to AIDS included stressful life events, elevated serum cortisol levels, poor social support, and reliance on denial coping strategies [47]. However, there is limited knowledge about the coping strategies employed by depressed people living with HIV, particularly WLWHIV, in Sub-Saharan Africa, including Ethiopia [48].

Previous studies have overlooked factors such as the time taken to initiate antiretroviral therapy, distance to healthcare facilities, fear of COVID-19, number of children, living arrangements, viral load, HIV-related stigma, food insecurity, alcohol use, and obstetric history. This lack of understanding regarding coping strategies and their related factors among depressed WLWHIV in low-income countries like Ethiopia poses a significant barrier to developing effective HIV/AIDS and mental health services. The tendency to rely on avoidant coping strategies further compounds this challenge [31, 49]. Gaining a deeper understanding of coping strategies is essential for developing effective interventions to improve the mental and emotional well-being of women living with HIV who experience depression [50]. Therefore, this study aimed to explore the specific coping strategies and associated factors among depressed women living with HIV in northwest Ethiopia.

Methods and materials

Study design and period

This is an institutional based cross-sectional study that was conducted between from 1st September to 30 October, 2023.

Study area

This study was conducted in Gondar town health facilities. Gondar is located in northwest of Ethiopia. In Gondar town, there is one comprehensive specialized hospital, one primary hospital and eight health centres, namely the University of Gondar Comprehensive Specialized Referral Hospital (UoGCSRH), Ayra Primary Hospital, Azezo, Maraki, Poly, Mintwab, Gebreal, Teda, Bilajig, and Woleka health centres. There were 6042 adult WLWHIV who had registered for ART follow up in Gondar town health facilities during the study period. For this study, four health facilities were selected based on the higher patient flow. These are the UoGCSRH, Azezo health centre, Gondar/Poly health centre and Maraki health centre. However, only UoGCSRH provides mental health services.

Sources population

All adult WLWHIV who had a follow up and had been screened for probable depression in Gondar town health facilities.

Study population

All adult probable depressed women living with HIV who had ART treatment follow up in Gondar town health facilities, available during the study period.

Inclusion criteria

All adult women living with HIV who were likely depressed, had been on antiretroviral therapy (ART) for at least six months, and provided consent were included in the study. Additionally, participants had to have a viral load measurement taken no longer than a year and had not been diagnosed with depression.

Exclusion criteria

Women living with HIV who were unable to communicate and had a serious general medical condition, were excluded.

Sampling technique

A total of 1,043 eligible women living with HIV were identified at baseline using a systematic random sampling technique. All participants were screened for probable depressive symptoms using the Patient Health Questionnaire (PHQ-9) [51]. Those who scored 10 or higher, indicating probable depression, were included in this analysis. Out of the 1,043 study participants, 435 exhibited probable depressive symptoms and were included in the study.

Data collection

Data were collected using a structured questionnaire that included socio-demographic, clinical, obstetric, psychosocial, behavioural, gender-based violence and food insecurity variables. Data collectors ($n = 8$ Bachelor of Science (BSc) psychiatry) were trained for two days and interviewed women in the health institutions. Three supervisors (MSc in psychiatry) were also trained for two days and assisted the investigators. The questionnaire was originally prepared in English language and then translated to local language Amharic by language experts. The Amharic version was translated back to English to verify the consistency. Data was collected using the Amharic interviewer administered version which is the local language of the study area. A pre-test was conducted in Kola Diba health centre, one of the health centres in the study area, through face-to-face interviews of 53 participants three weeks before the actual data collection period. The Cronbach's alpha of the pre-test was 0.93.

In Gondar town health facilities, 1043 women were selected by systematic random sampling and interviewed, and charts were reviewed by data collectors from September to 30 October, 2023. The purpose of the research was explained, and an information sheet was provided or read aloud for those who were unable to read. Women who consented to participate were interviewed in private rooms nearby the ART units. Out of 1,043 study participants, 435 had scores on the PHQ-9 suggesting probable depression. To those women who scored 10 and above in the PHQ-9, an additional questionnaire (Coping strategies) was administered and they were then referred to a psychiatry clinic.

Measurement

Coping strategies

The coping strategies were measured with BRIEF COPE which has 28 items self- report questionnaire designed to measure coping with a stressful life event [52]. Its score ranges from 28 to 112. The response choices are on a 4-point Likert scale, ranging from 1 to 4, (1 = I haven't been doing this at all, 2 = I've been doing this a little bit, 3 = I've been doing this a medium amount, and 4 = I've been doing this a lot). The Brief COPE tool encompasses three domains. The first is problem-focused coping, characterized by facets such as active coping, use of informational support, planning, and positive reframing. A high score in this domain indicates a strong ability to minimize stress and adopt a practical approach to problem-solving. The second domain, emotion-focused coping, includes facets like venting, seeking emotional support, using humor, practicing acceptance, self-reflection, and incorporating religious beliefs. While a high or low score in this domain does not directly correlate with psychological health or ill health, it provides insight into the respondent's coping strategies. The third domain, avoidant coping strategies, involves behaviors such as self-distraction, denial, substance use, and behavioral disengagement. A high score reflects significant physical or cognitive efforts to disengage from the stressor, while a low score indicates adaptive coping [52–54]. The Brief Cope assessment scale's validity and reliability was done in different countries among PLWHIV [55, 56], and other population [57–61]. In Ethiopia, the internal consistency (Cronbach's alpha) of the Brief COPE assessment tool for women with postpartum depression ranged from 0.72 to 0.74. The construct validity was checked. Except for religion and humor items, the inter-items correlation was all significant [49]. In this context, significant refers to strengthening the rationale for item acceptance [62].

Depression measurement

Patient Health Questionnaire (PHQ-9) was used to measure depression. Each item requires participants to rate the frequency of depressive symptoms experienced two weeks before the data collection period. The total score ranges from 0 to 27. The severity can be assessed using a Likert scale which has four points ranging from 0 to 3(0 = not at all, 1 = several days, 2 = more than half of the days and 3 = nearly every day). A total of 0–4 points = no depression; 5–9 points = mild depression; 10–14 points = moderate depression; 15–19 points = moderately severe depression, and 20–27 points = severe depression [51].

Social support measurement

Oslo Social Support was employed to assess the level of support. This tool has a total of 14 scores and is classified into three broad categories:- poor support: 3– 8, moderate support: 9–11, and strong support: 12–14 [63]. The Oslo social support can measure the level of social support considering financial, social and psychological conditions.

Harmful substance use measurement

The risk of harmful substance use was measured using modified WHO Alcohol, Smoking, and Substance Involvement Screening Test (ASSIST) version 3.1 [64], which consists of seven items for each of alcohol use, khat use and tobacco products use. However, for this study we considered only current substance use items. The reason for considering only current substance use items in this study is to ensure the findings are relevant to the participants' present behaviors and their immediate impact on coping strategies, health outcomes, and psychological well-being. These are; (1) Have you used any kind of alcohol drinks in last 3 months? Yes/No, (2) Have you used khat in the last 3 months? Yes/No, and (3) Have you used any kind of tobacco products in the last 3 months? Yes/No responses [64].

Stigma measurement

Perceived HIV related stigma was measured with 12 items. Each item has a four-point Likert scale (strongly disagree = 1, disagree = 2, agree = 3 and strongly agree = 4), a higher score indicates higher level of stigma. The total score of the scale for perceived HIV related stigma ranged from minimum 12 and maximum 48 score [65].

Intimate partner violence measurement

Intimate partner violence was evaluated using the World Health Organization's Violence against Women assessment tool, which consists of 13 items with yes or no responses. The tool is divided into three components: Physical violence (six items), psychological violence (four items), and sexual violence (three items). At least one yes of each item in the last one year was considered as having intimate partner violence [66, 67].

Food insecurity measurement

Food insecurity was assessed by using the Household Food Security Access Scale [68–70], which is easy and friendly to use for food insecurity assessment. Its reliability and validity were checked in different countries including low- and middle-income countries. The tool consists of nine items, with a total score ranging from 0 to 27. Responses to the questions were measured with a Likert scale as follows: never = 0, rarely = 1, sometimes = 2, and often = 3 [68–71].

COVID-19 measurement

Fear related to COVID-19 has been linked to increased psychological distress among individuals with pre-existing health conditions, such as HIV. This distress exacerbates depressive symptoms and anxiety, potentially worsening disease complications. COVID-19 fear was measured by the question, "Have you feared COVID-19?" with a Yes/No response. Participants who answered "Yes" were categorized as having a fear of COVID-19 [72].

Data processing and analysis

To examine the association factors within each of the three domains coping strategies, we utilized a structural equation model (SEM) for confirmatory factor analysis, employing AMOS 23.0 software. Of probable depressed women living with HIV, 435 study participants were included in the analysis. Coping strategies was the dependent variable whereas socio-demographic, obstetric, clinical, behavioural, food insecurity and psychosocial factors were considered as independent variables.

Data were double entered using Epi-Data version 3.1 and then exported to SPSS version 16, and cleaned, coded (recoding of variables) and analysed. Descriptive analyses were done like frequencies, mean, standard deviation and correlation among the items and the domain of the BRIEF COPE. Frequencies of the 28 items of the BRIEF COPE were calculated into the four Likert categories. Cronbach's alpha of each domain was (avoidant = 0.78, problem focused = 0.76, and emotional focused = 0.81). Confirmatory factor analysis was carried out to confirm the recommended three dimensions of coping namely, avoidant or dysfunctional, problem focused and emotional focused [73, 74] using AMOS-23 software. In confirmatory factor analysis, the coefficients for items loading onto the three dimensions of coping ranged from 0.19 alcohol use (I've been using alcohol or other drugs to help me get through it) in avoidant coping strategies to 0.69 accepting reality (I've been accepting the reality of the fact that it has happened) in emotional coping strategies. Model indices include chi-square, root mean square error of approximation (RMSEA), comparative fit index (CFI), and Tucker-Lewis Index (TLI), goodness of fit index (GFI), and adjusted goodness of fit index (AGFI) were held. Even though, there is no agreement as to the acceptable values of the indices, values closer to one are considered good fit. A value closer to zero is better for RMSEA. The chi-square test is frequently used as an index of model fit. A smaller chi-square with a p-value greater than 0.05 is considered to be a good fit. However, the value of chi-square is affected by large sample size, number of variables and distribution of variables. Usually, chi-square and RAMSEA are used to examine goodness of fit of the model [75, 76]. In the previous study, the CFA of the Brief COPE model fit indices in depressed

Table 1 Socio-demographic characteristics of depressed WLWHIV ($n=435$)

Variable		Frequency	Percent
Age	Mean with standard deviation 42.57(10.84)		
Marital status	Single	40	9.2
	Married	108	24.8
	Divorced	175	40.2
	Widowed	112	25.8
Religion	Orthodox	390	89.7
	Protestant	5	1.1
	Muslim	33	7.6
	Catholic	5	1.1
	Seven Day Adventist	2	0.5
Income category	low income	296	68.0
	middle income	82	18.9
	high income	57	13.1
Educational level	no formal education	174	40.0
	primary school	106	24.4
	secondary school	113	26.0
	diploma and above	42	9.7
Residency	Urban	410	94.2
	Rural	25	5.8
Living arrangement	Alone	70	16.1
	Family	360	82.8
	Relatives	5	1.1
Distance of the institution	5 km and less	182	41.8
	More than 5 km	253	58.2

Table 2 Obstetric characteristics of depressed women living with HIV, ($n=435$)

Variable		Frequency	Percent
Unplanned pregnancy	Yes	28	6.4
	No	407	93.6
History of infertility	Yes	21	4.8
	No	414	95.2
History of still birth	Yes	12	2.8
	No	423	97.2
History of abortion	Yes	39	9.0
	No	396	91
Premature baby	Yes	2	0.5
	No	433	99.5
Number of children	do not have child	71	16.4
	1 to 2 children	219	50.3
	3 to 4 children	107	24.6
	5 and above children	38	8.7

postpartum women in Ethiopia were: CMIN/DF = 3.58, RMSEA = 0.02, the comparative fit index = 0.72, and Tucker Lewis Index = 0.65 [49]. Simple and multiple linear regression analyses were then carried out to examine associated factors with each domain of the coping strategies. Variables in the bivariable analysis that fulfilled p-value < 0.2 were exported to multivariable analysis. This is because variables insignificant individually may be significant in multivariable or vice versa due to confounding factors or interaction with other variables, which leads falling to detect a true value [77, 78]. The other reason is taking cut off point of $p < 0.2$ in bivariable help to ensure that potentially meaningful predictors are not overlooked due to lack of power [77, 78]. In multivariable analysis variables that fulfilled p-value < 0.05 were considered as statistically significant.

Ethics approval

We assured that all procedures contributing to this work comply with the ethical standards of the relevant national and institutional committees on human experimentations and with Helsinki Declaration of 1975, as revised in 2008. This research was conducted in accordance with the guidelines of the Declaration of University of Gondar and was approved by the Institutional Review Board of the University of Gondar College of Medicine and Health Science with approval number 06/02699/8/2023. Moreover, we obtained informed written consent from all study participants before starting the investigation. Privacy and confidentiality were maintained. Participants who scored 10 and above in PHQ-9 were transferred to psychiatric clinic and those who reported intimate partner violence were linked to case managers.

Results

Socio-demographic factors

The mean age (± SD) of the respondents was 42.57(± 10.84), ranging from 18 to 78 years. Among the study participants 174(40%) had no formal education, 175(40.2%) had divorced, and 108 (25%) were married. Out of all respondents, 390(90%) were Orthodox religion followers, and the majority of the participants 296 (68.0%) were in the low-income category (Table 1).

Obstetric related factors

Related to the obstetric characteristic of respondents as shown the (Table 2), 28(6%) had history of unplanned pregnancy, and mothers who had one or two children were 219 (50%) (Table 2).

Comorbidities related factors

Of all respondents, 68(16%) reported comorbid medical illnesses. Of the total participants 14(3.2%) had mental illness other than depression, and 19(4%) participants reported a family history of mental illness (Table 3).

Clinical related factors

Only 13 (3%) reported ART side effects. The study participants reporting fear of COVID-19 were 160(37%). Three hundred and twenty-eight (76%) participants reported that they had not disclosed their HIV status to others (Table 3).

Table 3 Comorbidities and Clinical characteristics of the respondents, (*n*=435)

Variables		Frequency	Percent
ART side effect	Yes	13	3.0
	No	422	97.0
COVID-19 fear	Yes	160	36.8
	No	275	63.2
HIV disclosure	Yes	328	75.4
	No	107	24.6
ART starting duration	Less than 5 years	58	13.3
	More than 5 years	377	86.7
Medical illness	Yes	68	15.6
	No	367	84.4
Family history of mental illness	Yes	19	4.4
	No	416	95.6
Mental illness history	Yes	14	3.2
	No	421	96.8
WHO HIV clinical stage	I	384	88.3
	II	28	6.4
	III	10	2.3
	IV	13	3.0

Behavioural factors of respondents

More than one out of five participants 98(23%) had ART drug non-adherence. For the last three months, 174(40%) consumed alcohol, 7(2%) chewed Khat and 1(0.2%) smoked cigarette.

Social support related factors

The mean scores of social supports were 8.67(SD ± 2.47). Social support was categorized in to three groups as follows: 203(47%) participants had moderate social support, 179(41%) had poor social support and 53(12%) had strong social support.

Perceived HIV related stigma of the respondents

Half of the study participants, 218 (50.1%), reported experiencing a high level of perceived HIV-related stigma. The mean score for perceived HIV-related stigma was 25.83 (SD ± 7.04).

Food insecurity of the study participants

Four in ten depressed WLWHIV had food insecurity. The mean and standard deviation for food insecurity of the study participants were 4.34(SD ± 4.87).

Intimate partner violence (IPV)

Among depressed WLWHIV, 98 (22.5%) had experienced physical violence, 144 (33.1%) had experienced psychological violence, and 30 (6.9%) reported sexual violence (supplementary material 1).

supplementary material 1. Intimate partner violence characteristics of the respondents, (*n* = 435)

Coping strategies

Religious coping was the most frequently used strategy. "I have been praying or meditating" was reported to be used "a lot" by 273(62.8%) and "I've been trying to find comfort in my religion or spiritual beliefs" was reported by 243(55.9%). The least frequently used coping strategies were "I've been using alcohol or other drugs to help me get through it" 29(6.7%) and "I've been using alcohol or other drugs to make myself feel better" 32(7.4%) (Table 4).

The score on avoidant/dysfunctional coping strategies ranged from 15 to 48 with a mean of 28.36(SD ± 6.17). Score on the problem focused coping sub-scale ranged from 7 to 28 with mean 17.87(SD ± 4.22). The emotional focused coping strategies, the score ranged from 9 to 36 with mean and standard deviation of 25.12(SD ± 5.32) (Supplementary material 2).

Supplementary material 2. Frequency of use of coping strategies by WLWHIV to depressive symptoms (*n* = 435).

Construct validity of the BRIEF COPE

The internal consistency (Cronbach's alpha) of avoidant, problem focused and emotional focused coping strategies were 0.78, 0.76 and 0.81 respectively. The overall, internal consistency was 0.90. In confirmatory factor analysis, the coefficients for items loading onto the three dimensions of coping ranged from 0.19 alcohol use (I've been

Table 4 Simple and multiple linear regression analysis of factors associated with dysfunctional coping among depressed WLWHIV, (*n* = 435)

Variable		Mean (SD)	Crude β (95% CI)	Adjusted β (95% CI)	*p*-value
Living arrangement	Living with family	25.01(5.77)	Ref		
	Living alone	25.56(6.25)	0.71(-0.87, 2.28)	0.96(-0.62, 2.53)	0.234
	Living with relatives	20.80(2.39)	-5.11(-10.55, 0.33)	-4.92(-10.29, 0.45)	0.073
Distance from the health institution	Distance more than5km	25.51(5.90)	1.00(-0.17, 2.18)	1.05(-0.11, 2.21)	0.075
	Les than 5 km	24.41(5.71)	Ref		
Art start time	Less than 5yrs	26.90(7.14)	**2.48(0.79, 4.18)**	**2.46(0.77, 4.14)**	**0.004**
	ART start 5 yrs and above	24.76(5.56)	Ref		
Viral load	Viral load 0–75	25.23(5.77)	Ref		
	Viral load 75 and more	22.53(6.28)	**-2.29(-4.57, -0.01)**	**-2.46(-4.73, -0.18)**	**0.034**
Social support		8.67(2.47)	0.22(-0.01, 0.406)	0.20(-0.03, 0.44)	0.084

using alcohol or other drugs to help me get through it) to 0.66(I've been turning to work or other activities to take my mind off things) in avoidant coping strategies, 0.32 (I've been making jokes about it) to 0.69 accepting reality (I've been accepting the reality of the fact that it has happened) in emotional coping strategies and 0.45 (I've been getting help and advice from other people.) to 0.69(I've been trying to come up with a strategy about what to do) in problem focused coping. Correlation between avoidant and problem focused was 0.63. The correlation of avoidant and emotional focused was 0.56. The correlation between problem focused and emotional focused was 0.69 (Supplementary material 3).

Supplementary material 3. Coping strategies assessment tool and model summary.

In the model modification indices, the CFA model fit indices were as follows: CMIN/DF = 4.32, Comparative fit indices (CFI) = 0.75, root mean squared error of approximation (RMSEA) = 0.08, goodness of fit index (GFI) = 0.80 adjusted goodness of fit index (AGFI) = 0.75 and Tucker Lewis Index (TLI) = 0.72. Removing the item with low coefficients did not improve the model fitness. So, all items were retained for further analysis.

Factors associated with avoidance/dysfunctional coping

In the simple linear regression model, factors such as living arrangement, viral load, a distance of 5 km (km) or more from the health institution, time taken to initiate antiretroviral therapy (ART) of less than 5 years, and social support were found to have a p-value of less than 0.2 in relation to the avoidant coping subscale.

In the multivariable linear regression analysis, factors positively associated with avoidant coping strategies included the time taken to initiate antiretroviral therapy (ART) being less than 5 years [β = 2.46; 95% CI (0.77, 4.14)] ($p < 0.004$). On the other hand, an increase in viral load was negatively associated with avoidant coping [β = -2.46; 95% CI (-4.73, -0.18)] ($p < 0.034$) (Table 4).

Factors associated with problem focused coping

In the bivariate analysis, variables with a p-value less than 0.2 were included in the multivariable linear regression analysis. Several factors were found to be associated with problem-focused coping strategies in the multivariable linear regression. Women with 1 or 2 children showed an increase of 0.16 in problem-focused coping strategies [β = 0.16; 95% CI (0.07, 2.25)] ($p < 0.038$). For women living more than 5 km from a health institution, problem-focused coping strategies increased by 12% [β = 1.12; 95% CI (0.33, 1.91)] ($p < 0.006$). Each unit increase in social support was associated with a 30% increase in problem-focused coping strategies [β = 0.30; 95% CI (0.14, 0.47)] ($p \leq 0.001$). On the other hand, the time taken to initiate antiretroviral therapy (ART) for 5 years or more was associated with a 45% decrease in problem-focused coping strategies [β = -1.45; 95% CI (-2.60, -0.30)] ($p < 0.013$). Additionally, women who feared COVID-19 demonstrated an 82% decrease in problem-focused coping strategies [β = -0.82; 95% CI (-1.63, -0.01)] ($p < 0.048$) (Table 5).

Factors associated with emotional focused coping

In the bivariate analysis, variables with a p-value less than 0.2 included residency, living arrangement, number of children, distance from the health institution, time taken to initiate antiretroviral therapy (ART), social support, food insecurity, and alcohol use. In the multivariable linear regression analysis, several factors were positively

Table 5 Simple and multiple linear regression analysis of factors associated with problem focused coping among depressed WLWHIV, ($n = 435$)

Variable		Mean and SD	Crude β (95% CI)	Adjusted β (95% CI)	*p*-value
Number of children	No child	17.21(4.27)	Ref		
	Child 1 or 2	18.41(4.35)	**1.10(0.31, 1.89)**	**0.16(0.07, 2.25)**	**0.038**
	3 to 4 children	1769(3.94)	-0.23(-1.16, 0.69)	0.59(-0.65, 1.83)	0.350
	Child 5 and more	16.45(3.73)	-1.56(-2.96, -0.15)	-1.08(-2.70, 0.54)	0.191
Distance from health institution	Distance less or 5 km	17.25(4.23)	Ref		
	Distance more than 5 km	18.31(4.23)	**1.06(0.25, 1.86)**	**1.12(0.33, 1.91)**	**0.006**
Social support		8.67(2.47)	**0.30(0.14, 0.45)**	**0.30(0.14, 0.47)**	**0.000**
Stigma		25.83(7.04)	-0.06(-0.11, 0.01)	-0.02(-0.07, 0.04)	0.590
ART starting time	ART start from 6 months to 5yrs	19.16(5.03)	Ref		
	More than 5yrs	17.67(4.06)	-1.49(-2.65, -0.32)	**-1.45(-2.60, -0.30)**	**0.013**
Still birth	Yes	16.00(4.92)	-1.92(-4.35, 0.51)	-1.11(-3.46, 1.25)	0.356
	No	17.92(4.20)	Ref		
Abortion	Yes	16.87(4.27)	-1.09(-2.48, 0.30)	-1.22(-2.47, 0.23)	0.103
	No	17.96(4.21)	Ref		
Fear of COVID-19	Yes	17.30(3.53)	**-0.90(-1.72, -0.07)**	**-0.82(-1.63, -0.01)**	**0.048**
	No	18.20(4.55)	Ref		

Table 6 Simple and multiple linear regression analysis of factors associated with emotional focused coping among depressed WLWHIV, ($n = 435$)

Variables		Mean and SD	Crude β (95% CI)	Adjusted β (95% CI)	*p*-value
Residence	Urban	22.51(5.08)	-1.57(-3.72, 0.58)	-1.77(-3.92, 0.38)	0.106
	Rural	24.00(4.84)	Ref		
Living arrangement	Family	22.41(5.02)	Ref		
	Living alone	23.51(5.43)	0.99(-0.38, 2.35)	1.34(-0.02, 2.70)	0.053
	Relatives	23.20(3.56)	0.44(-4.27, 5.15)	0.83(-3.86, 5.53)	0.727
Distance from health institution	Distance 5 km and low	21.92(5.20)	Ref		
	5 km and above	23.09(4.94)	**1.19(0.18, 2.20)**	**1.01(0.01, 2.01)**	**0.048**
Number of children	No child	21.93(5.17)	Ref		
	1 to 2 children	22.84(5.23)	0.91(-0.52, 2.34)	0.88(-0.54, 2.31)	0.223
	3 to4 children	22.94(4.71)	1.05(-0.55, 2.65)	1.20(-0.45, 2.85)	0.153
	Children 5 and above	21.47(5.01)	-0.56(-2.66, 1.50)	-0.93(-3.04, 1.17)	0.385
Duration of ART start	ART start 6 months to 5yrs	23.57(6.12)	Ref		
	On ART 5 yrs and more	22.45(4.89)	-1.21(-2.69, 0.26)	**-1.53(-2.99, -0.06)**	**0.042**
Social support		8.67(2.47)	**0.25(0.05, 0.45)**	**0.38(0.18, 0.59)**	**0.0001**
Food insecurity		4.34(4.87)	**0.13(0.03, 0.23)**	**0.16(0.06, 0.27)**	**0.003**
Alcohol use	Yes	23.26(4.99)	1.14(0.12, 2.16)	0.78(-0.23, 1.79)	0.128
	No	22.15(5.20)	Ref		

associated with emotion-focused coping strategies. These included social support [β = 0.38; 95% CI (0.18, 0.59)] ($p \leq 0.001$), food insecurity [β = 0.16; 95% CI (0.06, 0.27)] ($p < 0.003$), and distance from the health institution (5 km and above) [β = 1.01; 95% CI (0.01, 2.01)] ($p < 0.048$). However, the time taken to initiate ART (5 years or more) was negatively associated with emotion-focused coping strategies [β = -1.53; 95% CI (-2.99, -0.06)] ($p < 0.048$) (Table 6).

Discussion

The present study aimed to examine coping strategies and associated factors among depressed women living with HIV. Our study found that depressed women living with HIV used various coping strategies, with avoidant coping, problem-focused coping, and emotion-focused coping being the most commonly employed. Factors associated with avoidant coping included viral load and the duration of time taken to initiate antiretroviral therapy (ART). For problem-focused and emotion-focused coping strategies, factors such as social support, living far from a health institution, and a delay of 5 years or more in initiating ART were identified as key associations.

In this study, avoidant coping was widely used by depressed WLWHIV. This finding aligns with previous research indicating that psychologically distressed WLWHIV tend to rely on avoidant coping strategies [30, 31]. This coping strategy is considered maladaptive because it often intensifies feelings of depression and worsens overall health conditions [27, 79]. Other studies have also shown that depressed women living with HIV commonly use avoidance, denial, or withdrawal coping strategies [39, 40]. A possible reason for this could be a lack of interest in confronting stressors and the difficulty in taking practical steps to address the reality, which may negatively impact both the clinical outcomes of depression and the progression of HIV [77]. Anotherpossible reason is that stigma is one of the most prevalent psychological issues among depressed WLWHIV, which may make it harder for women to engage in problem-focused coping strategies, opting instead for seeking support [25, 79]. Additionally, depression can foster a sense of helplessness, prompting women to adopt avoidant coping strategies as a way to escape their emotional pain [27, 80].

Two factors influenced the use of avoidant coping strategies, including the time taken to initiate antiretroviral therapy (ART) and viral load. The duration of time taken to initiate ART, particularly when it was less than five years, was positively associated with avoidant coping strategies. This may be because, during the initiation of ART, women face challenges in coping with both HIV and the side effects of the medication, which can lead to depressive symptoms. In such cases, women may resort to avoidant coping. Additionally, during ART initiation, women often experience perceived HIV stigma and poor ART adherence due to drug side effects [81]. Another possible explanation is that women may not disclose their HIV status to family members or partners during this period, which might reduce support and worsen depressive symptoms, ultimately leading to the use of avoidant coping strategies [82].

Viral load greater than 75 copies/ml was negatively associated with avoidant coping strategies, which aligns with findings showing that maladaptive coping strategies, such as harmful substance use and self-distraction, are linked to poorer medication adherence and higher viral

loads [37]. In our study, as viral load increased, the use of dysfunctional coping strategies decreased. Participants with higher viral loads reported less use of dysfunctional coping. This may be attributed to the type of counselling provided to those with higher viral loads [82]. Addressing stressors and improving coping skills in women living with HIV is crucial for enhancing their overall prognosis [79].

Problem-focused and emotional focused coping are an adaptive strategy employed by depressed women living with HIV in this study. This is because problem-focused coping addresses mental health issues by promoting health-enhancing behaviors, utilizing counselling services, and ultimately leading to better health outcomes [27, 80]. Similarly, emotion-focused coping is also an adaptive strategy used by depressed WLWHIV. Another study indicated that emotion-focused coping strategies, such as seeking emotional support, using positive reframing, and expressing feelings, are employed to reduce negative emotions, rather than directly addressing the underlying cause [79]. From emotional focused coping strategy, majority of the WLWHIV used religious/spiritual coping strategies. Engaging in religious practice can provide hope, comfort and sense of purpose, which helps the woman to manage stress and maintain positive outlook in spite of their challenges [34, 83].

In this finding religious/spiritual coping strategies have been found to be the most frequently used coping mechanisms by depressed WLWHIV. This finding is supported by research conducted in Ethiopia, where the majority of individuals identified with a religion or spiritual belief, using it as a primary coping strategy for psychological stress [84]. Other studies also report that women with postpartum depression frequently practice religion or spirituality as a coping strategy [49]. A possible reason for this could be that religious practices, emotional expression, and seeking social support as coping strategies may help alleviate both mental and physical health issues [31, 32, 85, 86].

Several factors were associated with both problem-focused and emotion-focused coping strategies. For problem-focused coping, these factors included having 1–2 children, living more than 5 km from a health institution, social support, 5 years or more in initiating antiretroviral therapy (ART), and fear of Coronavirus Disease-2019 (COVID-19). For emotion-focused coping, factors such as social support, food insecurity, living more than 5 km from a health institution, and a delay of 5 years or more in initiating ART were also found to be associated.

Problem-focused and emotion-focused coping strategies were positively associated with social support, a finding that aligns with other research indicating that strong family support helps reduce depressive symptoms and enhances adaptive coping [42]. The possible explanation is that social support can improve women's perceptions of their coping self-efficacy, thereby boosting their use of emotion-focused coping strategies [37]. In both emotional and problem-focused coping, social support can serve as a primary strategy for managing depression [87]. Another study also highlighted that social support and coping strategies are key factors in the psychological well-being of women living with HIV [88].

Both problem-focused and emotion-focused coping strategies were significantly associated with distance from the health institution. A long distance from the health institution plays a notable role in shaping coping strategies among women living with HIV. While distance from the health institution has been linked to ART non-adherence, which is considered a dysfunctional coping strategy [89], many women living with HIV who experience stigma choose to attend ART follow-up appointments far from their catchment areas, likely employing adaptive coping strategies [90]. Perhaps getting medical care far away from their home is to reduce stigma and get relief [91].

Time taken to initiate antiretroviral therapy (ART) 5 years and above was negatively associated with emotional and problem focused coping. Possibly WLWHIV who are on ART medication for life long may face complications and disease burden. So that, the women decreased to use emotional or problem focused coping strategy [50, 92]. Another finding revealed that depressed WLWHIV who had been on antiretroviral therapy (ART) for an extended period did not use emotional or problem-focused coping strategies. Instead, they resorted to harmful substance use and disengagement [27]. Additionally, other research indicated that, over time, depressed WLWHIV on long-term ART were less likely to use emotional or problem-focused coping strategies [50]. So, understanding of coping strategies and identifying related factors are very crucial in developing intervention strategies and providing comprehensive intervention for women living with HIV.

Study participants with 1–2 children were more likely to use problem-focused coping strategies compared to those with no children. This could be having children appears to enhance problem-focused coping in depressed WLWHIV. Another possible explanation is that children serve as a source of strength and motivation, which helps reduce feelings of guilt and stress, thereby encouraging the use of problem-focused coping strategies [35].

Fear of COVID-19 was negatively associated with problem focused coping strategy. Indeed, COVID-19 has contributed to increased psychological distress, which impacts coping strategies. One possible explanation is that a stronger belief in the severity of COVID-19 is linked to more severe depressive symptoms. The

perception of COVID-19's severity was negatively associated with problem-focused coping behaviors [93]. Additionally, participants experiencing food insecurity were more likely to use emotion-focused coping strategies. Research has highlighted that WLWHIV are disproportionately affected by food insecurity [94]. The other finding also supported the current study that food insecure women managed their food insecurity by utilising emotional coping strategies more frequently than their food secure counterparts [95].

Limitations

A limitation of the current study is that we did not undertake cultural validation of the Brief COPE for a similar population. Although our work demonstrated reasonable construct validity within this sample, the lack of cultural validation may affect its applicability. Another limitation is the inability to establish cause-and-effect relationships between depression and coping strategies due to the cross-sectional design of the study. Additionally, data were collected exclusively from patients attending an antiretroviral clinic, which may not represent the broader population of women living with HIV. The reliance on self-report measures also introduces potential biases, such as social desirability bias.

Despite these limitations, the study provides valuable information that can inform the development of appropriate and rational policies, as well as effective interventions for mental health issues. To our knowledge, this is the first study conducted in Ethiopia to investigate coping strategies among depressed women living with HIV.

Implication and future direction

In the present study, the findings indicated that the majority of participants utilized religious and spiritual coping strategies. A key advantage of this study is its integration of mental health services with religious and spiritual institutions.

This evidence can support policymakers in developing frameworks that address depression and coping strategies effectively. Policymakers play a crucial role in shaping mental health care frameworks by promoting effective coping strategies for depressed WLWHIV. By investing in evidence-based therapies that enhance social support, and consider factors such as childlessness, distance from healthcare facilities, fear of COVID-19, food insecurity, duration on ART, and viral load, comprehensive support can be provided.

These findings can also guide clinical service providers in developing targeted practices for depressed WLWHIV. Establishing support services that offer counselling for those struggling with avoidant coping strategies and creating support groups that focus on sharing experiences can foster healthier coping mechanisms. Integrating faith-based discussions into support groups can provide a holistic approach to intervention.

Future researchers are encouraged to conduct prospective studies to clarify whether coping strategies predispose women to depression or are a consequence of it.

Conclusion

Our study offers valuable insights into the coping strategies and related factors for depressed women living with HIV (WLWHIV) in Ethiopia. The findings indicate that all coping strategies were employed by WLWHIV, with spiritual and religious coping being the most commonly utilized among depressed individuals in the study. Social support was found to enhance adaptive coping strategies, while living more than 5 km from a medication source was positively associated with adaptive coping. Conversely, women who had been on medication for five years or longer exhibited a decrease in adaptive coping strategies.

This evidence can be instrumental in informing the development of interventions aimed at strengthening and expanding social support to improve the mental health and well-being of WLWHIV.

Abbreviations

AIDS	Acquired Immune Deficiency Syndrome
ASSIST	Alcohol, Smoking and Substance Involvement Screening Test
CI	Confidence Interval
DSM-IV	Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition
HIV	Human Immune Deficiency Virus
IPV	Intimate Partner Violence
LMIC	Low- and Middle-Income Country
PHQ	Patient Health Questionnaire
PLWHIV	People Living with Human Immune Virus
PTSD	Post Traumatic Stress Disorder
PS	Perceived Stigma
UoGCSRH	University of Gondar Comprehensive Specialized Referral Hospital
US	United State
WLWHIV	Women Living with Human Immunodeficiency Virus

Supplementary Information

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Supplementary Material 1

Supplementary Material 2

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Author contributions

Authors contribution Conceptualization: Tadele Amare Zeleke Data curation: Professor Telake Azale Bisetegn, Dr. Lillian Mwanri, Dr. Zewditu Abdissa Formal analysis: Tadele Amare Zeleke Investigation: Tadele Amare Zeleke, Methodology: Tadele Amare Zeleke, Prof. Telake Azale Bisetegn, Prof. Tadesse Awoke Ayele, Prof. Kassahun Alemu, Dr. Zewditu Abdissa Denu, Dr. Lillian

Mwanri Software: Tadele Amare Zeleke, Supervision: Prof. Kassahun Alemu, Prof. Tadesse Awoke Ayele, Dr. Zewditu Abdissa Denu, Dr. Lillian Mwanri, Prof. Telake Azale, Bisetegn Writing original draft: Tadele Amare Zeleke.

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Data availability
No datasets were generated or analysed during the current study.

Declarations

Ethics approval and consent to participate
The authors assured that all procedures contributing to this work comply with the ethical standards of the relevant national and institutional committees on human experimentations and with Helsinki Declaration of 1975, as revised in 2008. This research was conducted in accordance with the guidelines of the Declaration of University of Gondar and was approved by the Institutional Review Board of the University of Gondar College of Medicine and Health Science with approval number 06/02699/8/2023. Moreover, we obtained informed written consent from all study participants before starting the investigation. Privacy and confidentiality were maintained. Participants who scored 10 and above in PHQ-9 were transferred to psychiatric clinic and those who complained intimate partner violence were linked to case managers.

Consent for publication
Not applicable.

Competing interests
The authors declare no competing interests.

Author details
[1]Department of Psychiatry, College of Medicine and Health Science, University of Gondar, Gondar, Ethiopia
[2]Department of Epidemiology and Biostatics, Institute of Public Health, College of Medicine and Health Sciences, University of Gondar, Gondar, Ethiopia
[3]Department of Anesthesia, College of Medicine and Health Sciences, University of Gondar, Gondar, Ethiopia
[4]Research Centre for Public Health, Equity and Human Flourishing, Torrens University, Adelaide Campus, Adelaide, SA 5000, Australia
[5]Department of Health Promotion and Behavioral Sciences, Institute of Public Health, College of Medicine and Health Sciences, University of Gondar, Gondar, Ethiopia

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References

1. Moussavi S, Chatterji S, Verdes E, Tandon A, Patel V, Ustun B. 'Depression, Chronic Diseases, and Decrements in Health: Results from the World Health Surveys'. *The Lancet*, vol. 370, no. 9590, Sept. 2007, pp. 851–58. *DOI.org(Crossref)*, https://doi.org/10.1016/S0140-6736(07)61415-9
2. Pincus HA, Pettit AR. The societal costs of chronic major depression'. J Clin Psychiatry. 2001;62(6):5–9.
3. Wachs TD, Black MM, Engle PL, Maternal Depression. A Global Threat to Children's Health, Development, and Behavior and to Human Rights'. *Child Development Perspectives*, vol. 3, no. 1, Apr. 2009, pp. 51–59. *DOI.org(Crossref)*, https://doi.org/10.1111/j.1750-8606.2008.00077.x
4. Kessler RC, McGonagle KA, Swartz M, Blazer DG, Nelson CB. Nov. Sex and Depression in the National Comorbidity Survey I: Lifetime Prevalence, Chronicity and Recurrence'. *Journal of Affective Disorders*, vol. 29, no. 2–3, 1993, pp. 85–96. *DOI.org(Crossref)*, https://doi.org/10.1016/0165-0327(93)90026-G
5. Morrison MF, Petitto JM, Have TT, Gettes DR, Chiappini MS, Weber AL et al. May. Depressive and Anxiety Disorders in Women With HIV Infection'. *American Journal of Psychiatry*, vol. 159, no. 5, 2002, pp. 789–96. *DOI.org(Crossref)*, https://doi.org/10.1176/appi.ajp.159.5.789
6. Niu L, Luo D, Liu Y, Silenzio VM, Xiao S. Apr. The Mental Health of People Living with HIV in China, 1998–2014: A Systematic Review'. *PLOS ONE*, edited by Anil Kumar, vol. 11, no. 4, 2016, p. e0153489. *DOI.org(Crossref)*, https://doi.org/10.1371/journal.pone.0153489
7. Evans DL, Ten Have TR, Douglas SD, Gettes DR, Morrison M, Chiappini MS et al. Oct. Association of Depression With Viral Load, CD8 T Lymphocytes, and Natural Killer Cells in Women With HIV Infection'. *American Journal of Psychiatry*, vol. 159, no. 10, 2002, pp. 1752–59. *DOI.org(Crossref)*, https://doi.org/10.1176/appi.ajp.159.10.1752
8. Cook J, Grey D, Burke-Miller J, Cohen M, Anastos K, Gandhi M et al. Feb. Effects of Treated and Untreated Depressive Symptoms on Highly Active Antiretroviral Therapy Use in a US Multi-Site Cohort of HIV-Positive Women'. *AIDS Care*, vol. 18, no. 2, 2006, pp. 93–100. *DOI.org(Crossref)*, https://doi.org/10.1080/09540120500159284
9. Cook JA, Grey D, Burke J, Cohen MH, Gurtman AC, Richardson JL et al. Depressive Symptoms and AIDS-Related Mortality Among a Multisite Cohort of HIV-Positive Women'. *American Journal of Public Health*, vol. 94, no. 7, July 2004, pp. 1133–40. *DOI.org(Crossref)*, https://doi.org/10.2105/AJPH.94.7.1133
10. Mello VAd, Malbergier A. Mar. Depression in Women Infected with HIV'. *Revista Brasileira de Psiquiatria*, vol. 28, no. 1, 2006, pp. 10–17. *DOI.org(Crossref)*, https://doi.org/10.1590/S1516-44462006000100004
11. Wu DY, Munoz M, Espiritu B, Zeladita J, Sanchez E, Callacna M et al. Aug. Burden of Depression Among Impoverished HIV-Positive Women in Peru'. *JAIDS Journal of Acquired Immune Deficiency Syndromes*, vol. 48, no. 4, 2008, pp. 500–04. *DOI.org(Crossref)*, https://doi.org/10.1097/QAI.0b013e31817dc3e9
12. Melgar MIE, Alejandro CB, Chia EA, Stigma HIV, Support PS. Coping Style and Mental Health of Women Living with HIV in the Philippines'. *Madridge Journal of Behavioral & Social Sciences*, vol. 5, no. 1, Mar. 2022, pp. 79–85. *DOI.org(Crossref)*, https://doi.org/10.18689/mjbss-1000114
13. Unnikrishnan B, Jagannath V, Ramapuram JT, Achappa B, Madi D. Study of Depression and Its Associated Factors among Women Living with HIV/AIDS in Coastal South India'. *ISRN AIDS*, vol. 2012, June 2012, pp. 1–4. *DOI.org(Crossref)*, https://doi.org/10.5402/2012/684972
14. Hatcher AM, Tsai AC, Kumbakumba E, Dworkin SL, Hunt PW, Martin JN et al. Dec. Sexual relationship power and depression among HIV-infected women in rural Uganda. PloS Sexual Relationship Power and Depression among HIV-Infected Women in Rural Uganda'. *PLoS ONE*, edited by Paula Braitstein, vol. 7, no. 12, 2012, p. e49821. *DOI.org(Crossref)*, https://doi.org/10.1371/journal.pone.0049821
15. Cohen MH, Fabri M, Cai X, Shi Q, Hoover DR, Binagwaho A et al. Nov. Prevalence and Predictors of Posttraumatic Stress Disorder and Depression in HIV-Infected and At-Risk Rwandan Women'. *Journal of Women's Health*, vol. 18, no. 11, 2009, pp. 1783–91. *DOI.org(Crossref)*, https://doi.org/10.1089/jwh.2009.1367
16. Yousuf A, Musa R, Isa MLM, Arifin SRM. Anxiety and Depression Among Women Living with HIV: Prevalence and Correlations'. *Clinical Practice & Epidemiology in Mental Health*, vol. 16, no. 1, July 2020, pp. 59–66. *DOI.org(Crossref)*, https://doi.org/10.2174/1745017902016010059
17. Noble RE. May. Depression in Women'. *Metabolism*, vol. 54, no. 5, 2005, pp. 49–52. *DOI.org(Crossref)*, https://doi.org/10.1016/j.metabol.2005.01.014
18. Kalichman SC, Hernandez D, Finneran S, Price D, Driver R. Transgender Women and HIV-Related Health Disparities: Falling off the HIV Treatment Cascade'. *Sexual Health*, vol. 14, no. 5, 2017, p. 469. *DOI.org(Crossref)*, https://doi.org/10.1071/SH17015
19. Gaynes BN, Pence BW, Eron JJ Jr, Miller WC. May. Prevalence and Comorbidity of Psychiatric Diagnoses Based on Reference Standard in an HIV + Patient Population'. *Psychosomatic Medicine*, vol. 70, no. 4, 2008, pp. 505–11. *DOI.org(Crossref)*, https://doi.org/10.1097/PSY.0b013e31816aa0cc
20. Kendall CE, Wong J, Taljaard M, Glazier RH, Hogg W, Younger J et al. Dec. A Cross-Sectional, Population-Based Study Measuring Comorbidity among People Living with HIV in Ontario'. *BMC Public Health*, vol. 14, no. 1, 2014, p. 161. *DOI.org(Crossref)*, https://doi.org/10.1186/1471-2458-14-161
21. Bing EG, Burnam MA, Longshore D, Fleishman JA, Sherbourne CD, London AS et al. Aug. Psychiatric Disorders and Drug Use Among Human Immunodeficiency Virus–Infected Adults in the United States'. *Archives of General Psychiatry*, vol. 58, no. 8, 2001, p. 721. *DOI.org(Crossref)*, https://doi.org/10.1001/archpsyc.58.8.721
22. Lerner D, Adler DA, Chang H, Lapitsky L, Hood MY, Perissinotto C et al. Dec. Unemployment, Job Retention, and Productivity Loss Among Employees With Depression'. *Psychiatric Services*, vol. 55, no. 12, 2004, pp. 1371–78. *DOI.org(Crossref)*, https://doi.org/10.1176/appi.ps.55.12.1371
23. Mills JC, Pence BW, Todd JV, Bengtson AM, Breger TL, Edmonds A et al. Oct. Cumulative Burden of Depression and All-Cause Mortality in Women Living

With Human Immunodeficiency Virus'. *Clinical Infectious Diseases*, vol. 67, no. 10, 2018, pp. 1575–81. *DOI.org(Crossref)*, https://doi.org/10.1093/cid/ciy264
24. Antelman G, Kaaya S, Wei R, Mbwambo J, Msamanga GI, Fawzi WW et al. Apr. Depressive Symptoms Increase Risk of HIV Disease Progression and Mortality Among Women in Tanzania'. *JAIDS Journal of Acquired Immune Deficiency Syndromes*, vol. 44, no. 4, 2007, pp. 470–77. *DOI.org(Crossref)*, https://doi.org/10.1097/QAI.0b013e31802f1318
25. Bhadra NM, Hershow RB, Ha TV, Pence BW, Mai NVT, Go VF. Depression and Coping Strategies among Vietnamese Women Living with HIV: A Qualitative Study'. *Global Public Health*, vol. 15, no. 7, July 2020, pp. 1050–61. *DOI.org(Crossref)*, https://doi.org/10.1080/17441692.2020.1731566
26. Amanor-Boadu S, Hipolito MS, Rai N, McLean CK, Flanagan K, Hamilton FT et al. Poor CD4 Count Is a Predictor of Untreated Depression in Human Immunodeficiency Virus-Positive African-Americans'. *World Journal of Psychiatry*, vol. 6, no. 1, 2016, p. 128. *DOI.org(Crossref)*, https://doi.org/10.5498/wjp.v6.i1.128
27. Parcesepe AM, Filiatreau LM, Gomez A, Ebasone PV, Dzudie A, Pence BW et al. July. Coping Strategies and Symptoms of Mental Health Disorders Among People with HIV Initiating HIV Care in Cameroon'. *AIDS and Behavior*, vol. 27, no. 7, 2023, pp. 2360–69. *DOI.org(Crossref)*, https://doi.org/10.1007/s10461-022-03963-4
28. Endler NS, Parker JD. Assessment of multidimensional coping: task, emotion, and avoidance strategies'. *Psychological assessment*. APA PsycNet. 1994;6(1):50–60. https://doi.org/10.1037/1040-3590.6.1.50.
29. Carver CS, Scheier MF, Weintraub JK. Assessing Coping Strategies: A Theoretically Based Approach.' *Journal of Personality and Social Psychology*, vol. 56, no. 2, 1989, pp. 267–83. *DOI.org(Crossref)*, https://doi.org/10.1037/0022-3514.56.2.267
30. Kaneez S. Oct. Psychological Distress and Coping among HIV/AIDS Patients'. *JOURNAL OF INTEGRATED COMMUNITY HEALTH*, vol. 6, no. 2, 2017, pp. 15–18. *DOI.org(Crossref)*, https://doi.org/10.24321/2319.9113.201702
31. Kaneez S. Depression and Coping Mechanism among HIV/AIDS Patients under Anti-Retroviral Therapy'. *Indian Journal of Social Psychiatry*, vol. 32, no. 2, 2016, p. 149. *DOI.org(Crossref)*, https://doi.org/10.4103/0971-9962.181098
32. Dalmida SG, Holstad MM, Diiorio C, Laderman G. June. Spiritual Well-Being, Depressive Symptoms, and Immune Status Among Women Living with HIV/AIDS'. *Women & Health*, vol. 49, no. 2–3, 2009, pp. 119–43. *DOI.org(Crossref)*, https://doi.org/10.1080/03630240902915036
33. Morse EV, Morse PM, Klebba KE, Stock MR, Forehand R, Panayotova E. The use of religion among HIV-infected African American women. *Journal of Religion and Health*, vol. 39, no. 3, 2000, pp. 261–76. *DOI.org(Crossref)*, https://doi.org/10.1023/A:1010314724910
34. Zainal-Abidin AN, Ariffin F, Badlishah-Sham SF, Razali S. Exploring spiritual and religious coping among PLHIV in a Malaysian Muslim community: A qualitative study'. *HIV/AIDS (Auckland, N.Z)*. PubMed Cent. Aug. 2022;14:409–22. https://doi.org/10.2147/HIV.S371554.
35. Fauk NK, Gesesew HA, Mwanri L, Hawke K, Merry MS, Asa GA, Ward PR. Understanding coping strategies of mothers living with HIV who care for children living with HIV: A qualitative study in Indonesia'. BMC Women's Health. Apr. 2023;23(1):172. https://doi.org/10.1186/s12905-023-02299-y. *PubMed*.
36. Thoits PA. Stress, Coping, and Social Support Processes: Where Are We? What Next?' *Journal of Health and Social Behavior*, vol. Spec No, 1995, pp. 53–79.
37. Weaver KE, Llabre MM, Durán RE, Antoni MH, Ironson G, Penedo FJ et al. July. A Stress and Coping Model of Medication Adherence and Viral Load in HIV-Positive Men and Women on Highly Active Antiretroviral Therapy (HAART).' *Health Psychology*, vol. 24, no. 4, 2005, pp. 385–92. *DOI.org(Crossref)*, https://doi.org/10.1037/0278-6133.24.4.385
38. Choudhury S, Sahoo S, Dash SR. Coping Mechanisms Used by Women with Major Depression'. *Indian Journal of Public Health Research &* Development, Oct. 2020. *DOI.org(Crossref)*, https://doi.org/10.37506/ijphrd.v11i10.11136
39. Moneyham L, Murdaugh C, Phillips K, Jackson K, Tavakoli A, Boyd M et al. July. Patterns of Risk of Depressive Symptoms Among HIV-Positive Women in the Southeastern United States'. *Journal of the Association of Nurses in AIDS Care*, vol. 16, no. 4, 2005, pp. 25–38. *DOI.org(Crossref)*, https://doi.org/10.1016/j.jana.2005.05.005
40. Simoni JM, Ng M. Oct. Trauma, Coping, and Depression among Women with HIV/AIDS in New York City'. *AIDS Care*, vol. 12, no. 5, 2000, pp. 567–80. *DOI.org(Crossref)*, https://doi.org/10.1080/095401200750003752
41. Forsythe CJ, Compas BE. Aug. Interaction of Cognitive Appraisals of Stressful Events and Coping: Testing the Goodness of Fit Hypothesis'. *Cognitive Therapy and Research*, vol. 11, no. 4, 1987, pp. 473–85. *DOI.org(Crossref)*, https://doi.org/10.1007/BF01175357
42. Seffren V, Familiar I, Murray SM, Augustinavicius J, Boivin MJ, Nakasujja N et al. July. Association between Coping Strategies, Social Support, and Depression and Anxiety Symptoms among Rural Ugandan Women Living with HIV/AIDS'. *AIDS Care*, vol. 30, no. 7, 2018, pp. 888–95. *DOI.org(Crossref)*, https://doi.org/10.1080/09540121.2018.1441969
43. Gibson K, Rueda S, Rourke SB, Bekele T, Gardner S, Fenta H et al. June. Mastery and Coping Moderate the Negative Effect of Acute and Chronic Stressors on Mental Health-Related Quality of Life in HIV'. *AIDS Patient Care and STDs*, vol. 25, no. 6, 2011, pp. 371–81. *DOI.org(Crossref)*, https://doi.org/10.1089/apc.2010.0165
44. Tegegne AS. Quality of life and associated factors of HIV patients under treatment with first line regimens in public hospitals in Amhara region, North-West Ethiopia'. Patient Prefer Adherence. 2023;17:1347–59. https://doi.org/10.2147/PPA.S413192. *PubMed*.
45. Rood BA, McConnell EA, Pantalone DW. Mar. Distinct Coping Combinations Are Associated with Depression and Support Service Utilization in Men Who Have Sex with Men Living with HIV'. *Psychology of Sexual Orientation and Gender Diversity*, vol. 2, no. 1, 2015, pp. 96–105. *DOI.org(Crossref)*, https://doi.org/10.1037/sgd0000091
46. Amal AI, Sukartini T, Kurniawati ND, Sulistyaningsih DR, Suyanto S, Wahyuningsih IS. Apr. Analysis of Coping Strategies and Self-Stigma Among People Living with HIV (PLHIV): A Cross Sectional Study'. *The Open Public Health Journal*, vol. 17, no. 1, 2024, p. e18749445304007. *DOI.org(Crossref)*, https://doi.org/10.2174/0118749445304007240328052310
47. Leserman J, Petitto JM, Golden RN, Gaynes BN, Gu H, Perkins DO et al. Aug. Impact of Stressful Life Events, Depression, Social Support, Coping, and Cortisol on Progression to AIDS'. *American Journal of Psychiatry*, vol. 157, no. 8, 2000, pp. 1221–28. *DOI.org(Crossref)*, https://doi.org/10.1176/appi.ajp.157.8.1221
48. Moskowitz JT, Hult JR, Bussolari C, Acree M. Jan. What Works in Coping with HIV? A Meta-Analysis with Implications for Coping with Serious Illness.' *Psychological Bulletin*, vol. 135, no. 1, 2009, pp. 121–41. *DOI.org(Crossref)*, https://doi.org/10.1037/a0014210
49. Azale T, Fekadu A, Medhin G, Hanlon C. Coping strategies of women with postpartum depression symptoms in rural Ethiopia: a cross-sectional community study. BMC Psychiatry. 2018;18:41. https://doi.org/10.1186/s12888-018-1624-z.
50. Ashaba S, Kaida A, Burns BF, O'Neil K, Dunkley E, Psaros C et al. Dec. Understanding Coping Strategies during Pregnancy and the Postpartum Period: A Qualitative Study of Women Living with HIV in Rural Uganda'. *BMC Pregnancy and Childbirth*, vol. 17, no. 1, 2017, p. 138. *DOI.org(Crossref)*, https://doi.org/10.1186/s12884-017-1321-9
51. Kroenke K, Spitzer RL, Williams JB. Sept. The PHQ-9: Validity of a Brief Depression Severity Measure'. *Journal of General Internal Medicine*, vol. 16, no. 9, 2001, pp. 606–13. *DOI.org(Crossref)*, https://doi.org/10.1046/j.1525-1497.2001.016009606.x
52. Chan BT, Pradeep A, Prasad L, Murugesan V, Chandrasekaran E, Kumarasamy N et al. Dec. Association between Internalized Stigma and Depression among HIV-Positive Persons Entering into Care in Southern India'. *Journal of Global Health*, vol. 7, no. 2, 2017, p. 020403. *DOI.org(Crossref)*, https://doi.org/10.7189/jogh.07.020403
53. Adams LM, Wilson TE, Merenstein D, Milam J, Cohen J, Golub ET et al. Jan. Using the Center for Epidemiologic Studies Depression Scale to Assess Depression in Women with HIV and Women at Risk for HIV: Are Somatic Items Invariant?' *Psychological Assessment*, vol. 30, no. 1, 2018, pp. 97–105. *DOI.org(Crossref)*, https://doi.org/10.1037/pas0000456
54. Xiaowen W, Guangping G, Ling Z, Jiarui Z, Xiumin L, Zhaoqin L et al. Sept. Depression and Anxiety Mediate Perceived Social Support to Predict Health-Related Quality of Life in Pregnant Women Living with HIV'. *AIDS Care*, vol. 30, no. 9, 2018, pp. 1147–55. *DOI.org(Crossref)*, https://doi.org/10.1080/09540121.2018.1456640
55. Matsumoto S, Yamaoka K, Nguyen HDT, Nguyen DT, Nagai M, Tanuma J et al. Dec. Validation of the Brief Coping Orientation to Problem Experienced (Brief COPE) Inventory in People Living with HIV/AIDS in Vietnam'. *Global Health & Medicine*, vol. 2, no. 6, 2020, pp. 374–83. *PubMed Central*, https://doi.org/10.35772/ghm.2020.01064
56. Mohanraj R, Jeyaseelan V, Kumar S, Mani T, Rao D, Murray KR et al. Feb. Cultural Adaptation of the Brief COPE for Persons Living with HIV/AIDS in Southern India'. *AIDS and Behavior*, vol. 19, no. 2, 2015, pp. 341–51. *DOI.org(Crossref)*, https://doi.org/10.1007/s10461-014-0872-2
57. Kimemia M, Asner-Self KK, Daire AP. Sept. An Exploratory Factor Analysis of the Brief COPE with a Sample of Kenyan Caregivers'. *International Journal*

for the Advancement of Counselling, vol. 33, no. 3, 2011, pp. 149–60. *DOI.org(Crossref)*, https://doi.org/10.1007/s10447-011-9122-8
58. Bacanli H, Surucu M, Ilhan T. An Investigation of Psychometric Properties of Coping Styles Scale Brief Form: A Study of Validity and Reliability'. *Educational Sciences: Theory and Practice*, vol. 13, no. 1, 2013, pp. 90–96. *ERIC*, https://eric.ed.gov/?id=EJ1016675
59. Muller L, Spitz E. Évaluation multidimensionnelle du coping: validation du brief COPE Sur Une population Française. L'encéphale. 2003;29(6):507–18.
60. Kapsou M, Panayiotou G, Kokkinos CM, Demetriou AG, Demetriou AG. Mar. Dimensionality of Coping: An Empirical Contribution to the Construct Validation of the Brief-COPE with a Greek-Speaking Sample'. *Journal of Health Psychology*, vol. 15, no. 2, 2010, pp. 215–29. *DOI.org(Crossref)*, https://doi.org/10.1177/1359105309346516
61. Weeratunga E, Senadheera C, Hettiarachchi M, Perera B. Dec. Validation of the Sinhalese Version of Brief COPE Scale for Patients with Cancer in Sri Lanka'. *BMC Psychology*, vol. 10, no. 1, 2022, p. 157. *DOI.org(Crossref)*, https://doi.org/10.1186/s40359-022-00863-z
62. Sadeghi K. Dec. Doubts on the Validity of Correlation as a Validation Tool in Second Language Testing Research: The Case of Cloze Testing'. *Language Testing in Asia*, vol. 3, no. 1, 2013, p. 15. *DOI.org(Crossref)*, https://doi.org/10.1186/2229-0443-3-15
63. Kocalevent R-D, Berg L, Beutel ME, Hinz A, Zenger M, Härter M, et al. Social support in the general population: standardization of the Oslo social support scale (OSSS-3). BMC Psychol. 2018;6:31. https://doi.org/10.1186/s40359-018-0249-9.
64. World Health Organization. T The Alcohol, Smoking and Substance Involvement Screening Test (ASSIST).Manual for use in primary care. 2010.
65. Reinius M, Wettergren L, Wiklander M, Svedhem V, Ekström AM, Eriksson LE. Dec. Development of a 12-Item Short Version of the HIV Stigma Scale'. *Health and Quality of Life Outcomes*, vol. 15, no. 1, 2017, p. 115. *DOI.org(Crossref)*, https://doi.org/10.1186/s12955-017-0691-z
66. Schraiber LB, Latorre MRDO, França I Jr, Segri NJ, d'Oliveira AFPL, alidade Do Instrumento WHO VAW STUDY Para Estimar. Aug. Violência de Gênero Contra a Mulher'. *Revista de Saúde Pública*, vol. 44, no. 4, 2010, pp. 658–66. *DOI.org(Crossref)*, https://doi.org/10.1590/S0034-89102010000400009
67. Nybergh L, Taft C, Krantz G. Psychometric Properties of the WHO Violence Against Women Instrument in a Female Population-Based Sample in Sweden: A Cross-Sectional Survey'. *BMJ Open*, vol. 3, no. 5, 2013, p. e002053. *DOI.org(Crossref)*, https://doi.org/10.1136/bmjopen-2012-002053
68. Knueppel D, Demment M, Kaiser L. Mar. Validation of the Household Food Insecurity Access Scale in Rural Tanzania'. *Public Health Nutrition*, vol. 13, no. 3, 2010, pp. 360–67. *DOI.org(Crossref)*, https://doi.org/10.1017/S1368980009991121
69. Weiser SD, Palar K, Frongillo EA, Tsai AC, Kumbakumba E, Depee S et al. Longitudinal Assessment of Associations between Food Insecurity, Antiretroviral Adherence and HIV Treatment Outcomes in Rural Uganda'. *AIDS*, vol. 28, no. 1, 2014, pp. 115–20. *DOI.org(Crossref)*, https://doi.org/10.1097/01.aids.0000433238.93986.35.70. Castell GS, Rodrigo CP, de la Cruz JN, Bartrina JA. Household food insecurity access scale (HFIAS). Nutricion hospitalaria. 2015;31(3):272-8.
70. Frongillo EA, Nanama S. May. Development and Validation of an Experience-Based Measure of Household Food Insecurity within and across Seasons in Northern Burkina Faso'. *The Journal of Nutrition*, vol. 136, no. 5, 2006, pp. 1409S-1419S. *DOI.org(Crossref)*, https://doi.org/10.1093/jn/136.5.1409S
71. Hussein FM, Ahmed AY, Muhammed OS. Household Food Insecurity Access Scale and Dietary Diversity Score as a Proxy Indicator of Nutritional Status among People Living with HIV/AIDS, Bahir Dar, Ethiopia, 2017'. *PLOS ONE*, edited by David A. Lightfoot, vol. 13, no. 6, June 2018, p. e0199511. *DOI.org(Crossref)*, https://doi.org/10.1371/journal.pone.0199511
72. Sahay MR, Dubey S, Sahoo RK, Kanungo S, Sahoo KC, Pati S. Health-Related challenges and coping strategies among women during pandemics: A systematic review of qualitative studies'. Front Health Serv. 2022;2:847753. https://doi.org/10.3389/frhs.2022.847753. *PubMed*.
73. Folkman S. Personal Control and Stress and Coping Processes: A Theoretical Analysis'. *Journal of Personality and Social Psychology*, vol. 46, no. 4, 1984, pp. 839–52. *DOI.org(Crossref)*, https://doi.org/10.1037/0022-3514.46.4.839
74. Skinner EA, Edge K, Altman J, Sherwood H. Mar. Searching for the Structure of Coping: A Review and Critique of Category Systems for Classifying Ways of Coping.' *Psychological Bulletin*, vol. 129, no. 2, 2003, pp. 216–69. *DOI.org(Crossref)*, https://doi.org/10.1037/0033-2909.129.2.216
75. Hooper D, Coughlan J, Mullen M, editors. *Evaluating Model Fit:A Synthesis of the Structural Equation Modelling Literature*. 2008. *arrow.tudublin.ie*, https://doi.org/10.21427/D79B73
76. Schumacker RE, Lomax RG. *A Beginner's Guide to Structural Equation Modeling*. 0 ed., Psychology Press, 2004. *DOI.org(Crossref)*, https://doi.org/10.4324/9781410610904
77. Malhotra RK. Errors in the Use of Multivariable Logistic Regression Analysis: An Empirical Analysis'. *Indian Journal of Community Medicine*, vol. 45, no. 4, 2020, p. 560. *DOI.org(Crossref)*, https://doi.org/10.4103/ijcm.IJCM_16_20
78. Frost J. Nov. H*ow to Interpret a Regression Model with Low R-Squared and Low P Values*. https://blog.minitab.com/en/adventures-in-statistics-2/how-to-interpret-a-regression-model-with-low-r-squared-and-low-p-values. Accessed 30 2024.
79. Meza-Rodríguez MP, Farfan-Labonne B, Avila-García M, Figueroa-Damian R, Plazola-Camacho N, Pellón-Díaz G et al. Nov. Psychological Distress, Anxiety, Depression, Stress Level, and Coping Style in HIV-Pregnant Women in Mexico'. *BMC Psychology*, vol. 11, no. 1, 2023, p. 366. *DOI.org(Crossref)*, https://doi.org/10.1186/s40359-023-01416-8
80. Golrokhi R, Manshadi SD, SeyedAlinaghi S, Mohraz M, Jafarinasab M, Rahimi R et al. Sept. Coping Strategies and Their Correlation with Depression, Anxiety, and Stress among HIV-Positive Patients Referred to Voluntary Counseling and Testing Center, Tehran, Iran, 2019'. *HIV & AIDS Review*, vol. 22, no. 3, 2023, pp. 251–60. *DOI.org(Crossref)*, https://doi.org/10.5114/hivar.2023.131613
81. Opara HC, Iheanacho PN, Nebo B, Ingwu JA, Anetekhai CJ, Anarado AN. Apr. Factors Affecting Adherence to Anti-Retroviral Therapy among Women Attending HIV Clinic of a Tertiary Health Institution in SouthEastern, Nigeria'. *African Health Sciences*, vol. 22, no. 1, 2022, pp. 456–64. *DOI.org(Crossref)*, https://doi.org/10.4314/ahs.v22i1.54
82. Karugaba G, Thupayagale-Tshweneagae G, Moleki MM, Matshaba M. Apr. Challenges and Coping Strategies among Young Adults Living with Perinatally Acquired HIV Infection in Botswana. A Qualitative Study'. *PLOS ONE*, edited by Nelsensius Klau Fauk, vol. 18, no. 4, 2023, p. e0284467. *DOI.org(Crossref)*, https://doi.org/10.1371/journal.pone.0284467
83. Morales DJ. Jan. Positive coping methods among people living with HIV/AIDS'. Theses Digitization Project, 2008, https://scholarworks.lib.csusb.edu/etd-project/3383
84. Fekadu W, Haregwoin M, Kibrom H. Magnitude of Mental Illness and Associated Factors among Holy Water Users at Entoto St. Mary Church, Addis Ababa, Ethiopia, 2014'. *Journal of Psychiatry*, vol. 18, no. 4, 2015. *DOI.org(Crossref)*, https://doi.org/10.4172/2378-5756.1000285
85. Hall BA. Apr. Patterns of Spirituality in Persons with Advanced HIV Disease'. *Research in Nursing & Health*, vol. 21, no. 2, 1998, pp. 143–53. *DOI.org(Crossref)*, https://doi.org/10.1002/(SICI)1098-240X(199804)21:2%3C143::AID-NUR5%3E3.0.CO;2-J
86. McIntosh RC, Rosselli M. Nov. Stress and Coping in Women Living with HIV: A Meta-Analytic Review'. *AIDS and Behavior*, vol. 16, no. 8, 2012, pp. 2144–59. *DOI.org(Crossref)*, https://doi.org/10.1007/s10461-012-0166-5
87. Taylor SE, Stanton AL. Apr. Coping Resources, Coping Processes, and Mental Health'. *Annual Review of Clinical Psychology*, vol. 3, no. 1, 2007, pp. 377–401. *DOI.org(Crossref)*, https://doi.org/10.1146/annurev.clinpsy.3.022806.091520
88. Li L, Lin C, Liang L-J, Ji G. Feb. Exploring Coping and Social Support with Gender and Education Among People Living with HIV in China'. *AIDS and Behavior*, vol. 20, no. 2, 2016, pp. 317–24. *DOI.org(Crossref)*, https://doi.org/10.1007/s10461-015-1232-6
89. Gelaw YK, Adugna B, Tsegaye AT, Melaku T, Kefale B. Coping Strategies for Adverse Effects of Antiretroviral Therapy among Adult HIV Patients Attending University of Gondar Referral Hospital, Gondar, Northwest Ethiopia: A Cross-Sectional Study'. *AIDS Research and Treatment*, vol. 2018, Dec. 2018, pp. 1–10. *DOI.org(Crossref)*, https://doi.org/10.1155/2018/1879198
90. Yang Z, Yang H, Gong B, Zhang L, Fu Y, Hu Y. Exploring stigma experience and coping strategies among women living with HIV/AIDS in China: A phenomenological study'. Psychol Res Behav Manage. 2024;17:1487–98. https://doi.org/10.2147/PRBM.S456850. *PubMed*.
91. Brown MJ, Serovich JM, Laschober TC, Kimberly JA, Lescano CM. Aug. Ways of Coping and Perceived HIV-Related Stigma among People Living with HIV: Moderation by Sex and Sexual Orientation'. *Psychology, Health & Medicine*, vol. 25, no. 7, 2020, pp. 867–78. *DOI.org(Crossref)*, https://doi.org/10.1080/13548506.2019.1680852
92. Quatremère G, Guiguet M, Girardi P, Liaud M-N, Mey C, Benkhoucha C et al. Mar. How Are Women Living with HIV in France Coping with Their Perceived Side Effects of Antiretroviral Therapy? Results from the EVE Study'. *PLOS ONE*, edited by Viviane D. Lima, vol. 12, no. 3, 2017, p. e0173338. *DOI.org(Crossref)*, https://doi.org/10.1371/journal.pone.0173338
93. Skapinakis P, Bellos S, Oikonomou A, Dimitriadis G, Gkikas P, Perdikari E et al. Depression and Its Relationship with Coping Strategies and Illness

Perceptions during the COVID-19 Lockdown in Greece: A Cross-Sectional Survey of the Population'. *Depression Research and Treatment*, vol. 2020, Aug. 2020, p. 3158954. *PubMed Central*, https://doi.org/10.1155/2020/3158954

94. Chop E, Duggaraju A, Malley A, Burke V, Caldas S, Yeh PT et al. Sept. Food Insecurity, Sexual Risk Behavior, and Adherence to Antiretroviral Therapy among Women Living with HIV: A Systematic Review'. *Health Care for Women International*, vol. 38, no. 9, 2017, pp. 927–44. *PubMed*, https://doi.org/10.1080/07399332.2017.1337774
95. Napier C, Oldewage-Theron W, Makhaye B. Predictors of food insecurity and coping strategies of women asylum seekers and refugees in Durban, South Africa. Agric Food Secur. 2018;7:67. https://doi.org/10.1186/s40066-018-0220-2.

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