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Psychological Factors Related to Resilience and Vulnerability Among Youth with HIV in an Integrated Care Setting

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Psychological factors related to resilience and vulnerability among youth with HIV in an integrated care setting

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ABSTRACT
Approximately 22% of HIV diagnoses in 2015 occurred among youth aged 13–24. Much is known about the risk factors and psychopathology present in youth living with HIV (YLWH), however, relatively little is known about resiliency in this population. The current study sought to assess factors related to resilience and vulnerability among YLWH as well as the impact of psychosocial factors on these constructs using existing clinical data from an integrated care clinic serving YLWH in the southeastern United States. Data included findings from mental health screeners administered as part of the standard protocol of care for youth aged 13–24 including information about anxiety (GAD-7), post-traumatic stress disorder (PC-PTSD), depression (PHQ-9), substance use (CRAFFT), and medication adherence (BEHKA-HIV Action subscale) as well as viral load and demographic variables. Hierarchical linear regression was used to determine factors related to biological (viral load) and behavioral indicators of resilience and vulnerability (BEHKA-HIV Action subscale and CRAFFT). Results showed that anxiety was a significant covariate of both biological and behavioral indicators of resilience while gender was a significant factor associated with behavioral indicators of vulnerability. None of the psychological or demographic factors examined in this study were associated with substance use, a behavioral indicator of vulnerability and resilience. Our results support the need for clinicians to screen for and monitor anxiety symptoms among YLWH in integrated care settings in an effort to promote resilience and minimize vulnerability. Practical, evidence-based strategies should be applied in clinical settings to address medication adherence and anxiety among YLWH.

The percentage of youth aged 13–24 years diagnosed with HIV in 2016 was approximately 21% (CDC, 2017). The rate of new HIV diagnoses from 2011 to 2015 decreased for most age groups but remained the same for those aged 20–24 years and this age group had the second highest rate of new HIV diagnoses (CDC, 2017). Additionally, 81% of new HIV infections among youth were a result of male-to-male sexual contact, and 79% were African American/Black or Hispanic/Latino (CDC, 2017). In urban poverty areas, lower socioeconomic status was related to greater prevalence of HIV (Denning & DiNenno, 2017). Clearly, HIV disproportionately affects minority and economically disadvantaged groups who are already facing significant vulnerabilities. Youth living with HIV (YLWH) have been targeted as a population in need of prevention and intervention strategies (Bekker, Johnson, Wallace, & Hosek, 2015) and taking into account both risk and resilience when developing these interventions will help to promote complete mental health.

The World Health Organization (1948) defined health as “a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity” (p. 1). This definition takes a strengths-based approach to the medical model, in which an individual is diagnosed with a condition based on meeting certain criteria. Instead, complete mental health is not only the absence of psychopathology but also the presence of flourishing (Keyes, 2005). This dual-factor model examining both vulnerability and resilience has been explored in a variety of youth populations (e.g., Greenspoon & Saklofske, 2001; Suldo & Shaffer, 2008). These studies identified four distinct groups based on whether individuals were classified as high or low on the constructs of psychopathology and well-being: complete mental health (high well-being, low psychopathology), vulnerable (low well-being, low psychopathology), symptomatic but content (high well-being, high psychopathology), and troubled (low well-being, high psychopathology);
Several studies have examined the psychopathology construct of the dual-factor model among YLWH as well as various risk factors for acquiring HIV. YLWH have been found to have high rates of psychopathology including approximately 35% screening positive for depression (Lynn et al., 2018; Murphy, Wilson, Durako, Muenz, & Belzer, 2001), 17%–25% screening positive for anxiety (Lynn et al., 2018; Martinez & Ercklan, 2009), and 13%–20% screening positive for PTSD (Lynn et al., 2018; Radcliffe et al., 2007). Regarding other HIV-related risk factors, less than 10% of YLWH reported using condoms consistently over their lifetime, and after finding out they were HIV positive, 50.7% indicated they engaged in protected sex (Rotheram-Borus et al., 2001). YLWH also reported using an average of 4.7 different substances and almost all youth in the study had drunk alcohol, smoked cigarettes, used marijuana, and used other hard drugs not including those injected (Rotheram-Borus et al., 2001).

Although much is known about the risk factors and psychopathology present in YLWH, relatively little is known about resiliency among this population. One study conducted qualitative interviews with 54 young gay/bisexual males aged 16–24 years (Harper, Bruce, Hosek, Fernandez, & Rood, 2014). The study identified four resilience processes that the young adults engaged in: cognitive processes to promote their health (e.g., taking action toward life goals, learning more about HIV), behavioral processes to promote their health (e.g., exercise, practicing safe sex, decreasing drug/alcohol use), utilizing social support (e.g., medical providers, friends, partners), and empowering other gay/bisexual men (e.g., peer mentors, peer navigators). A subsequent study of 200 young gay/bisexual males sought to quantitatively examine predictors of these dimensions of resilience (Hussen et al., 2017). Results indicated that education level, attitude toward having HIV, satisfaction with social support, behavioral resilience, ethnic identity, and internalized homonegativity were all predictors of cognitive resilience. Cognitive resilience and social support satisfaction were predictors of behavioral resilience. These findings suggest several avenues for creating interventions that focus on building resilience.

Historically, research has focused on identifying risk-factors, or vulnerabilities, for contracting HIV. To date, very few studies exist (e.g., Harper et al., 2014; Hussen et al., 2017) that have examined the factors associated with resilience, or mental health, among YLWH. In order to obtain complete mental health, the dual-factor model suggests the need to explore both psychopathology and well-being. Thus, the current study sought to assess factors related to resilience and vulnerability among YLWH as well as the impact of psychosocial factors on these constructs.

**Methods**

**Participants and procedures**

This study used existing clinical data from an integrated care clinic serving YLWH in the southeastern United States. This particular clinic provides accessible, comprehensive, family-centered, culturally-competent, community-based, coordinated system of care for infants, children, adolescents, and young adults infected with or exposed to HIV. The program is the sole provider of comprehensive HIV care to children and youth in a 12-county geographic area encompassing West Central and Southwest Florida. The location of this program is important given that Florida ranks third in the nation for persons living with HIV/AIDS (Florida Department of Health; FDOE, 2014a), and first for persons living with an AIDS diagnosis (FDOE, 2014b). The program provides a “medical home” with 24-hour on-call services and intensive medical case management services provided by doctors, nurses, nutritionists, pharmacists, psychologists, and social workers. Youth are retained in care by intensive linkage programs and are educated on basic HIV health information, treatment adherence, prevention, sexuality, family planning, and chronic disease self-management.

As part of the standard protocol of care in this clinic, mental health screeners (described below) are administered at least once annually to patients aged 12–25 years. For this study, we abstracted de-identified patient data from a clinical database for the period of July 2016–March 2017. Given this study’s focus on youth aged 13–24, we excluded data from patients 12 years or younger and 25 or older. The University of South Florida Institutional Review Board reviewed this study.

**Measures**

Demographic data were collected on gender, age, sexual orientation, race, ethnicity, mode of transmission, and education level. The measures described below were used in this study and are part of the mental health screening protocol in the clinic where data were collected. All these measures are established in the literature as valid and reliable measures in clinical care settings.

**Patient health questionnaire (PHQ)**

The PHQ-9 (Kroenke & Spitzer, 2002) and the PHQ-Adolescents (PHQ-A; Johnson, Harris, Spitzer, & Williams, 2002) were used to assess for symptoms of
depression. Scores on the PHQ-9 and PHQ-A range from 0 to 27 with scores of 10 or higher indicating a positive screener.

**Generalized anxiety disorder-7 (GAD-7)**
The GAD-7 (Spitzer, Kroenke, Williams, & Löwe, 2006) was used to assess for symptoms of anxiety. Scores on the GAD-7 range from 0 to 21 with scores of 10 or higher indicating a positive screener.

**Primary care-PTSD screen (PC-PTSD)**
The PC-PTSD (Prins et al., 2003) was used to assess for symptoms of post-traumatic stress disorder (PTSD). Scores range from 0 to 4 with scores over three indicating a positive screener.

**CRAFFT**
The CRAFFT (Knight et al., 1999) was used to assess for symptoms of substance use. The CRAFFT contains a total of nine items, three assessing behaviors within the past 12 months and six assessing behaviors over the lifetime. Scores on the last six items range from 0 to 6 with scores over two considered a positive screener.

**Brief estimate of health knowledge and action- HIV version (BEHKA-HIV)**
The BEHKA-HIV (Osborn, Davis, Bailey, & Wolf, 2010) was used to measure HIV health literacy and medication adherence. Scores range from 0 to 10. However, for this study, researchers used only the Action subscale to assess medication adherence. Scores range from 0 to 5 with higher scores indicating greater adherence.

**Data analysis**
Descriptive statistics were used to describe the sample. Hierarchical linear regression analyses were used to determine the relative impact of psychosocial factors on resilience and vulnerability. In this study, viral load was used as a biological indicator of resilience (low viral load; ≤50 copies/mL) and vulnerability (high viral load; > 50 copies/mL) given the documented relationship between viral load and resilience (Dale et al., 2014; Murphy & Marelich, 2008). Medication adherence as measured by the BEHKA-HIV Action subscale and substance use as measured by the CRAFFT were used as behavioral indicators of resilience and vulnerability, respectively, with high levels of adherence and low levels of substance use indicating resilience and low levels of adherence and high levels of substance use indicating vulnerability. Psychological factors included depression as measured by the PHQ-9 or PHQ-A, anxiety as measured by the GAD-7, and PTSD as measured by the PC-PTSD.

**Results**

**Sample characteristics**
All participants in the sample were YLWH receiving medical treatment in an integrated care clinic in the southeastern US, N = 131. The mean age of respondents was 20.57 years (SD = 2.66), ranging from age 13 to 24 years. Most participants were male (55.7%, n = 73), heterosexual (61.1%, n = 80), and African American/Black (67.9%, n = 89). See Table 1 for more information about sample demographics.

**Psychological factors**
Three psychological factors were assessed in this study: depression (PHQ-9 and PHQ-A), anxiety (GAD-7), and post-traumatic stress disorder (PC-PTSD). The mean score on the PHQ-9 and PHQ-A in our sample was 5.47, SD = 5.69, and 21.4% (n = 28) of respondents screened positive for depression. The mean score on the GAD-7 was 6.05, SD = 5.40, and 25.1% (n = 33) of respondents screened positive for anxiety. Finally, the mean score on the PC-PTSD score was 1.05, SD = 1.41, and 18.3% (n = 24) of respondents screened positive for PTSD. Although differences were not statistically significant, females reported higher anxiety scores at 6.87, SD = 5.74 compared to males at 5.41, SD = 5.07, p = .12 and higher PTSD scores at 1.24, SD = 1.49 compared to...
males at .90, SD = 1.34, \( p = .20 \). There were no differences in psychological scores based on sexual orientation, race, ethnicity, transmission route, or education level.

**Covariates of biological indicators of resilience and vulnerability**

Viral load was selected as the biological indicator of resilience and vulnerability. A high viral load (> 50 copies/mL) was considered vulnerable and a low viral load (≤ 50 copies/mL) was considered resilient. The mean viral load was 32480.28, SD = 242022.33 among our sample. Fifty percent of our sample were biologically resilient and 38.2% of our sample was biologically vulnerable. Hierarchical linear regression analysis was used to assess what psychological factors and key demographics were associated with participants’ viral load. A two-stage hierarchical regression was conducted with viral load as the dependent variable. GAD-7, PC-PTSD, and PHQ-9/PHQ-A scores were entered at stage one, and all demographic variables (age, gender, race, ethnicity, sexual orientation, education level, and transmission route) were entered at the second stage. Dummy variables were created for all categorical variables. The results of the regression indicated that one covariate accounted for 9% of the variance in viral load, \( R^2 = .09, F(3,97) = 3.179, p = .02 \). It was found that higher anxiety scores were significantly associated with higher viral load (\( \beta = .37, p = .004 \)), indicating high anxiety being linked to a biological indicator of vulnerability (Table 2). No other psychological or demographic factors were associated with viral load.

**Covariates of behavioral indicators of resilience and vulnerability**

Medication adherence as measured by the BEHKA-HIV Action subscale and substance use as measured by the CRAFFT were used as behavioral indicators of resilience and vulnerability whereby high levels of adherence and low levels of substance use were used as indicators of resilience and low levels of adherence and high levels of substance use were used as indicators of vulnerability. The mean score on the BEHKA-HIV Action subscale in our sample was 4.56, SD = .98 indicating high levels of action as it relates to healthy HIV medication adherence behaviors. The mean CRAFFT score was 1.43, SD = 1.67 with a total of 23.8% \( (n = 31) \) of participants scoring positive for substance use.

Here, a two-stage hierarchical linear regression was conducted with BEHKA-HIV Action scores as the dependent variable. GAD-7, PC-PTSD, and PHQ-9/PHQ-A scores were entered at stage one, and all demographic variables (age, gender, race, ethnicity, sexual orientation, education level, and transmission route) were entered at the second stage. Dummy variables were created for all categorical variables. The results of the regression indicated that two covariates accounted for 37% of the variance in BEHKA-HIV Action scores \( R^2 = .37, F(13,66) = 3.083, p = .001 \). Higher anxiety scores were significantly associated with lower medication adherence scores (\( \beta = -.213, p = .01 \)), showing high anxiety linked to behavioral vulnerability. Being male was significantly associated with higher medication adherence scores (\( \beta = .261, p = .01 \)).

**Table 2. Summary of Hierarchical Regression Analysis for Covariates and Factors of Biological Indicators of Resilience and Vulnerability (Viral Load) \( (N = 126) \).**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Model 1</th>
<th>Model 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>-57038.999</td>
<td>185742.797</td>
</tr>
<tr>
<td>Anxiety</td>
<td>19950.866</td>
<td>24277.936</td>
</tr>
<tr>
<td>Depression</td>
<td>4432.660</td>
<td>8266.478</td>
</tr>
<tr>
<td>PTSD</td>
<td>-43847.718</td>
<td>-51061.048</td>
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<tr>
<td>Age</td>
<td>-15550.136</td>
<td>13052.06</td>
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<tr>
<td>Education</td>
<td>100440.337</td>
<td>68789.774</td>
</tr>
<tr>
<td>Gender</td>
<td>52201.481</td>
<td>66127.871</td>
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<tr>
<td>Sexual orientation</td>
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<td></td>
</tr>
<tr>
<td>Homosexual</td>
<td>83072.537</td>
<td>83072.537</td>
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<tr>
<td>Bisexual</td>
<td>51311.048</td>
<td>106569.148</td>
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<tr>
<td>Questioning</td>
<td>-52054.113</td>
<td>284733.466</td>
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<tr>
<td>Race</td>
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<td></td>
</tr>
<tr>
<td>African American</td>
<td>-137296.015</td>
<td>215726.138</td>
</tr>
<tr>
<td>White</td>
<td>47709.880</td>
<td>208958.095</td>
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<tr>
<td>Asian</td>
<td>-269940.079</td>
<td>290493.644</td>
</tr>
<tr>
<td>Ethnicity</td>
<td>-135042.041</td>
<td>86768.523</td>
</tr>
<tr>
<td>Transmission</td>
<td>73544.110</td>
<td>71211.804</td>
</tr>
<tr>
<td>( R^2 )</td>
<td>0.09</td>
<td>0.23</td>
</tr>
<tr>
<td>( F ) for ( R^2 )</td>
<td>3.17</td>
<td>1.87</td>
</tr>
</tbody>
</table>

\*p < .01.  
**p < .001.

Note: Education is coded as 1 = less than high school education and 0 = high school education/equivalent or higher. Gender is coded as 1 = male and 0 = female. For sexual orientation, heterosexual is the reference group. For race, bi-racial is the reference group. Ethnicity is coded as 1 = Hispanic and 0 = not Hispanic. Transmission is coded as 1 = perinatally acquired and 0 = behaviorally acquired.
among the psychological factors examined in this study, anxiety was the only factor related to resilience and vulnerability. Specifically, low levels of anxiety were associated with biological (low viral load) and behavioral (high medication adherence) indicators of resilience while high levels of anxiety were associated with biological (high viral load) and behavioral (low medication adherence) indicators of vulnerability. Among the demographic factors examined in this study, gender was the only factor related to resilience and vulnerability. Specifically, females were more likely to display behavioral indicators of vulnerability (low medication adherence). None of the psychological or demographic factors examined in this study were significantly associated with substance use, a behavioral indicator of vulnerability and resilience.

The role of anxiety as a biological indicator of resilience and vulnerability in this study is somewhat inconsistent with the existing literature. Ironson et al. (2005) reported that depression rather than anxiety was most commonly associated with higher viral load. However, our finding that anxiety was related to decreased medication adherence as a behavioral indicator of vulnerability is consistent with other studies demonstrating that increased anxiety and depression are associated with lower HIV medication adherence (Willie, Oversreet, Sullivan, Sikkema, & Hansen, 2016). According to a study conducted by Willie et al. (2016), females experience higher levels of anxiety than males, which may explain the differences in medication adherence found in our study whereby females reported higher levels of anxiety than males although the differences were not statistically significant.

In the current study, gender was associated with medication adherence (behavioral indicator), but not viral load (biological indicator). Specifically, females were less likely than males to adhere to their medication regimen. These findings are comparable to a previous study, where authors completed analyses of pharmacy and medical claims in the United States (Manteuffel et al., 2014). Researchers found that females were less likely than males to be adherent to chronic medication use (Manteuffel et al., 2014). A more recent study again showed females reporting lower medication adherence than males (Willie et al., 2016). Ironically, Napravnik, Poole, Thomas, and Eron (2002) reported that females experienced significantly lower viral loads than males and differences persisted regardless of age, race, medications, mode of transmission, time of seroconversion and CD4 count. This is surprising given the documented relationship between viral load and medication adherence. That is, if female youth are less adherent, then we expect adherence scores ($\beta = 2.601, p = .011$, Table 3), compared to females, showing that being female was associated with behavioral vulnerability. An independent samples t-test showed that males’ mean BEHKA-HIV Action score was $M = 4.83$, SD = .47 compared to females $M = 4.35$, SD = 1.22; $t(92) = 1.227$, $p = .01$, showing females had significantly lower medication adherence. Another two-stage hierarchical regression analysis was completed with CRAFFT scores as the dependent variable. However, no demographic or psychological factors were associated with CRAFFT scores, $p = .341$.

Discussion

The current study sought to assess psychological and demographic factors related to resilience and vulnerability among YLWH in an integrated care setting in the southeastern US. Viral load was used as a biological indicator whereby low viral load ($\leq$ 50 copies/mL) served as an indicator of resilience and high viral load ($> 50$ copies/mL) served as an indicator of vulnerability. Medication adherence and substance use were used as behavioral indicators whereby high levels of adherence served as an indicator of resilience and low levels of adherence served as an indicator of vulnerability and, conversely, low levels of substance use were used as an indicator of resilience and high levels of substance use were used as an indicator of vulnerability.

Table 3. Summary of Hierarchical Regression Analysis for Covariates of Behavioral Indicators of Resilience and Vulnerability (BEHKA Action Scores) ($N = 131$).

<table>
<thead>
<tr>
<th>Variable</th>
<th>Model 1</th>
<th>Model 2</th>
</tr>
</thead>
<tbody>
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<td></td>
<td>B</td>
<td>SE (B)</td>
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<tr>
<td>Constant</td>
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<tr>
<td>Anxiety</td>
<td>-.117</td>
<td>.054</td>
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<tr>
<td>Depression</td>
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<td>.043</td>
</tr>
<tr>
<td>PTSD</td>
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<td>.208</td>
</tr>
<tr>
<td>Age</td>
<td>.158</td>
<td>.100</td>
</tr>
<tr>
<td>Education</td>
<td>.144</td>
<td>.506</td>
</tr>
<tr>
<td>Gender</td>
<td>1.229</td>
<td>.472</td>
</tr>
<tr>
<td>Sexual Orientation</td>
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<td></td>
</tr>
<tr>
<td>Homosexual</td>
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<td>.574</td>
</tr>
<tr>
<td>Bisexual</td>
<td>-.440</td>
<td>.814</td>
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<tr>
<td>Questioning</td>
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<td>.054</td>
</tr>
<tr>
<td>Race</td>
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<td></td>
</tr>
<tr>
<td>White</td>
<td>1.037</td>
<td>.557</td>
</tr>
<tr>
<td>Asian</td>
<td>2.505</td>
<td>1.348</td>
</tr>
<tr>
<td>Ethnicity</td>
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<td>.644</td>
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<tr>
<td>Transmission</td>
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<td>.529</td>
</tr>
<tr>
<td>$R^2$</td>
<td></td>
<td>.07</td>
</tr>
<tr>
<td>$F$ for $R^2$</td>
<td>2.116</td>
<td>3.083</td>
</tr>
</tbody>
</table>

*p < .05.

Note. Education is coded as 1 = less than high school education and 0 = high school education/equivalent or higher. Gender is coded as 1 = male and 0 = female. For sexual orientation, heterosexual is the reference group. For race, African American is the reference group. Ethnicity is coded as 1 = Hispanic and 0 = not Hispanic. Transmission is coded as 1 = perinatally acquired and 0 = behaviorally acquired.
them to have a higher viral load. In our study however, gender was not associated with viral load.

**Limitations**

Despite the important implications of these findings, this study has limitations. Because the current sample consisted of participants from one clinic in the southeastern US, findings may not generalize to other YLWH. In addition, a larger sample size could highlight small, yet statistically significant relationships not found in our study. Although the biological indicator of resilience and vulnerability provided is objective and accurate, participants’ medication adherence as determined by the BEHKA-HIV Action subscale was self-reported. Self-reported data may be characterized by selective memory where participants may either underreport or over report their level of adherence. Social desirability bias may also cause participants to report higher levels of adherence than is accurate. Additionally, results should be interpreted with caution as the $R^2$ values are relatively small and may indicate other important yet unevaluated factors or covariates of vulnerability and resilience.

**Conclusion and future direction**

Our results support the need for clinicians to screen for, monitor, and address mental health symptoms, particularly symptoms of anxiety, among YLWH in an effort to promote resilience and minimize vulnerability. Findings also suggest that females may be more prone to anxiety and may require some additional strategies to encourage their medication adherence. In the integrated care setting where data was collected, these findings will be used to tailor interventions for YLWH based on gender and the presentation of mental health symptoms, particularly anxiety. Beyond the clinical practice implications of this study, findings contribute to the existing literature on resilience and vulnerability among YLWH. However, future research is needed to explore further factors related to resilience and vulnerability among YLWH. Future research should include the development of practical and evidence-based strategies that can be applied in clinical settings to address medication adherence and anxiety among YLWH.

**Disclosure statement**

No potential conflict of interest was reported by the authors.

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**References**


