

**Associations of depression and anxiety with substance use
and social health among older people living with HIV**

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Abstract

Life expectancy after HIV infection dramatically increased following the development of antiretroviral therapies (ART) in 1996. As the population of older adults living with HIV increases, concerns have grown about possible disparities in mental health. We evaluated mental health outcomes, specifically depressive symptoms and anxiety, among older adults living with HIV in two large urban cities. We also examined the relationship between mental health outcomes and substance use and social health. We recruited 154 participants from infectious disease clinics in Los Angeles, CA and New Orleans, LA to complete cross-sectional surveys. We assessed prevalence of depressive symptoms (CES-D-10) and anxiety (GAD-7). Bivariate analyses and multivariate linear regressions were run to examine the factors associated with depressive symptoms and anxiety. We found that 44.8% of all participants were at risk for clinical depression, 55.8% reported mild to severe levels of anxiety, and 40.0% met criteria for both. In multivariate analyses, greater depressive symptoms and anxiety were associated with greater perceived HIV-related stigma and smaller social networks. Depressive symptoms were additionally associated with younger age. Substance use was not associated with depressive symptoms or anxiety. Findings suggest older adults living with HIV may be at high risk for depression and anxiety and that the presence of these conditions may also be linked to poorer social health indicators. This highlights the importance of screening for and addressing depression and anxiety among older adults with HIV.

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People ages 50 or older make up about 50% of all people living with HIV (PLWH) in the United States and that number is expected to grow (CDC, 2019). As PLWH enjoy longer life expectancies, there is a growing body of research that focuses on identifying and addressing mental health challenges that older PLWH may face. Depression and anxiety are of particular concern because these conditions are prevalent among PLWH at higher rates compared to the general adult population (Groves et al., 2010; Johnson Shen et al., 2019; McGowan et al., 2018). Depressive symptoms are prevalent in 6-15% of the general, community-dwelling older adult population (Akincigil et al., 2011) and anxiety is estimated to affect upwards of 15% of community-dwelling older adults (Wolitzky-Taylor et al., 2010). Depression and anxiety are

often comorbid and both conditions can have significant impacts on health and HIV disease management for PLWH. Depression is associated with poorer medication adherence, lower CD4+ cell counts, and higher viral loads (Shacham et al., 2009; Tufano et al., 2015). Anxiety symptoms are associated with HIV-related somatic symptoms and emotion dysregulation (Brandt et al., 2017). In general, depression and anxiety are individual risk factors for suicide ideation with comorbid depression and anxiety posing elevated risk for suicide ideation (Almeida et al., 2012).

While depression and anxiety are not challenges that are unique to aging populations or to PLWH, older PLWH may face factors that increase vulnerability to poor mental health outcomes. Older PLWH are more likely than younger PLWH to have experienced compounded stigmas due to HIV status, sexual orientation, and age (Emlet et al., 2015; Johnson Shen et al., 2019). Older PLWH have weaker social ties and smaller social networks compared to general older populations (Emlet, 2006; Shippy & Karpiak, 2005). Depressive disorders are frequently comorbid with substance use disorders (Davis et al., 2008) and compared to their HIV-negative counterparts, older PLWH are more likely to report past or current substance use. One study found the rate of illicit substance use among urban-dwelling older PLWH to be 37% (Deren et al., 2019). Cohort differences may be a driver of likelihood for substance use with the baby boomer generation using alcohol and other substances at higher rates compared to previous generations (Deren et al., 2019).

In this study, we evaluated the prevalence of depressive symptoms and anxiety in a group of ethnically diverse older PLWH and examined the factors associated with depression and anxiety. We drew from two catchment areas for this study- Los Angeles, California and New Orleans, Louisiana. According to the most recently available surveillance data, the HIV prevalence rate in Los Angeles was 501 per 100,000 population with 48% of all PLWH being ages 50 and over (Division of HIV and STD Programs, 2018). The prevalence rate in New Orleans was over 400 per 100,000 population. The age breakdown in New Orleans is not reported by the Louisiana Department of Health, but 52% of all PLWH in the state of Louisiana were ages 45 and over (State of Louisiana Department of Health, 2017). Both cities are urban areas though some differences may exist in terms of density of HIV-related services. For example, a search for AIDS Services Organizations (ASO) on a website managed by the U.S. Department of Health and Human Services (www.locator.aids.gov) yielded 333 listings within Los Angeles and 117 listings within New Orleans. Thus, it is worth noting that availability of HIV-related services may differ between these two cities.

Methods

Cross-sectional data were collected from individuals living with HIV who were ages 50 or older. A total of 154 participants were recruited from infectious disease clinics in Los Angeles, California ($n = 80$) and in New Orleans, Louisiana ($n = 74$). At both sites, potential participants were approached by research assistants in the clinic waiting rooms and handed flyers describing the study. Those who were interested in the study were screened for the inclusion criteria, that is: 1) ages 50 or older, 2) HIV-positive, and 3) able to complete a survey in English. Eligible participants completed the survey in a private space at the clinic either before or after their appointments. Surveys were anonymous and gift card incentives were provided for participation. Additional details on study procedures are published elsewhere (Nguyen et al., 2019).

Measures

Mental health outcomes. The CES-D-10 (Cronbach's $\alpha = .81$; Kohout et al., 1993; Zhang et al., 2012) and GAD-7 (Cronbach's $\alpha = .93$; Dear et al., 2011; Löwe et al., 2008; Spitzer et al., 2006) measures were used to assess risk for depression and anxiety, respectively. Scores for each item on the CES-D-10 were summed for a total score. The cut-off for clinical depression is a total score of ≥ 10 . Items on the GAD-7 were summed with higher scores indicating greater levels of anxiety. Recommended cut-offs used to classify severity of anxiety are: ≤ 5 , no anxiety; 5-9, mild anxiety; 10-14, moderate anxiety; and ≥ 15 , severe anxiety.

Demographics. Demographic information collected from participants included age, gender, race/ethnicity, highest level of education completed, sexual orientation, relationship status (partnered/married vs. not partnered/single), and living situation (live alone vs. live with other people). We also collected self-reported data on HIV characteristics: years living with HIV, CD4+ cell count range (> 500 indicates healthy range), and viral load detectability (undetectable vs. detectable).

Social health and substance use. The Perceived Stigma Scale (Cronbach's $\alpha = .85$; Herek & Capitanio, 1993) was used to assess perceived HIV-related stigma. Participants indicated their level of agreement with statements such as “People gossip about my HIV status” and “I feel discriminated by health workers”. Items were summed and higher total scores indicate greater perceived HIV-related stigma.

Social support was measured using the Lubben Social Network Scale (LSNS-6) (Cronbach's $\alpha = .91$; Lubben et al., 2006) which assessed support received from both kin and non-kin sources. The total score was calculated by a sum of the six items with a total possible range of 0-30. Higher scores indicate larger social networks.

To assess substance use, we asked whether the patient had used: 1) any illicit substance (e.g., cocaine, crack, methamphetamines, heroin, opioids without a prescription), 2) marijuana, or 3) alcohol within the past six months. Use of these three substances were treated as separate dichotomous variables.

Data Analyses

Descriptive statistics were used to characterize the overall sample. Bivariate analyses identifying associations between depression and anxiety, separately, and variables of interest were performed using Pearson correlations for continuous variables and one-way ANOVA and t-tests for categorical variables. Variables that were significant in bivariate analyses were included as covariates in linear regressions modelled for depression and anxiety scores separately. Critical alpha was set at 0.05.

Study Findings

Participants' mean age was 56.7 years (SD = 5.1) with a mean of 18.1 years (SD = 8.8) living with HIV. The majority were male (72.1%), black/African American (61.7%), single/not partnered (72.1%), and living alone (56.5%), and had completed high school or more (74.1%). Most people reported non-detectable viral loads (83.1%) and CD4+ ranges in the normal target

range of greater than 500 (87.7%). Almost half of participants (43.5%) self-identified as gay, lesbian, or bisexual. There were no significant demographic differences between participants by recruitment site in terms of age, gender, education, years living with HIV, CD4+ range, viral load detectability, and living arrangement. There were some differences by racial/ethnic composition and sexual orientation, where participants in Los Angeles had a greater composition of Hispanic participants (35.0% vs. 5.4%), fewer whites (7.5% vs. 21.6%), and more participants who identified as heterosexual (67.1% vs. 51.4%). See Table 1.

Overall, mean CES-D-10 scores were 9.7 (SD = 6.5) with 44.8% of participants falling into the category of being at risk for clinical depression (scores ≥ 10). Mean GAD-7 scores were 6.9 (SD = 6.4) with 14.9% meeting criteria for severe anxiety ≥ 15 , 16.9% for moderate anxiety (10-14), and 24.0% for mild anxiety (5-9). Out of all 154 participants, 38.3% did not meet criteria for depression or any level of anxiety, 16.9% met criteria for anxiety alone, 5.8% met criteria for depression alone, and 40.0% met criteria for both depression and anxiety.

Bivariate analyses. Scores for depressive symptoms were not significantly associated with years living with HIV, gender, relationship status, living situation, race/ethnicity, sexual orientation, CD4+ range, marijuana use, alcohol use, or illicit substance use. Depressive symptoms were higher in participants who completed high school vs. those who completed some college or more (11.4 vs. 8.2; $p = 0.03$). Greater depressive symptoms were associated with younger age ($p = 0.01$), greater stigma ($p < 0.001$), and smaller social networks ($p = 0.01$).

Anxiety scores were not significantly associated with years living with HIV, number of health conditions, gender, relationship status, living situation, race/ethnicity, sexual orientation, education, CD4+ range, marijuana use, alcohol use, or illicit substance use. Increasing anxiety scores were associated with younger age ($p = 0.005$), greater stigma ($p < 0.001$), and smaller social networks ($p = 0.03$).

Linear regressions for depression and anxiety scores and stratified analyses. In a linear regression model accounting for age, education, stigma, and social network size, more depressive symptoms remained associated with greater stigma ($p < 0.001$). See Table 2. In a linear regression model accounting for age, stigma, and social network size, higher anxiety scores remained associated with younger age ($p = 0.3$) and greater stigma ($p < 0.001$). See Table 3.

Discussion

Risk for depression and anxiety were present at high rates among the participants in this study and comorbid risks for depression and anxiety were common. The results from the multivariate analyses suggested that the most salient factors associated with greater risk for depression and anxiety were younger age, smaller social networks, and greater HIV-related stigma. This is consistent with findings from other studies. In a study by Emlet and colleagues (2015), 44% of PLWH under the age of 40 had depression compared to 26% of people over age

Table 1

Participant Demographics for All Participants and by Recruitment Site

Variable	All participants (N = 154)	Los Angeles (n = 80)	New Orleans (n = 73)
Age (years), M (SD)	56.8 (5.1)	56.7 (5.0)	56.8 (5.2)
Sex (male)	72.1%	76.2%	67.6%
Heterosexual	56.5%	67.1%	32.9%
Race/ethnicity			
Hispanic	20.8%	35.0%	5.4%
White	14.3%	7.5%	21.6%
Black/African American	61.7%	55.0%	68.9%
API and other	3.2%	2.5%	4.1%
Education			
<High school	26.0%	23.8%	28.4%
High school	31.2%	35.0%	27.0%
Some college or more	42.9%	41.3%	44.6%
Single/not partnered	72.1%	72.5%	71.6%
Lives alone	56.5%	55.0%	58.1%
Years with HIV, M (SD)	18.1 (8.8)	18.2 (8.9)	18.0 (9.1)
CD4 count > 500	87.7%	86.3%	89.2%
Undetectable viral load	85.3%	84.8%	85.9%

Table 2

Linear Regression Model with Depressive Symptoms (CES-D-10 scores) as the Dependent Variable

Variables	B	SE	T	p-value
Age	-0.18	0.10	-1.74	0.08
Education (<HS vs. some college or more)	0.84	1.24	0.68	0.50
Education (HS vs. some college or more)	2.10	1.16	1.82	0.07
Social network score	-0.09	0.06	-1.49	0.14
Stigma score	0.34	0.09	3.57	< 0.001

$F(5, 148) = 6.53, p < .0001, \text{adjusted } r^2 = 0.15$

Table 3

Linear Regression Model with Anxiety (GAD-7 scores) as the Dependent Variable.

Variables	B	SE	T	p-value
Age	-0.22	0.10	-2.26	0.03
Social network score	-0.06	0.06	-0.99	0.32
Stigma score	0.32	0.09	3.44	0.001

$F(3, 147) = 8.39, p < .0001, \text{adjusted } r^2 = 0.13$

55. McGowen and colleagues (2018) found depression and anxiety to be prevalent among 20% and 16%, respectively, in their study population of adults with HIV with a mean age of 48.

We found depression and anxiety to be associated with higher perceived stigma among our participants. Some studies have found levels of perceived stigma to be lower among older adults (Emlet et al., 2015; Emlet et al., 2013) but stigma and its impact on health outcomes is multifaceted and complex. Older adults living with HIV may experience multiple forms of stigma including intersectional stigma which results from marginalization based on more than one identity such as age, sexual orientation, gender, or race (Sangaramoorthy et al., 2017; Slater et al., 2015). Thus, older adults living with HIV may face stigma related to multiple factors in addition to their disease status and more research is needed to disentangle the impact of intersectional stigmas and related experiences such as discrimination and trauma.

Depression and anxiety were associated with lower social network scores in our study. A possible explanation for this association is that smaller social networks contribute to the

development of depression and anxiety. Greater social support for people with HIV is associated with less distress, greater positive affect, and better medication adherence (Mavandadi et al., 2009), so smaller networks may contribute to distress and poorer affect and medication adherence. Conversely, the symptoms of depression and anxiety can prevent one from expanding and maintaining one's social network (Audet et al., 2013). For example, depression can result in low energy and loss of interest in activities, and patients with such symptoms may engage less frequently with friends and family. People with anxiety may experience anxiety when engaging with their social networks, leading to avoidance of social interactions. Thus, the association between social network size and mental health outcomes is likely to be bidirectional.

Depression and anxiety were not associated with some factors previously shown to be associated or conventionally thought to be associated with depression and anxiety, namely HIV progression. Less than 20% of participants had advanced HIV infection (as measured by CD4+ cell count < 200 cells/ μ L and detectable viral load). However, data were obtained through self-report, and patients may not have known or reliably reported their CD4+ cell counts or viral loads. It is also possible that laboratory markers of disease and clinical diagnoses are less reliably related to the mental health compared to other social factors.

Finally, we note that the clinics from which participants were recruited received funding by the Ryan White HIV/AIDS Program under the auspices of the Health Resources and Services Administration (HRSA), which aims to provide HIV primary care, medications, and other essential HIV-related services for low income people who are uninsured and underserved. Thus, the participants in this study may represent individuals from lower socioeconomic strata and shoulder the multiple burdens associated with poverty including lack of access and options for comprehensive medical and mental health care, unmet basic day-to-day needs such as food security, housing, and transportation, and reliable and stable employment opportunities. Stressful life situations that arise from socioeconomic disadvantage are associated with a host of health disparities, including disparities in mortality and mental health (Adler & Rehkopf, 2008). Although socioeconomic data was not collected in this study, the stresses associated with low socioeconomic status may be a contributing factor to the high rates of depression and anxiety seen in this sample.

Implications for Health Behavior Theory

Most of the participants represented in this study were long-term survivors. Self-reported information on viral load indicated that the majority of participants were undetectable, which suggests high levels of adherence to antiretroviral medication. However, even within the context of long-term survivors who are linked to medical care, mental health outcomes may still be poor. This has implications on efforts to keep patients in care and particularly within the context of HIV, engaged in the HIV care continuum. The HIV care continuum emphasizes the importance of linking people with HIV to medical care and promoting adherence to antiretroviral medications in order to improve health outcomes and reduce HIV transmission (Gardner et al., 2011). This focus on the care continuum is a priority of the National HIV/AIDS Strategy for the United States. Research and health promotion efforts have been targeted at increasing HIV testing, willingness to seek medical care, and medication adherence. However, our findings suggest that being connected to comprehensive medical care, which includes mental health services, should be a major consideration. Unaddressed poor mental health can have a cascade effect not just on efforts to keep individuals engaged in medical care but on individual health,

well-being, and overall quality of life. Older PLWH who are not already connected to medical services may have even greater difficulty accessing mental health resources. Thus, federal, state, and local programs should aim to increase access to mental health services for PLWH by increasing funding and availability of culturally-appropriate mental health programs. Addressing stigma may necessarily go hand in hand with addressing the mental health needs of older PLWH. Researchers and policymakers can draw on lessons learned from interventions that have been successful in reducing HIV-related stigma in different settings within the United States, as well as international settings (Pulerwitz et al., 2010) and incorporate practices into programs that address mental health.

Study Limitations

Due to our use of cross-sectional analyses, causality may not be inferred. Depression and anxiety were measured using CES-D-10 and GAD-7, respectively, which are screening tools that do not necessarily suggest a clinical diagnosis for depression or anxiety. Nonetheless, these are reliable and valid tools and the prevalence of depressive and anxiety symptoms are worrisome and suggests participants are vulnerable to poor mental health outcomes. In this study, levels and frequency of substance use were not measured. We assessed participants' alcohol and drug use in the last six months but did not capture lifetime substance use or past substance misuse diagnosis or treatment. Participants were recruited through Ryan White funded primary care clinics and represented an uninsured or underserved population that is already linked to care, so findings may not apply to other study populations.

Conclusion

Depression and anxiety were present at high rates in a population of older adults with HIV recruited from infectious disease clinics in two large urban areas. Depression and anxiety were associated with greater perceived stigma and smaller social networks. Depression, but not anxiety, was associated with younger age. Results suggest the importance of actively screening for and treating mental health issues, even in patient populations that may already be linked to care. Attention needs to be paid to the social context of older adults living with HIV to mitigate vulnerability to poor mental health outcomes.

Discussion Questions

1. Findings from this study suggest mental health concerns may be prominent among older people living with HIV. Given these results were found in the sample of participants who were connected to clinical care, what are the implications for people who are not already connected to care?
2. The HIV Care Continuum emphasizes the importance of linking people living with HIV into care with the goal of achieving viral suppression. How might addressing mental health care enhance the HIV Care Continuum?

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References

- Adler, N. E., & Rehkopf, D. H. (2008). U.S. disparities in helath: Descriptions, causes, and mechanisms. *Annual Review of Public Health, 29*: 235-252.
<https://doi.org/10.1146/annurev.publhealth.29.020907.090852>
- Akincigil, A., Olfson, M., Walkup, J. T., Siegel, M. J., Kalay, E., Amin, S., Zurlo, K. A., & Crystal, S. (2011). Diagnosis and treatment of depression in older community-dwelling adults: 1992-2005. *Journal of the American Geriatric Society, 59*(6), 1042-1051.
<https://doi.org/10.1111/j.1532-5415.2011.03447.x>
- Almeida, O. P., Draper, B., Snowdon, J., Lautenschlager, N. T., Pirkis, J., Byrne, G., Sim, M., Stocks, N., Flicker, L., & Pfaff, J. J. (2012). Factors associated with suicidal thoughts in a large community study of older adults. *British Journal of Psychiatry, 201*(6), 466-472.
<https://doi.org/10.1192/bjp.bp.112.110130>
- Audet, C. M., McGowan, C. C., Wallston, K. A., & Kipp, A. M. (2013). Relationship between HIV stigma and self-isolation among people living with HIV in Tennessee. *PLoS One, 8*(8), e69564. <https://doi.org/10.1371/journal.pone.0069564>
- Brandt, C., Zvolensky, M. J., Woods, S. P., Gonzalez, A., Safren, S. A., & O'Cleirigh, C. M. (2017). Anxiety symptoms and disorders among adults living with HIV and AIDS: A critical review and integrative synthesis of the empirical literature. *Clinical Psychology Review, 51*, 164-184. <https://doi.org/10.1016/j.cpr.2016.11.005>
- Center for Disease Control and Preventin (CDC). (2019). *HIV Sureillance Report, 2018* (Preliminary Edition, Vol. 30). <http://www.cdc.gov/hiv/library/reports/hiv-surveillance.html>
- Davis, L., Uezato, A., Newell, J. M., & Frazier, E. (2008). Major depression and comorbid substance use disorders. *Current Opinion in Psychiatry, 21*(1), 14-18.
<https://doi.org/10.1097/YCO.0b013e3282f32408>
- Dear, B. F., Titov, N., Sunderland, M., McMillan, D., Anderson, T., Lorian, C., & Robinson, E. (2011). Psychometric comparison of the Generalized Anxiety Disorder Scale-7 and the Penn State Worry Questionnaire for measuring response during treatment of generalised anxiety disorder. *Cognitive Behaviour Therapy, 40*(3), 216-227.
<https://doi.org/10.1080/16506073.2011.582138>
- Deren, S., Cortes, T., Dickson, V. V., Guilamo-Ramos, V., Han, B. H., Karpiak, S., Naegle, M., Ompad, D. C., & Wu, B. (2019). Substance use among older people living with HIV: Challenges for health care providers. *Frontiers in Public Health, 7*, 94.
<https://doi.org/10.3389/fpubh.2019.00094>
- Division of HIV and STD Programs, Los Angeles County Department of Public Health. (2018). 2017 Annual HIV Surveillance Report.
<http://publichealth.lacounty.gov/dhsp/Reports.htm>
- Emler, C. A. (2006). An examination of the social networks and social isolation in older and younger adults living with HIV/AIDS. *Health & Social Work, 31*(4), 299-308.
<https://doi.org/10.1093/hsw/31.4.299>

- Emlet, C. A., Brennan, D. J., Brennenstuhl, S., Rueda, S., Hart, T. A., & Rourke, S. B. (2015). The impact of HIV-related stigma on older and younger adults living with HIV disease: Does age matter? *AIDS Care*, 27(4), 520-528. <https://doi.org/10.1080/09540121.2014.978734>
- Emlet, C. A., Brennan, D. J., Brennenstuhl, S., Rueda, S., Hart, T. A., Rourke, S. B., & the OHTN Cohort Study Team. (2013). Protective and risk factors associated with stigma in a population of older adults living with HIV in Ontario, Canada. *AIDS Care*, 25(10), 1330-1339. <https://doi.org/10.1080/09540121.2013.774317>
- Gardner, E. M., McLees, M. P., Steiner, J. F., Del Rio, C., & Burman, W. J. (2011). The spectrum of engagement in HIV care and its relevance to test-and-treat strategies for prevention of HIV infection. *Clinical Infectious Diseases*, 52(6), 793-800. <https://doi.org/10.1093/cid/ciq243>
- Grov, C., Golub, S. A., Parsons, J. T., Brennan, M., & Karpiak, S. E. (2010). Loneliness and HIV-related stigma explain depression among older HIV-positive adults. *AIDS Care*, 22(5), 630-639. <https://doi.org/10.1080/09540120903280901>
- Herek, G. M., & Capitanio, J. P. (1993). Public reactions to AIDS in the United States: A second decade of stigma. *American Journal of Public Health*, 83(4), 574-577. <https://doi.org/10.2105/ajph.83.4.574>
- Johnson Shen, M., Freeman, R., Karpiak, S., Brennan-Ing, M., Seidel, L., & Siegler, E. L. (2019). The intersectionality of stigmas among key populations of older adults affected by HIV: A thematic analysis. *Clinical Gerontology*, 42(2), 137-149. <https://doi.org/10.1080/07317115.2018.1456500>
- Kohout, F. J., Berkman, L. F., Evans, D. A., & Cornoni-Huntley, J. (1993). Two shorter forms of the CES-D (Center for Epidemiological Studies Depression) depression symptoms index. *Journal of Aging and Health*, 5(2), 179-193. <https://doi.org/10.1177/089826439300500202>
- Löwe, B., Decker, O., Müller, S., Brähler, E., Schellberg, D., & Herzog, W. (2008). Validation and standardization of the Generalized Anxiety Disorder Screener (GAD-7) in the general population. *Medical Care*, 46(3), 266-274. <https://doi.org/10.1097/MLR.0b013e318160d093>
- Lubben, J., Blozik, E., Gillmann, G., Iliffe, S., von Renteln Kruse, W., Beck, J. C., & Stuck, A. E. (2006). Performance of an abbreviated version of the Lubben Social Network Scale among three European community-dwelling older adult populations. *The Gerontologist*, 46(4), 503-513. <https://doi.org/10.1093/geront/46.4.503>
- Mavandadi, S., Zanjani, F., Ten Have, T. R., & Oslin, D. W. (2009). Psychological well-being among individuals aging with HIV: The value of social relationships. *Journal of Acquired Immune Deficiency Syndromes*, 51(1), 91-98. <https://doi.org/10.1097/QAI.0b013e318199069b>
- McGowan, J. A., Brown, J., Lampe, F. C., Lipman, M., Smith, C., & Rodger, A. (2018). Resilience and physical and mental well-being in adults with and without HIV. *AIDS and Behavior*, 22(5), 1688-1698. <https://doi.org/10.1007/s10461-017-1980-6>
- Nguyen, A. L., Seal, D. W., Bruce, O., Dalton, M., Palmer, A., Pardini, M., Quiroga, B., Ryu, J., Soliman, S., Welty, J. C., & Younus, I. (2019). Caregiving preferences and advance care planning among older adults living with HIV. *AIDS Care*, 31(2), 243-249. <https://doi.org/10.1080/09540121.2018.1515472>

- Pulerwitz, J., Michaelis, A., Weiss, E., Brown, L., & Mahendra, V. (2010). Reducing HIV-related stigma: Lessons from Horizons research and programs. *Public Health Reports, 125*(2): 272-281. <https://doi.org/10.1177/003335491012500218>
- Sangaramoorthy, T., Jamison, A., & Dyer, T. (2017). Intersectional stigma among midlife and older black women living with HIV. *Culture, Health & Sex, 19*(12), 1329-1343. <https://doi.org/10.1080/13691058.2017.1312530>
- Shacham, E., Nurutdinova, D., Satyanarayana, V., Stamm, K., & Overton, E. T. (2009). Routine screening for depression: Identifying a challenge for successful HIV care. *AIDS Patient Care and STDS, 23*(11), 949-955. <https://doi.org/10.1089/apc.2009.0064>
- Shippy, R. A., & Karpiak, S. E. (2005). The aging HIV/AIDS population: Fragile social networks. *Aging & Mental Health, 9*(3), 246-254. <https://doi.org/10.1080/13607860412331336850>
- Slater, L. Z., Moneyham, L., Vance, D. E., Raper, J. L., Mugavero, M. J., & Childs, G. (2015). The multiple stigma experience and quality of life in older gay men with HIV. *Journal of the Association of Nurses in AIDS Care, 26*(1), 24-35. <https://doi.org/10.1016/j.jana.2014.06.007>
- Spitzer, R. L., Kroenke, K., Williams, J. B. W., & Löwe, B. (2006). A brief measure for assessing generalized anxiety disorder: The GAD-7. *Archives of Internal Medicine, 166*(10), 1092-1097. <https://doi.org/10.1001/archinte.166.10.1092>
- State of Louisiana Department of Health, Office of Public Health. 2017. 2017 STD/HIV Surveillance Report. http://ldh.la.gov/assets/oph/HIVSTD/std/STDAnnualReports/2017_STDHIV_SURVEIL_LANCE_REPORT.pdf
- Tufano, C. S., Amaral, R. A. d., Cardoso, L. R. D., & Malbergier, A. (2015). The influence of depressive symptoms and substance use on adherence to antiretroviral therapy. A cross-sectional prevalence study. *Sao Paulo Medical Journal, 133*(3), 179-186. <https://doi.org/10.1590/1516-3180.2013.7450010>
- Wolitzky-Taylor, K. B., Castriotta, N., Lenze, E. J., Stanley, M. A., & Craske, M. G. (2010). Anxiety disorders in older adults: A comprehensive review. *Depression & Anxiety, 27*(2), 190-211. <https://doi.org/10.1002/da.20653>
- Zhang, W., O'Brien, N., Forrest, J. I., Salters, K. A., Patterson, T. L., Montaner, J. S. G., Hogg, R. S., & Lima, V. D. (2012). Validating a shortened depression scale (10 item CES-D) among HIV-positive people in British Columbia, Canada. *PLoS One, 7*(7), e40793. <https://doi.org/10.1371/journal.pone.0040793>