

## Religion, Spirituality, and Depressive Symptoms in Patients with HIV/AIDS

Michael S. Yi, MD, MSc,<sup>1,2,3</sup> Joseph M. Mrus, MD, MSc,<sup>1,2,3,4</sup> Terrance J. Wade, PhD,<sup>5</sup> Mona L. Ho, MS,<sup>2,3</sup> Richard W. Hornung, DrPH,<sup>2,3</sup> Sian Cotton, PhD,<sup>2,4</sup> Amy H. Peterman, PhD,<sup>6</sup> Christina M. Puchalski, MD,<sup>7,8</sup> Joel Tsevat, MD, MPH<sup>1,2,4</sup>

<sup>1</sup>Division of General Internal Medicine, Section of Outcomes Research, Department of Internal Medicine, University of Cincinnati Medical Center, Cincinnati, OH, USA; <sup>2</sup>Institute for the Study of Health, University of Cincinnati Medical Center, Cincinnati, OH, USA; <sup>3</sup>Cincinnati Children's Hospital Medical Center, Cincinnati, OH, USA; <sup>4</sup>HSR&D Service, Cincinnati Veterans Affairs Medical Center and Veterans Healthcare System of Ohio, Cincinnati, OH, USA; <sup>5</sup>Departments of Community Health Sciences and Child and Youth Studies, Brock University, St. Catharines, Ontario, Canada; <sup>6</sup>Center on Outcomes, Research and Education, Evanston Northwestern Healthcare, Evanston, IL, USA; <sup>7</sup>Department of Medicine, George Washington University Medical Center, Washington, DC, USA; <sup>8</sup>George Washington Institute for Spirituality and Health, Washington, DC, USA.

**BACKGROUND:** Depression has been linked to immune function and mortality in patients with chronic illnesses. Factors such as poorer spiritual well-being has been linked to increased risk for depression and other mood disorders in patients with HIV.

**OBJECTIVE:** We sought to determine how specific dimensions of religion, spirituality, and other factors relate to depressive symptoms in a contemporary, multi-center cohort of patients with HIV/AIDS.

**DESIGN:** Patients were recruited from 4 medical centers in 3 cities in 2002 to 2003, and trained interviewers administered the questionnaires. The level of depressive symptoms was measured with the 10-item Center for Epidemiologic Studies Depression (CESD-10) Scale. Independent variables included socio-demographics, clinical information, 8 dimensions of health status and concerns, symptoms, social support, risk attitudes, self-esteem, spirituality, religious affiliation, religiosity, and religious coping. We examined the bivariate and multivariable associations of religiosity, spirituality, and depressive symptoms.

**MEASUREMENTS AND MAIN RESULTS:** We collected data from 450 subjects. Their mean (SD) age was 43.8 (8.4) years; 387 (86.0%) were male; 204 (45.3%) were white; and their mean CD4 count was 420.5 (301.0). Two hundred forty-one (53.6%) fit the criteria for significant depressive symptoms (CESD-10 score  $\geq 10$ ). In multivariable analyses, having greater health worries, less comfort with how one contracted HIV, more HIV-related symptoms, less social support, and lower spiritual well-being was associated with significant depressive symptoms ( $P < .05$ ).

**CONCLUSION:** A majority of patients with HIV reported having significant depressive symptoms. Poorer health

status and perceptions, less social support, and lower spiritual well-being were related to significant depressive symptoms, while personal religiosity and having a religious affiliation was not associated when controlling for other factors. Helping to address the spiritual needs of patients in the medical or community setting may be one way to decrease depressive symptoms in patients with HIV/AIDS.

**KEY WORDS:** HIV; AIDS; mental health; depression; spirituality; health status; quality of life; outcome assessment (health care).

DOI: 10.1111/j.1525-1497.2006.00643.x  
J GEN INTERN MED 2006; 21:S21-27.

In the United States, there are approximately 850,000 to 950,000 persons living with HIV or AIDS, with 40,000 new cases every year.<sup>1</sup> In the pre-highly active antiretroviral therapy (HAART) era, depressive symptoms and other mood problems were shown to be substantial problems for patients with HIV/AIDS.<sup>2-5</sup> Although there is some evidence to indicate that with the advent of HAART and improved long-term prognosis, the rates of mood disorders may have decreased, those findings have been inconsistent, and mood disorders continue to be a substantial problem in both women and men with HIV.<sup>6-12</sup> In a recent investigation of veterans with HIV, the majority of patients reported having significant levels of depressive symptoms.<sup>11</sup> Depression has been linked to end points such as poorer immune function, worsened disease severity, and greater mortality rates, although this relationship has not been shown to be consistent across all studies.<sup>11-16</sup> Moreover, in previous smaller studies, factors such as poorer spiritual well-being have been linked to increased risk for depression and other mood disorders in certain demographic groups with HIV.<sup>17-19</sup> However, an examination of various specific dimensions of religion and spirituality and their relationships with depressive symptoms in a large and diverse population of patients with HIV is lacking.

There has been a growing interest in the study of religion, religiosity, and spirituality and their relationships to mental and physical health in patients with chronic illness, including patients with HIV.<sup>20</sup> Prior conceptualizations have often described the terms religion and spirituality similarly and broadly.<sup>21</sup> However, more contemporaneous views have

---

This investigation was presented at the Society of General Internal Medicine Annual Meeting, Chicago, IL, 2004.

Address correspondence and requests for reprints to Dr. Yi: Division of General Internal Medicine, Section of Outcomes Research, University of Cincinnati Medical Center, PO Box 670535, Cincinnati, OH 45267-0535 (e-mail: michael.yi@uc.edu).

tended to narrow the terms' respective definitions such that they describe somewhat different constructs, although there continues to be ongoing debate among scholars regarding the concepts behind the terms religion and spirituality.<sup>21</sup> Accordingly, some scholars have employed the terms religion and religiosity to describe institutional, doctrinal, or formal traditions and expressions.<sup>20</sup> Conversely, the term spirituality has been used more recently to describe an individual's sense of purpose and meaning and personal connectedness to the divine or to the truth. In that view of spirituality, the conception relies more on the individual context than the institutional context.

With this investigation, our goal was to explore various specific facets of religion, religiosity, and spirituality, and their relationships with depressive symptoms in patients with HIV. Our aims were: (1) to determine the prevalence of significant depressive symptoms in a large, multi-center, contemporary cohort; and (2) to examine how depressive symptoms relate to religious affiliation, religiosity, and spirituality in the context of various socio-demographic, clinical, and health status variables.

## METHODS

### Study Participants

Between February 2002 and 2003, we recruited patients with HIV from 4 medical centers in 3 cities: the University of Cincinnati and Cincinnati Veterans Affairs Medical Centers, Cincinnati, OH; George Washington University Medical Center, Washington, DC; and the Veterans Affairs Pittsburgh Healthcare System, Pittsburgh, PA. Patients were made aware of the study by the following methods: (1) by posted fliers at the clinics, (2) by telephone calls from clinic nurses, and (3) by patients' physicians or nurses at patients' regularly scheduled visits. In order to recruit patients who were demographically representative of patients followed at each of these medical centers, the proportion of women and minorities recruited mirrored the proportions from each HIV clinic. Patients were paid \$30 for participating in the interview. The respective institutional review boards at each center approved the protocol.

### Instruments

**Outcome Measure.** Depressive symptoms were measured with the 10-item Center for Epidemiologic Studies Depression (CESD-10) Scale.<sup>11,22</sup> The CESD-10 is a subset of the 20-item CESD Scale and has been used extensively in general populations and patients with chronic illness, including those with HIV. The CESD-10 uses a 4-point Likert scale (range 0 to 30) with higher scores representing greater depressive symptoms. As previously reported by others, a score  $\geq 10$  on the CESD-10 represents significant depressive symptoms. This threshold approximates the full 20-item version of the CESD, which has been shown to correlate well with a clinical diagnosis of major depression.<sup>22,23</sup> The full CESD has been reported to have internal consistency coefficients ranging from 0.63 to 0.93 and a test-retest reliability coefficient of 0.61.<sup>24</sup>

### Independent Measures

**Demographic, Substance Use, and Clinical Information.** We collected data on a number of socio-demographic variables from chart review and patient interviews. Substance

use data included history of injection drug use and frequency of alcohol consumption. Clinical information included history of an AIDS-defining illness or CD4 count, most recent viral load and CD4 count, duration since HIV diagnosis, and whether or not the patient was on HAART at the time of the interview.

**Health Status, Health Concerns, and Symptoms.** We used the HIV/AIDS-Targeted Quality of Life (HAT-QoL) instrument to measure health status and HIV-related concerns.<sup>25,26</sup> The HAT-QoL assesses 9 domains: life satisfaction, overall functioning, health worries, financial worries, medication worries, HIV mastery (comfort with how the patient acquired HIV), disclosure worries, provider trust, and sexual functioning. Each subscale is scored from 0 (worst functioning) to 100 (best functioning). The instrument has been shown to exhibit good psychometric properties, including acceptable internal consistency and construct validity.<sup>26</sup> Owing to conceptual similarities and high correlations ( $r=.71$ ) between the life satisfaction subscale from the HAT-QoL and depressive symptoms, we did not incorporate the HAT-QoL life satisfaction subscale into the analyses. We used the HIV Symptom Index (HSI) to assess the presence of 20 symptoms during the past 4 weeks (e.g., fatigue, fever, pain/numbness/tingling, memory problems, nausea/vomiting, diarrhea, rash, cough/shortness of breath, headache, stomach pain or bloating, changes in body appearance), and degree of bother of those symptoms (on a 4-point Likert scale with possible answers of "it doesn't bother me"; "it bothers me a little"; "it bothers me"; or "it bothers me a lot").<sup>25,26</sup> The original HSI has evidence of construct validity and has been shown to be more sensitive and more reproducible than provider-reported HIV symptoms.<sup>25,27</sup> As previously described by Killbourne et al.,<sup>11</sup> because 5 items of the HSI (fatigue, memory, sadness, anxiety, insomnia) relate closely to elements of the CESD-10, we did not incorporate those items from the HSI. Of the remaining 15 items, we counted the number of symptoms considered bothersome ("it bothers me" or "it bothers me a lot").

**Risk Attitudes, Self Perception, and Social Support.** We used a 6-item version of the risk-taking subscale from the Jackson Personality Inventory to measure risk attitudes (scored from 6 to 36, with higher scores indicating greater risk-seeking attitudes and lower scores indicating greater risk aversion).<sup>28</sup> We used the 6-item Rosenberg Global Self-esteem Measure (RGSM) to measure self-perception and sense of self-worth (scored from 6 to 24 with higher scores indicating greater sense of self-worth), and the 12-item version of the Interpersonal Support Evaluation List (ISEL) to evaluate social support, consisting of appraisal, belonging, and tangible support (scored from 12 to 48 with higher scores indicating greater perceived social support).<sup>29,30</sup> The test-retest reliability of the RGSM has been shown to be 0.85, and the RGSM has good construct, convergent, and discriminant validity<sup>29</sup>; the full version of the ISEL has acceptable internal consistency and validity in general populations.<sup>31,32</sup>

**Religious Affiliation, Religiosity, and Spirituality.** We used a single question modeled after the question used in Gallup surveys, "What is your religious preference?" to inquire about religious affiliations.<sup>33</sup> The subject could check one of 23 specific religions and Christian denominations or indicate "none," "other specific," or "undesigned." For purposes of

our analysis, we categorized religious affiliation into any versus none. We used the 5-item Duke Religion Index to measure 3 dimensions of religious activity: organized religious activity (attendance at religious meetings; scored from 1 to 6 with higher scores indicating greater frequency), nonorganized religious activities (prayer, meditation, or text study; scored from 1 to 6 with higher scores indicating greater frequency), and intrinsic religiosity (views on religion and religious experience; scored 3 to 15 with higher scores indicating greater levels of intrinsic religiosity).<sup>34</sup> The Cronbach's  $\alpha$  for the intrinsic religiosity subscale is 0.75 and the subscale has good convergent validity.<sup>34</sup>

We used the 14-item Brief RCOPE to assess the positive and negative roles of religion in coping. Positive religious coping mechanisms include spiritual connection, spiritual support seeking, religious forgiveness, collaborative religious coping, benevolent religious reappraisals, religious purification, and religious focus (scored from 7 to 28 with higher scores indicating greater levels of positive religious coping mechanisms). Negative religious coping mechanisms include spiritual discontent, punishing God reappraisals, interpersonal religious discontent, demonic reappraisals, and reappraisals of God's powers (scored from 7 to 28 with higher scores indicating more negative religious coping mechanisms).<sup>35</sup> The Brief RCOPE exhibits high internal consistency ( $\alpha=0.81$  to 0.90) and good discriminant validity.<sup>35</sup>

We measured spiritual well-being with the 23-item Functional Assessment of Chronic Illness Therapy Spiritual Well-being—Expanded (FACIT-SpEx) scale, which assesses faith (comfort and strength in one's beliefs), and meaning/peace (sense of meaning, purpose, and peacefulness in life).<sup>36</sup> The FACIT-SpEx is scored from 0 to 92 with higher scores indicating greater overall spiritual well-being. The FACIT-SpEx exhibits good internal reliability and convergent validity.<sup>36</sup>

## Analysis

Descriptive statistics included means, standard deviations, medians, and 25th and 75th percentiles. Bivariate analyses included  $\chi^2$  tests to compare proportions and Student's *t* tests or Wilcoxon rank-sum tests, as appropriate, for continuous variables. Multivariable analyses were conducted by using backward elimination logistic regression, using our bivariate analysis results as guidelines. Specifically, independent variables with *P* values  $\leq .15$  were entered into the model, and the final model included all terms whose *P* values were  $< .05$ . Regression diagnostics were examined for distribution of residuals and for multicollinearity. Residuals were normally distributed and no problems with multicollinearity were found. Although we had very low rates of missing data (e.g., 35 of 38 variables had no missing data for at least 441 of a total possible 450 subjects), in cases where data for scales were not 100% complete, we imputed data based on recommendations preferred by the scale developers or, if such information was not available, by methods developed by the consensus of the research team (information available from the authors by request).

All analyses were performed by using SAS software, version 8.2 (SAS Institute Inc., Cary, NC).

## RESULTS

A total of 450 patients from the 4 medical centers participated in the study. Their mean (SD) age was 43.8 (8.4) years; 387

(86.0%) were male; 225 (50.0%) were African American; 204 (45.3%) were Caucasian; 148 (32.9%) were heterosexual; 182 (40.4%) had a high school education or less; and 358 (79.6%) reported a religious affiliation. The mean (SD) CD4 was 420.5 (301.0) and the mean duration since HIV diagnosis was 8.4 (5.3) years (Table 1).

The mean (SD) CESD-10 score was 11.0 (7.0). Significant depressive symptoms (CESD-10 score  $\geq 10$ ) were reported by 241 (53.6%) of the respondents. In bivariate analyses, significant depressive symptoms were significantly related to certain socioeconomic factors such as having no health insurance, having a high school education or less, being unemployed, and having an unstable housing situation (Table 1). However, most demographic factors (e.g., age, ethnicity, gender) were unrelated to depressive symptoms with the exception of marital status—married patients tended to have lower levels of depressive symptoms than single patients. Substance use (history of injection drug use, alcohol use) was also not related to depressive symptoms. Two clinical disease measures, CD4 count and viral load, were associated with significant depressive symptoms, but having AIDS (as opposed to having HIV but not AIDS) was not (Table 1). Greater numbers of bothersome HIV-related symptoms, poorer health status, and greater levels of health concerns (all HAT-QoL domains) were associated with the presence of significant depressive symptoms (Table 2). Individual characteristics such as sense of self-worth and perceptions of available social support were also associated with significant depressive symptoms. Greater levels of spiritual well-being (FACIT-SpEx) were associated with lower levels of depressive symptoms. Two measures of religiosity—more negative religious coping mechanisms (RCOPE) and less organized religious activity (Duke Religion Index)—were also related to having significant depressive symptoms (Table 3). However, having a religious affiliation and the other dimensions of religiosity were not significantly related to depressive symptoms (Tables 1 and 3).

In multivariable analyses, greater health worries, less comfort with how one contracted HIV, a greater number of bothersome HIV-related symptoms, and less social support, was significantly associated with depressive symptoms (Table 4). Although more negative religious coping mechanisms and less organized religious activity were no longer associated with significant depressive symptoms in multivariable analyses, greater spiritual well-being was related with a lower risk for significant depressive symptoms. The *C* statistic for the multivariable model was 0.91.

## COMMENT

Previous investigations have linked depression to health behaviors and health-related outcomes.<sup>37–40</sup> With this investigation, we examined how (in the context of socio-demographic, health status, clinical, and other psychosocial variables) religious affiliation, various and specific dimensions of religiosity, and spiritual well-being may relate to depressive symptoms in a contemporary, large, and diverse cohort of patients with HIV. We hypothesized that aspects of religiosity and spirituality may have salutary effects on depressive symptoms in patients with HIV/AIDS. We found that, in the HAART era, significant depressive symptoms continue to be very common in both men and women with HIV. In fact, the majority of our subjects had significant depressive symptoms. In multivariable

Table 1. Demographic and Clinical Characteristics: Overall and Stratified by CESD-10 Score

| Variable  | Overall Group | No Significant Depressive Symptoms* | Significant Depressive Symptoms* | P value |
|---|---------------|-------------------------------------|----------------------------------|---------|
| Mean (SD) age, years                            | 43.8 (8.4)    | 44.5 (8.2)                          | 43.2 (8.6)                       | NS      |
| Gender  |               |                                     |                                  |         |
| Male, N (%)                                     | 387 (86.0)    | 181 (46.8)                          | 206 (53.2)                       | NS      |
| Female, N (%)                                   | 63 (14.0)     | 28 (44.4)                           | 35 (55.6)                        |         |
| Race/ethnicity                                  |               |                                     |                                  |         |
| Caucasian, N (%)                                | 204 (45.3)    | 94 (46.1)                           | 110 (53.9)                       | NS      |
| Minority, N (%)                                 | 246 (54.7)    | 115 (46.8)                          | 131 (53.3)                       |         |
| Sexual orientation                              |               |                                     |                                  |         |
| Heterosexual, N (%)                             | 148 (32.9)    | 64 (43.2)                           | 84 (56.8)                        | NS      |
| Nonheterosexual, N (%)                          | 302 (67.1)    | 145 (48.0)                          | 157 (52.0)                       |         |
| Religious affiliation                           |               |                                     |                                  |         |
| Has affiliation, N (%)                          | 358 (79.6)    | 174 (48.6)                          | 184 (51.4)                       | NS      |
| No affiliation, N (%)                           | 92 (20.4)     | 35 (38.0)                           | 57 (62.0)                        |         |
| Marital status                                  |               |                                     |                                  |         |
| Single, N (%)                                   | 327 (72.8)    | 138 (42.2)                          | 189 (57.8)                       | <.01    |
| Married or living with significant other, N (%) | 122 (27.2)    | 70 (57.4)                           | 52 (42.3)                        |         |
| Children  |               |                                     |                                  |         |
| Has one or more children, N (%)                 | 130 (29.5)    | 60 (46.2)                           | 70 (54.8)                        | NS      |
| No children, N (%)                              | 311 (70.5)    | 145 (46.6)                          | 166 (53.4)                       |         |
| Health insurance                                |               |                                     |                                  |         |
| No health insurance, N (%)                      | 54 (12.0)     | 17 (31.5)                           | 37 (68.5)                        | .02     |
| Has health insurance (includes VA), N (%)       | 396 (88.0)    | 192 (48.5)                          | 204 (51.5)                       |         |
| Education                                       |               |                                     |                                  |         |
| High school or less, N (%)                      | 182 (40.4)    | 68 (37.4)                           | 114 (62.6)                       | <.01    |
| More than high school, N (%)                    | 268 (59.6)    | 141 (52.6)                          | 127 (47.4)                       |         |
| Employment                                      |               |                                     |                                  |         |
| Unemployed, N (%)                               | 218 (48.4)    | 75 (34.4)                           | 143 (65.6)                       | <.0001  |
| Employed, N (%)                                 | 232 (51.6)    | 134 (57.8)                          | 98 (42.2)                        |         |
| Housing   |               |                                     |                                  |         |
| Unstable, N (%)                                 | 35 (7.8)      | 8 (22.9)                            | 27 (77.1)                        | <.01    |
| Stable, N (%)                                   | 415 (92.2)    | 201 (48.4)                          | 214 (51.6)                       |         |
| Mean (SD) number of alcoholic drinks/mo         | 12.5 (30.2)   | 12.3 (28.6)                         | 12.6 (31.5)                      | NS      |
| History of injection drug use                   |               |                                     |                                  |         |
| Past history of use, N (%)                      | 61 (14.1)     | 23 (37.7)                           | 38 (62.3)                        | NS      |
| No history, N (%)                               | 371 (85.9)    | 179 (48.3)                          | 192 (51.8)                       |         |
| Clinical characteristics                        |               |                                     |                                  |         |
| Disease class                                   |               |                                     |                                  |         |
| AIDS, N (%)                                     | 274 (61.4)    | 118 (43.1)                          | 156 (56.9)                       | NS      |
| HIV but not AIDS, N (%)                         | 172 (38.6)    | 89 (51.7)                           | 83 (48.3)                        |         |
| Mean (SD) duration since HIV diagnosis, years   | 8.4 (5.3)     | 8.3 (5.1)                           | 8.4 (5.4)                        | NS      |
| HAART status                                    |               |                                     |                                  |         |
| Currently on HAART, N (%)                       | 342 (76.3)    | 161 (47.1)                          | 181 (52.9)                       | NS      |
| Not on HAART, N (%)                             | 106 (23.7)    | 47 (44.3)                           | 59 (55.7)                        |         |
| Mean (SD) CD4 count, cells/ $\mu$ L             | 420.5 (301.0) | 467.8 (326.4)                       | 378.8 (270.2)                    | <.01    |
| Viral load level                                |               |                                     |                                  |         |
| $\leq$ 400 copies/mL, N (%)                     | 232 (52.6)    | 119 (51.3)                          | 113 (48.7)                       | .05     |
| $>$ 400 copies/mL, N (%)                        | 209 (47.4)    | 88 (42.1)                           | 121 (57.9)                       |         |
| Type of hospital                                |               |                                     |                                  |         |
| VA hospital, N (%)                              | 100 (22.2)    | 42 (42.0)                           | 58 (58.0)                        | NS      |
| Non-VA hospital, N (%)                          | 350 (77.8)    | 167 (47.7)                          | 183 (52.3)                       |         |

\*CESD-10, Center for Epidemiologic Studies—Depression scale, 10-item version; range of scores: 0 to 30, with scores  $\geq$ 10 indicative of significant depressive symptoms.

NS, nonsignificant; HAART, highly active antiretroviral therapy; VA, Veterans Affairs Medical Center.

analyses, having greater HIV-related health worries, less comfort with how HIV was contracted, a greater number of bothersome HIV-related symptoms, poorer perceived social support, and lower spiritual well-being were statistically significant and highly discriminative ( $C$  statistic = 0.91) for significant depressive symptoms.

Other studies have noted the inverse relationship between level of spiritual well-being and level of depressive symptoms.<sup>18,19,41</sup> Spiritual well-being, or a sense of purpose/meaning and personal connectedness to a higher power or truth, may enhance physical and mental health through biological, psychological, and social mechanisms.<sup>20</sup> Greater

spiritual well-being may facilitate more positive and “healthy” personal and social behaviors, may provide an overarching and unifying framework with which to deal with unexpected and difficult situations, and may give a greater sense of coherence between the individual and their environment, all of which may provide protection against depression or other psychological problems.

Depression has been linked to a number of end points such as poorer immune function and higher mortality rates.<sup>11–16</sup> Depression has also been shown to predict negative health behaviors such as poorer adherence to medications.<sup>37–40</sup> More so than in many other diseases, meticulous

**Table 2. Health Status, Symptoms, Risk Attitudes, Self-perception, and Perceived Social Support: Overall and Stratified by CESD-10 Score**

| Variable  | Overall Group Mean (SD) | No Significant Depressive Symptoms* Mean (SD) | Significant Depressive Symptoms* Mean (SD) | P value |
|---|-------------------------|---|--|---------|
| HAT-QoL <sup>†</sup>                                |                         |   |  |         |
| Overall functioning                                 | 70.6 (22.9)             | 82.2 (18.1)                                   | 60.5 (21.9)                                | <.0001  |
| Health worries                                      | 70.0 (27.1)             | 85.0 (19.5)                                   | 57.0 (26.1)                                | <.0001  |
| Financial worries                                   | 57.1 (34.6)             | 74.3 (28.5)                                   | 42.2 (32.5)                                | <.0001  |
| Medication worries                                  | 76.8 (22.2)             | 86.8 (15.5)                                   | 67.9 (23.5)                                | <.0001  |
| HIV mastery   | 67.7 (32.5)             | 81.1 (24.6)                                   | 56.2 (34.0)                                | <.0001  |
| Disclosure worries                                  | 57.3 (28.4)             | 66.2 (26.6)                                   | 49.7 (27.6)                                | <.0001  |
| Provider trust                                      | 79.5 (24.1)             | 85.0 (21.8)                                   | 74.8 (25.0)                                | <.0001  |
| Sexual functioning                                  | 63.5 (35.6)             | 76.8 (29.2)                                   | 52.0 (36.7)                                | <.0001  |
| HIV Symptom Index <sup>‡</sup>                      | 3.1 (3.2)               | 1.5 (1.9)                                     | 4.5 (3.3)                                  | <.0001  |
| Jackson Personality Inventory <sup>§</sup>          | 18.9 (5.4)              | 19.1 (5.4)                                    | 18.7 (5.3)                                 | NS      |
| Rosenberg Global Self-esteem Measure <sup>  </sup>  | 19.6 (3.6)              | 21.5 (2.4)                                    | 17.9 (3.6)                                 | <.0001  |
| Interpersonal Support Evaluation list <sup>*†</sup> | 37.7 (8.3)              | 42.0 (5.8)                                    | 33.9 (8.4)                                 | <.0001  |

\*CESD-10: Center for Epidemiologic Studies—Depression scale, 10-item version; range of scores: 0 to 30, with scores ≥10 indicative of significant depressive symptoms.

<sup>†</sup>HAT-QoL: HIV/AIDS-Targeted Quality of Life instrument; range on all subscales: 0 (worst) to 100 (best).

<sup>‡</sup>Number of symptoms from a list of 15 in which the respondent said that “it bothers me” or “it bothers me a lot.”

<sup>§</sup>Range: 6 (greater risk aversion) to 36 (greater risk seeking).

<sup>||</sup>Range: 6 (low) to 24 (high).

<sup>\*†</sup>Range: 12 (low) to 48 (high).

adherence to medical regimens is particularly important for patients with HIV. Missing doses of antiretrovirals can lead to viral rebound and resistance and therefore may negatively impact future treatment options. In our investigation, controlling for other significant factors, a 1-point increase in the measure for spiritual well-being (FACIT-SpEx; range 0 to 92) was associated with a 5% decrease in the odds of reporting significant depressive symptoms. Although we cannot infer that the

inverse relationship between spirituality and depressive symptoms is causal, it is plausible that, beyond “traditional” approaches to the prevention and treatment of depression in patients with HIV/AIDS, addressing the spiritual needs of patients could potentially serve as another facet of an integrated and comprehensive approach to the clinical care of these patients.

We found that certain characteristics of religiosity (having a religious affiliation; frequency of participating in nonorganized religious activity; intrinsic religiosity; and positive religious coping mechanisms) were not related to significant depressive symptoms. Although less involvement in organized religious activity and more negative religious coping mechanisms were related to significant depressive symptoms in bivariate analyses, in multivariable analyses, those relationships were also no longer significant. This investigation therefore revealed that both external and more personal expressions of religion and religiosity were not associated with depressive symptoms when other significant factors were taken into account. In a variety of diseases such as cancer, greater religious involvement and spiritual well-being have been associated with better mood and other psychological domains.<sup>42–46</sup> In prior smaller studies in patients with HIV, however, spirituality, but not religiosity, was associated with lower levels of depression.<sup>17–19</sup> Patients with HIV may therefore be different from other patients with chronic illness, perhaps due to the stigma that patients may still face in social and religious communities.<sup>47–49</sup> Researchers have proposed that some elements of religion and the value systems they represent (e.g., HIV representing punishment from God) may exacerbate feelings of guilt and other negative emotions rather than facilitate coping with HIV, resulting in less religious participation by the patient even in the face of need.<sup>47,50</sup>

Detailed questions regarding reasons for involvement in or disengagement from religion and religious activities were beyond the scope of this study. However, we speculate that subjects who did or did not report depressive symptoms generally participate in (or refrain from) religious expression and

**Table 3. Religiosity and Spirituality: Overall and Stratified by CESD-10 Score**

| Variable                                     | Overall Group Mean (SD) | No Significant Depressive Symptoms* Mean (SD) | Significant Depressive Symptoms* Mean (SD) | P value |
|--|-------------------------|---|--|---------|
| Duke Religion Index                          |                         |   |  |         |
| Organized Religious Activity <sup>†</sup>    | 3.0 (1.7)               | 3.2 (1.7)                                     | 2.8 (1.6)                                  | <.01    |
| Nonorganized Religious Activity <sup>†</sup> | 2.9 (1.9)               | 3.1 (2.0)                                     | 2.8 (1.9)                                  | NS      |
| Intrinsic Religiosity <sup>‡</sup>           | 11.2 (3.6)              | 11.4 (3.7)                                    | 11.1 (3.5)                                 | NS      |
| FACIT-SpEx <sup>§</sup>                      | 63.5 (19.3)             | 73.9 (13.2)                                   | 54.5 (19.2)                                | <.0001  |
| RCOPE  |                         |   |  |         |
| Positive Religious Coping <sup>  </sup>      | 17.7 (6.4)              | 17.5 (6.8)                                    | 17.8 (6.1)                                 | NS      |
| Negative Religious Coping <sup>  </sup>      | 10.7 (4.3)              | 9.5 (3.3)                                     | 11.8 (4.8)                                 | <.0001  |

\*CESD-10: Center for Epidemiologic Studies—Depression scale, 10-item version; range of scores: 0 to 30, with scores ≥10 indicative of significant depressive symptoms.

<sup>†</sup>Range: 1 (never) to 6 (more than once a week).

<sup>‡</sup>Range: 3 (low) to 15 (high).

<sup>§</sup>Functional Assessment of Chronic Illness Therapy—Spirituality scale; range: 0 (low) to 92 (high).

<sup>||</sup>Range: 7 (low) to 28 (high).

Table 4. Multivariable Correlates with Significant Depressive Symptoms

| Outcome Measure                  | Significant Independent Variables                        | OR   | 95% CI       | C Statistic |
|----------------------------------|--|------|--------------|-------------|
| Significant depressive symptoms* | Lower level of health worries <sup>†</sup>               | 0.97 | 0.96 to 0.98 | 0.91        |
|                                  | Greater comfort with how HIV was contracted <sup>†</sup> | 0.99 | 0.98 to 1.00 |             |
|                                  | HIV Symptom Index <sup>‡</sup>                           | 1.38 | 1.22 to 1.56 |             |
|                                  | Interpersonal Support Evaluation List <sup>§</sup>       | 0.93 | 0.90 to 0.98 |             |
|                                  | FACIT-SpEx <sup>  </sup>                                 | 0.95 | 0.93 to 0.97 |             |

\*CESD-10: Center for Epidemiologic Studies—Depression scale, 10-item version; range of scores: 0 to 30, with scores  $\geq 10$  indicative of significant depressive symptoms.

<sup>†</sup>Subscale of the HIV/AIDS-Targeted Quality of Life instrument; range on all subscales: 0 (worst) to 100 (best).

<sup>‡</sup>Number of symptoms from a list of 15 in which the respondent said that “it bothers me” or “it bothers me a lot.”

<sup>§</sup>Range: 12 (low) to 48 (high).

<sup>||</sup>Functional Assessment of Chronic Illness Therapy—Spirituality scale; range: 0 (low) to 92 (high).

activities at similar rates but for different reasons. Some subjects who experience psychological effects from HIV may turn to their religious institution and religious activities to ameliorate those feelings. Praying, attending services, and reading religious texts may offer solace for those patients. Conversely, others under similar distress may not experience such salutary effects from religious participation and may feel even more prone to psychological harm from the stigma often still associated with HIV in certain religious communities.<sup>47,50</sup> Patients' experiences and perceptions surrounding the moral stance of many religious denominations regarding sexual orientation and certain lifestyle choices may thus play a part in our findings.<sup>47,50</sup> Similarly, some patients with HIV who are functioning well psychologically may also benefit from religion and religious activities. Others with HIV who are otherwise functioning well psychologically, however, may find it difficult to connect with a religious community due to the stigma associated with HIV.

There were several limitations to our investigation. As stated above, the nonexperimental study design prevents us from making inferences regarding causality between the significant independent factors and depressive symptoms. Because the sickest patients may have been less likely to participate in this study, our cohort may have reported more favorable physical, psychological, social, and spiritual well-being than those who did not participate. Although our sample was large and diverse and was recruited from multiple centers, the generalizability of our findings to patients receiving care in other centers is uncertain, and particularly to patients with HIV who are not receiving care at all. Additionally, we did not determine whether patients were taking antidepressants at the time of interview and therefore cannot estimate the effects of those treatments. Patients taking antidepressants may have reported fewer depressive symptoms due to the effectiveness of treatment, or conversely, those requiring treatment may have had more severe mood problems to begin with and may have reported more depressive symptoms.

In conclusion, although mortality from HIV/AIDS has declined substantially in the United States, depressive symptoms continue to be widespread. Controlling for certain health status and psychosocial factors, spiritual well-being was associated with fewer depressive symptoms, and thus may serve as a potential target for interventions for patients with HIV.<sup>51</sup> Potential spiritual or religious interventions could entail a structured program in the context of patients' ongoing clinical care.<sup>51</sup> Interventions could target patients interested in spiritual counseling and support and could be tailored to

one's particular religious and spiritual traditions. Another model could employ interventions in the context of HIV support group meetings or retreats at regular intervals. A less intensive approach would involve informing patients of community services or of religious congregations with a more in-depth understanding of the spiritual needs of patients with HIV. Further study is indicated to determine whether spiritual and other interventions can ameliorate depression in patients with HIV, and to identify groups that may benefit the most from such interventions.

This study was funded by Veterans Affairs Health Services Research and Development grant #EC1 01-195 (PI: Tsevat) and by National Center for Complementary and Alternative Medicine grant R01 AT01147 (PI: Tsevat). Dr. Yi is supported by a National Institute of Child Health and Human Development Career Development Award (K23HD046690). Dr. Tsevat is supported by a National Center for Complementary and Alternative Medicine award (K24 AT001676). Dr. Mrus was a recipient of a Career Development Award (RCD 01011-2) from the Veterans Affairs Health Services Research and Development Service. Dr. Wade is the Canadian Research Chair in Youth and Wellness. Dr. Mrus was employed at GlaxoSmithKline at the time this manuscript was submitted. Dr. Peterman is currently in the Department of Psychology, University of North Carolina at Charlotte.

## REFERENCES

1. HIV/AIDS update: a glance at the HIV epidemic. Centers for Disease Control and Prevention. (Accessed September 12, 2003, at [www.cdc.gov/nchstp/od/news/At-a-Glance.pdf](http://www.cdc.gov/nchstp/od/news/At-a-Glance.pdf)).
2. Cochran SD, Mays VM. Depressive distress among homosexually active African American men and women. *Am J Psychiatry*. 1994;151:524-9.
3. Drebing CE, Van Gorp WG, Hinkin C, et al. Confounding factors in the measurement of depression in HIV. *J Pers Assess*. 1994;62:68-83.
4. Kelly JA, Murphy DA, Bahr GR, et al. Factors associated with severity of depression and high-risk sexual behavior among persons diagnosed with human immunodeficiency virus (HIV) infection. *Health Psychol*. 1993;12:215-9.
5. Thompson SC, Nanni C, Levine A. Primary versus secondary and central versus consequence-related control in HIV-positive men. *J Pers Soc Psychol*. 1994;67:540-7.
6. Aiciati A, Starace F, Scaramelli B, et al. Has there been a decrease in the prevalence of mood disorders in HIV-seropositive individuals since the introduction of combination therapy? *Eur Psychiatry*. 2001;16:491-6.
7. Chan KS, Orlando M, Joyce G, et al. Combination antiretroviral therapy and improvements in mental health: results from a nationally representative sample of persons undergoing care for HIV in the United States. *J Acquir Immune Defic Syndr*. 2003;33:104-11.

8. **Low-Beer S, Chan K, Yip B, et al.** Depressive symptoms decline among persons on HIV protease inhibitors. *J Acquir Immune Defic Syndr.* 2000;23:295–301.
9. **Starace F, Bartoli L, Aloisi MS, et al.** Cognitive and affective disorders associated to HIV infection in the HAART era: findings from the NeuroICONA study. Cognitive impairment and depression in HIV/AIDS. The NeuroICONA study. *Acta Psychiatr Scand.* 2002;106:20–6.
10. **Rabkin JG, Ferrando SJ, Lin SH, Sewell M, McElhiney M.** Psychological effects of HAART: a 2-year study. *Psychosom Med.* 2000;62:413–22.
11. **Kilbourne AM, Justice AC, Rollman BL, et al.** Clinical importance of HIV and depressive symptoms among veterans with HIV infection. *J Gen Intern Med.* 2002;17:512–20.
12. **Ickovics JR, Hamburger ME, Vlahov D, et al.** Mortality, CD4 cell count decline, and depressive symptoms among HIV-seropositive women: longitudinal analysis from the HIV Epidemiology Research Study. *JAMA.* 2001;285:1466–74.
13. **Burack JH, Barrett DC, Stall RD, Chesney MA, Ekstrand ML, Coates TJ.** Depressive symptoms and CD4 lymphocyte decline among HIV-infected men. *JAMA.* 1993;270:2568–73.
14. **Cook JA, Grey D, Burke J, et al.** Depressive symptoms and AIDS-related mortality among a multisite cohort of HIV-positive women. *Am J Public Health.* 2004;94:1133–40.
15. **Lyketos CG, Hoover DR, Guccione M, et al.** Depressive symptoms as predictors of medical outcomes in HIV infection. Multicenter AIDS Cohort Study. *JAMA.* 1993;270:2563–7.
16. **Cole SW, Kemeny ME.** Psychobiology of HIV infection. *Crit Rev Neurobiol.* 1997;11:289–321.
17. **Biggar H, Forehand R, Devine D, et al.** Women who are HIV infected: the role of religious activity in psychosocial adjustment. *AIDS Care.* 1999;11:195–9.
18. **Coleman CL, Holzemer WL.** Spirituality, psychological well-being, and HIV symptoms for African Americans living with HIV disease. *J Assoc Nurses AIDS Care.* 1999;10:42–50.
19. **Simoni JM, Ortiz MZ.** Mediation models of spirituality and depressive symptomatology among HIV-positive Puerto Rican women. *Culture Divers Ethnic Minor Psychol.* 2003;9:3–15.
20. **Hill PC, Pargament KI.** Advances in the conceptualization and measurement of religion and spirituality. Implications for physical and mental health research. *Am Psychol.* 2003;58:64–74.
21. **Hill PC, Pargament KI, Hood RW, et al.** Conceptualizing religion and spirituality: points of commonality, points of departure. *J Theory Soc Behav.* 2000;30:51–77.
22. **Andresen EM, Malmgren JA, Carter WB, Patrick DL.** Screening for depression in well older adults: evaluation of a short form of the CES-D (Center for Epidemiologic Studies Depression Scale). *Am J Prev Med.* 1994;10:77–84.
23. **Mulrow CD, Williams JW Jr, Gerety MB, Ramirez G, Montiel OM, Kerber C.** Case-finding instruments for depression in primary care settings. *Ann Intern Med.* 1995;122:913–21.
24. **Radloff LS.** The CES-D Scale: a self-report depression scale for research in the general population. *Appl Psych Meas.* 1977;1:385–401.
25. **Justice AC, Holmes W, Gifford AL, et al.** Development and validation of a self-completed HIV symptom index. *J Clin Epidemiol.* 2001;54(suppl 1):S77–90.
26. **Holmes WC, Shea JA.** A new HIV/AIDS-targeted quality of life (HAT-QoL) instrument: development, reliability, and validity. *Med Care.* 1998;36:138–54.
27. **Justice AC, Rabeneck L, Hays RD, Wu AW, Bozzette SA.** Sensitivity, specificity, reliability, and clinical validity of provider-reported symptoms: a comparison with self-reported symptoms. Outcomes Committee of the AIDS Clinical Trials Group. *J Acquir Immune Defic Syndr.* 1999;21:126–33.
28. **Pearson SD, Goldman L, Orav EJ, et al.** Triage decisions for emergency department patients with chest pain: do physicians' risk attitudes make the difference? *J Gen Intern Med.* 1995;10:557–64.
29. **Robinson JP, Shaver PR.** Measures of social psychological attitudes. Ann Arbor, MI: Survey Research Center, Institute for Social Research; 1969.
30. **Cohen S, Mermelstein R, Kamarck T, Hoberman S.** Measuring the functional components of social support. In: Sarason I, Sarason B, eds. *Social Support: Theory Research and Applications.* The Hague, The Netherlands: Martinus Nijhoff; 1985:73–94.
31. **Brookings JB, Bolton B.** Confirmatory factor analysis of the Interpersonal Support Evaluation List. *Am J Comm Psychol.* 1988;16:137–47.
32. **Schonfeld IS.** Dimensions of functional social support and psychological symptoms. *Psychol Med.* 1991;21:1051–60.
33. **Gallup G, Gallup GH.** The Gallup Poll: Public Opinion 1995. Wilmington, DE: Scholarly Resources Inc; 1996.
34. **Koenig H, Parkerson GR Jr, Meador KG.** Religion index for psychiatric research. *Am J Psychiatry.* 1997;154:885–6.
35. **Pargament KI, Smith BW, Koenig HG, Perez L.** Patterns of positive and negative religious coping with major life stressors. *J Sci Study Relig.* 1998;37:710–24.
36. **Peterman AH, Fitchett G, Brady MJ, Hernandez L, Cella D.** Measuring spiritual well-being in people with cancer: the functional assessment of chronic illness therapy—Spiritual Well-being Scale (FACIT-Sp). *Ann Behav Med.* 2002;24:49–58.
37. **Beck A, McNally I, Petrak J.** Psychosocial predictors of HIV/STI risk behaviours in a sample of homosexual men. *Sex Transm Infect.* 2003;79:142–6.
38. **Cook JA, Cohen MH, Burke J, et al.** Effects of depressive symptoms and mental health quality of life on use of highly active antiretroviral therapy among HIV-seropositive women. *J Acquir Immune Defic Syndr.* 2002;30:401–9.
39. **Starace F, Ammassari A, Trotta MP, et al.** Depression is a risk factor for suboptimal adherence to highly active antiretroviral therapy. *J Acquir Immune Defic Syndr.* 2002;31(suppl 3):S136–S139.
40. **Tucker JS, Burnam MA, Sherbourne CD, Kung FY, Gifford AL.** Substance use and mental health correlates of nonadherence to antiretroviral medications in a sample of patients with human immunodeficiency virus infection. *Am J Med.* 2003;114:573–80.
41. **Coleman CL.** Spirituality and sexual orientation: relationship to mental well-being and functional health status. *J Adv Nurs.* 2003;43:457–64.
42. **Mytko JJ, Knight SJ.** Body, mind and spirit: towards the integration of religiosity and spirituality in cancer quality of life research. *Psychooncology.* 1999;8:439–50.
43. **Meraviglia MG.** The effects of spirituality on well-being of people with lung cancer. *Oncol Nurs Forum.* 2004;31:89–94.
44. **Koenig HG, George LK, Titus P.** Religion, spirituality, and health in medically ill hospitalized older patients. *J Am Geriatr Soc.* 2004;52:554–62.
45. **George LK, Ellison CG, Larson DB.** Explaining the relationships between religious involvement and health. *Psycho Inquiry.* 2002;13:190–200.
46. **Koenig HG, George LK, Peterson BL.** Religiosity and remission of depression in medically ill older patients. *Am J Psychiatry.* 1998;155:536–42.
47. **Somlai AM, Heckman TG, Kelly JA, Mulry GW, Multhaupt KE.** The response of religious congregations to the spiritual needs of people living with HIV/AIDS. *J Pastoral Care.* 1997;51:415–26.
48. **Crandall CS, Coleman R.** AIDS-related stigmatization and the disruption of social relationships. *J Soc Pers Relat.* 1992;9:163–77.
49. **Lichtenstein B, Laska MK, Clair JM.** Chronic sorrow in the HIV-positive patient: issues of race, gender, and social support. *AIDS Patient Care STDS.* 2002;16:27–38.
50. **Maton KI, Elizabeth A.** Religion as a community resource for well-being: prevention, healing, and empowerment pathways. *J Soc Issues.* 1995;51:177–93.
51. **Cole B, Pargament K.** Re-creating your life: a spiritual/psychotherapeutic intervention for people diagnosed with cancer. *Psychooncology.* 1999;8:395–407.