The Role of Depression in Retention in Care for Persons Living with HIV

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Abstract

Individuals infected with HIV experience high rates of depression when compared to their sero-negative counterparts. Although symptoms of depression have been consistently linked to poor medication adherence among persons living with HIV/AIDS, their relation to retention in care are less well-known. The purpose of this study was to examine whether clusters of depressive symptoms influence retention in care and if so, whether these clusters had different relations to retention in care. This is a secondary data analysis of a larger study that investigated the role of health literacy, cognitive impairment, and social determinants on retention in HIV care. Individuals with HIV were recruited from South Florida from August 2009 to May 2011. A total of 210 participants were included in the current analyses. A measure of visit constancy was calculated to represent the number of 4-month intervals with at least one kept visit. Individual items on the Center for Epidemiological Studies Depression Scale short form (CES-D10) and factor analysis of the CES-D10 were independent variables. Overall, there was a high prevalence of depressive symptoms in the study participants. Furthermore, factor analysis showed that certain clusters of depressive symptoms were significantly associated with visit constancy. Specifically, negative mood/somatic symptoms were associated with a greater odds of missing a visit in any of the observed 4-month time periods than positive mood factor. Those patients reporting somatic symptoms and negative mood may need additional intervention and support to be effectively retained in care and successfully follow through with appointments and care.

Introduction

DEPRESSION, A MULTIDIMENSIONAL construct predominantly characterized by affective, cognitive, and somatic symptoms,¹ is one of the most prevalent psychiatric diagnoses in persons in HIV.² Its actual prevalence in patients with HIV/AIDS is unknown because it is often under-reported, undiagnosed, and untreated.³ Whether diagnosed or not, depression can thus have a profound effect on health outcomes. It has been linked with poor medication adherence among individuals infected with HIV,⁴ and even depressive symptoms that do not meet diagnostic criteria for major depressive disorder can disrupt self-care behaviors such as poor adherence to HIV treatment regimens.⁵

Adherence to combined antiretroviral therapy (cART) regimens is important in managing HIV infection and improving health by lowering viral load, improving CD4 T cell counts, and decreasing susceptibility to opportunistic dis-

eases.^{6,7} However, cART adherence is only one part of a larger picture of health maintenance in HIV/AIDS.⁸ By definition, treatment adherence includes scheduling and keeping medical appointments, filling prescriptions, following medication instructions, and complying with recommended lifestyle changes.⁹

Recent research on engagement in HIV care has revealed important clinical implications for effective HIV management. Only about 37% of persons living with HIV (PLWH) in the US are retained in care.¹⁰ Patients who are successfully retained in HIV care have a higher percentage of viral suppression and, subsequently, improved health outcomes.¹¹ In contrast, poor clinic attendance has been associated with lower CD4 T cell counts and higher mortality rates.¹² Factors associated with better retention in care are female gender, older age, and AIDS diagnosis.¹³ Little is known, however, about the potential effect of symptoms of depression on retention in care. The effects of depression on adherence to

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cART have been frequently investigated, but to date only a handful of studies have examined the role of depression on retention in care.

Among the existing studies, the general consensus is that depression is related to adherence.^{14–17} There is a high prevalence of depression among PLWH,^{18,19} and depression or mentally unhealthy days were associated with retention in care.^{20, 21} However, no studies have evaluated the relative importance of subsets of depressive symptoms in relation to retention in HIV care. Thus, the primary objective of this study was to examine the relationship between the clusters of depressive symptoms and retention in care, and whether these clusters have different relations to retention in care. Given that depression consists of a number of symptoms, identification of those most related to missed HIV care visits can facilitate tailoring of treatments that may not only alleviate depression, but may also help to improve retention in HIV care.

Methods

This is a secondary data analysis of a larger study that investigated the role of health literacy, cognitive impairment, and social determinants on retention in HIV care. The study collected data at baseline, then again 28 weeks post-baseline. The results of the parent study were published elsewhere.²² The parent study was approved by the University of Miami Institutional Review Board.

Participants and setting

In the parent study, PLWH were recruited from public hospital-affiliated outpatient HIV clinics in South Florida from August 2009 to May 2011. Participants were excluded if they (1) were enrolled in another clinical trial, (2) were experiencing a major psychiatric illness, or (3) had a history of head trauma. After being screened and providing informed consent, participants completed two face-to-face study visits scheduled 6 months apart. Since the sample was at risk for low literacy, all study materials were read aloud. Electronic medical records (EMR) were reviewed, and data on HIV-related medical visits were extracted. The EMR observation period consisted of 7 months preceding the baseline study visit and 7 months following the 6-month follow-up visit (for a total EMR observation period of 20 months).

Measures

Demographic information included age, race, sex, educational status, and time since HIV diagnosis.

Retention in care was measured by Mugavero and colleagues²³ visit constancy, which is defined as “...the proportion of time intervals with at least 1 completed clinic visit during an observation period of interest.” EMR data collection included the 28 weeks prior to entering in the study, and 28 weeks after completion of the study, where the number of scheduled visits kept and the number of visits for which the participant was a “no-show” were recorded. The observation period was divided into clinically relevant intervals that represented periods of time during which patients would, under routine care circumstances, be expected to have a regular HIV care appointment (based on the guidelines in place at the time of the parent study). Intervals of 4 months were selected,

and visit constancy was calculated as the number of 4-month intervals (out of the 14 intervals in this study) with at least one kept visit.²² Visits that were cancelled or rescheduled by the participant were not included as “no show” visits.

Depression was measured using the Center for Epidemiologic Studies Depression Scale (CES-D10). The CES-D10 is a 10-item scale that measures symptoms of depression using a 4-point Likert format that ranges from 0 = “rarely” to 3 = “all of the time.” Two items that were worded positively, “I felt happy” and “I felt hopeful about the future,” were recoded to correspond with the negative wording of the other scale items. Scores on this measure are summed, and a score greater than 10 indicates being depressed.

There are three subscales: negative mood, somatic symptoms, and low positive mood. Cronbach’s alpha for the CES-D10 among participants in this study was 0.80. To calculate standardized CES-D factor score for each factor, we used PROC SCORE procedure in SAS. This procedure first standardized each CES-D10 item by removing its mean and dividing by its standard deviation. The resulting standardized CES-D10 items then had zero mean and unit standard deviation. The CES-D factor score was then calculated as the weighted average of these standardized CES-D10 items where the weight for each item was their corresponding standardized scoring coefficient from the factor analysis.

Statistical analysis

First, correlation analysis was conducted to examine the relationship between retention in care and the depression scale. Principal components factor analysis was performed using PROC FACTOR in SAS. The factors extracted were subjected to a non-orthogonal/oblique (Promax) rotation to allow for the possibility of correlated factors.²⁴ Finally, logistic regression, adjusted for time since HIV diagnosis, was performed to analyze the effects of standardized CESD-10 factor scores on retention in care (visit constancy).

The missing rate in this dataset was low therefore, complete-cases were included in the analyses.

Results

A total of 210 participants were enrolled in the parent study and complete cases resulted in the inclusion of 204 participants in the present analyses. Their demographics are shown in Table 1. The participants were mostly African American

TABLE 1. DESCRIPTIVE CHARACTERISTICS

	% or Mean (SD)
Gender	
Women	52.9%
Men	46.2%
Years of school	11.1 (2.1)
Age	47.1 (7.4)
Race	
White/Non-Hispanic	4.3%
Hispanic	10.5%
African American	82.9%
Time since HIV diagnosis (yrs)	11.4 (6.9)
Retained into care	82 %
CES-D score	10.8 (6.7)

TABLE 2. FACTOR ANALYSIS

	<i>Somatic/worry</i>	<i>Positive mood</i>	<i>Communality estimates</i>
Bothered by things	0.75020	0.11337	0.52
Trouble keeping my mind on what I was doing	0.69201	−0.13772	0.56
Felt depressed	0.70647	−0.22067	0.65
Felt everything I did was an effort	0.78265	0.46242	0.59
Felt hopeful about the future	0.07315	0.82868	0.65
Felt fearful	0.63159	−0.14485	0.48
My sleep was restless	0.56934	−0.16218	0.41
I was happy	−0.28344	0.64515	0.61
I felt lonely	0.62221	−0.18932	0.50
I could not “get going”	0.69667	−0.15283	0.58
Variance explained	4.204	2.114	

(82.9%), with an average of 11 school years (11.1 ± 2.1). Over half of the participants were women (52.6%). Their average CES-D10 score was 10.8 ± 6.7 , indicating that, on average, these participants were depressed.

CES-D10 item scores were entered into principal components factor analysis to assess for the underlying factor structure of the scale and to evaluate whether underlying clusters of depressive symptoms might be differentially associated with retention in care. Inspection of the correlation matrix revealed the presence of moderate correlations among most items. Spearman correlation of individual CES-D10 items showed a negative relationship between somatic symptoms of depression and visit constancy. The scree test showed that the eigenvalue curve leveled off at two factors, indicating a two-factor structure. Two factors emerged, representing low positive mood (two items: “I feel happy” and “I feel hopeful about the future”) and somatic/negative mood (the remaining eight items, which included both negative mood and somatic symptoms).

In the rotated factor pattern matrix, an item with an absolute loading of greater than 0.5 was considered to have a salient loading on the common factor and was incorporated to interpret the factor. Communality estimates of each item represented the proportion of its total variance attributed to the common variance shared with other items, with higher communality indicating a more cohesive structure (Table 2). Since no communalities were below 0.40, no variables were excluded on the basis of low communality. Cronbach’s alpha was used to measure the factor internal consistency. For somatic/negative mood factor, the Cronbach’s alpha was 0.85, representing good internal consistency. For the positive mood factor, the Cronbach’s alpha value was 0.56, possibly due to the small number (2) of items composing this factor. Findings from this factor should be interpreted with caution.²⁵

Three 4-month intervals were included in the visit constancy measure. Eighty-two percent of participants attended at least one scheduled visit within each of the three intervals, 14% had one interval with a missed visit, 2% had two intervals with a missed visit, and 2% missed a visit in each of the four intervals. Because there were small numbers within some cells ($n < 5$), data were collapsed into binary categories (0=no intervals with a missed visit and 1=at least one interval with a missed visit). Finally, logistic regression adjusting for time since HIV diagnosis was performed in order to analyze the effects of standardized CESD-10 factor scores on visit constancy (Table 3).

The somatic/negative mood factor score was significantly associated with visit constancy ($p=0.02$). As somatic/negative mood factor scores increased by 1, the odds ratio of having at least one 4-month interval with a missed visit was 1.6 (95% CI [1.1,2.4]). The results did not change when adjusted for time since diagnosis or age. Positive mood factor scores were not significantly associated with visit constancy.

Discussion

In this study, we tested the relationship between depressive symptoms clusters and retention in HIV care. Overall, there was a high prevalence of depressive symptoms in the participants. Furthermore, negative mood/somatic symptoms were associated with greater odds of missing a visit in any of the observed 4-month time periods. Positive mood was not associated with a missed visit during the observation period.

In the original validation of the CES-D10,²⁶ three subscales were identified: positive mood, negative mood, and somatic symptoms. However, in our study sample of persons living with HIV (PLWH), only two factors emerged: positive mood and negative mood/somatic symptoms. Somatic symptoms represented in depression scales overlap considerably with symptoms of HIV infection itself as well as the side effects of cART, such as poor concentration and fatigue.²⁷

The etiology of the symptoms may not be attributed to depression, however the scale does not discriminate between side effects of medications and symptoms of depression. This may account for the discrepancy between the subscales identified in our sample and those identified in the original CESD-10 validation sample. Although some criticize the use of measures of depression that include somatic symptoms,²⁷ it may be argued that the symptoms themselves—regardless

TABLE 3. LOGISTIC REGRESSION OF DEPRESSIVE SYMPTOM FACTORS ON VISIT CONSTANCY

<i>Effect</i>	<i>Point estimate</i>	<i>95% Wald confidence limits</i>	<i>p Value</i>
Time since HIV diagnosis (yr)	0.973	(0.918, 1.032)	0.3673
Somatic/worry	1.604	(1.086, 2.368)	0.0175 ^a
Positive mood	0.917	(0.623, 1.352)	0.6630

^a $p < 0.05$.

of their etiology—are important to consider in terms of behavioral outcomes such as attending medical visits.

In this study, the low positive mood factor had a low Cronbach's alpha. In previous studies, the reverse coded questions have had mixed results.^{28,29} Carson et al.,³⁰ administered the CES-D20 to adults 60 years and older enrolled in a well-elderly study and found that the four positively worded items had low internal consistency (item scale correlation = 0.45) and were atypically answered by the participants. They reported that the format of these questions makes it difficult for people to answer, especially for the elderly population.³⁰ This may be the same for the sample in the present study. Although the factor scale reliability was higher in this study, results should be interpreted with caution.

Cook et al. assessed the influence of depression and mental health quality of life on use of ARVs in women living with HIV.³¹ They did not include the subset of somatic symptoms for analysis. Without the somatic subset, they reported a significant correlation between depression and adherence to HIV medication.³¹ Findings from the present study suggest that both negative mood and somatic symptoms may be important contributors to missed HIV visits. It therefore remains unclear whether the somatic symptoms shared by both HIV infection and depression should be considered separately, or whether they are an integral component of negative mood and should be retained as part of the scale.

The present study's findings concur with those of several others. Despite using different measures of retention in HIV care, previous studies reported that retention in care declined as symptoms of depression increased.^{13,14} Among HIV-positive men in Chicago, those with greater depressive symptoms were more likely to self-report a missed HIV medical visit within the past 12 months.³² A study from rural Rwanda tested the relation between depression and retention in care directly and also examined whether it was mediated by suboptimal adherence to antiretroviral treatment.¹⁴ Not being retained in care (attrition) was defined at 3 months post-baseline as treatment default, loss to follow-up, or death. Depression was associated with time to attrition and was not mediated by suboptimal antiretroviral adherence.¹⁴ Although time frames for follow-up, measures of depression, and characteristics of study participants have varied across studies, the findings from the present and previous studies present compelling evidence that depression is a key factor in retention in care for PLWH.

In the present study, no demographic variable was significantly associated with retention in care. Specifically, age was not significantly associated with either retention in care or depression. This contrasts with a study by Torian and colleagues, who found a positive association between retention in care and adherence to medication for some age groups.¹³ They reported that among PLWH, teenagers and adults over age 60 were more likely to be retained in care. The discrepancy between our findings and theirs may be a result of differences in the respective samples' demographics. The very young were not included in the present study, and few adults over age 60 were enrolled.

Limitations

The results of this study should be interpreted in light of certain limitations. Since this was a secondary data analysis, options for instrument and sample selection were already

determined. The positive mood factor of the CES-D was represented by items that were positively worded, and the different phrasing of these items may have influenced response tendencies. In addition, the CES-D10 comprises only 10 questions; the 20-item version might better discriminate the factors. The relationship of study findings in the context of alcohol and drug use were not evaluated in the present study and should be addressed in future studies.

The findings may not be generalizable to the larger HIV population since participants were a convenience sample from public hospital clinics in South Florida. Moreover, women were over-represented in comparison with the general population of persons living with HIV. Additionally, these findings are not applicable to persons who have never accessed HIV care or those who have dropped out of care for extended periods of time.

These findings contribute to the understanding of contributors to poor retention in HIV care and underscore the importance of evaluating depressive symptoms in PLWH and offering treatment options such as therapy and support groups. Lapses in HIV care for those already enrolled in care can place patients at risk for poor outcomes. Engaging PLWH in routine care is essential for effective treatment and management of their disease, yet somatic symptoms of depression that also overlap with symptoms of HIV infection itself and negative mood may impede the quality of their engagement in and adherence to treatment recommendations. Thus, to improve retention in care, health care providers should consider screening their patients for depression. Patients reporting somatic symptoms and negative mood may need additional intervention and support to be effectively retained in care and to successfully follow through with appointments and care.

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