Published in final edited form as:

Behav Med. 2009 ; 34(4): 133–144. doi:10.3200/BMED.34.4.133-144.

Influence of Coping, Social Support, and Depression on Subjective Health Status Among HIV-Positive Adults With Different Sexual Identities

Katie E. Mosack, PhD, Lance S. Weinhardt, PhD, Jeffrey A. Kelly, PhD, Cheryl Gore-Felton, PhD, Timothy L. McAuliffe, PhD, Mallory O. Johnson, PhD, Robert H. Remien, PhD, Mary Jane Rotheram-Borus, PhD, Anke A. Ehrhardt, PhD, Margaret A. Chesney, PhD, and Stephen F. Morin, PhD

Dr Mosack is with the Department of Psychology at the University of Wisconsin in Milwaukee. Drs Weinhardt, Kelly, and McAuliffe are with the Department of Psychiatry and Behavioral Medicine at the Medical College of Wisconsin in Milwaukee. Dr Gore-Felton is with the Department of Psychiatry and Behavioral Sciences at Stanford University School of Medicine. Drs Johnson and Morin are with the Center for AIDS Prevention Studies at the University of California in San Francisco. Dr Remien is with the HIV Center for Clinical and Behavioral Studies in New York, NY. Dr Rotheram-Borus is with the Center for HIV Identification, Prevention, and Treatment Services at the University of California in Los Angeles. Dr Ehrhardt is with the HIV Center for Clinical and Behavioral Studies at New York State Psychiatric Institute and Columbia University in New York, NY. Dr Chesney is with the National Center for Complementary and Alternative Medicine in Bethesda, MD.

Abstract

The authors examined associations between psychosocial variables (coping self-efficacy, social support, and cognitive depression) and subjective health status among a large national sample (N = 3,670) of human immunodeficiency virus (HIV)-positive persons with different sexual identities. After controlling for ethnicity, heterosexual men reported fewer symptoms than did either bisexual or gay men and heterosexual women reported fewer symptoms than did bisexual women. Heterosexual and bisexual women reported greater symptom intrusiveness than did heterosexual or gay men. Coping self-efficacy and cognitive depression independently explained symptom reports and symptom intrusiveness for heterosexual, gay, and bisexual men. Coping self-efficacy and cognitive depression explained symptom intrusiveness among heterosexual women. Cognitive depression significantly contributed to the number of symptom reports for heterosexual and bisexual women and to symptom intrusiveness for lesbian and bisexual women. Individuals likely experience HIV differently on the basis of sociocultural realities associated with sexual identity. Further, symptom intrusiveness may be a more sensitive measure of subjective health status for these groups.

Keywords

coping; depression; HIV; sexual identity; symptoms; social support

Human immunodeficiency virus (HIV) is increasingly considered a chronic disease. For a person living with HIV, this means having to cope with a range of HIV-related symptoms for extended periods. Symptoms may be related to the infection itself, comorbid illnesses, or iatrogenic effects from HIV-related medications.^{1,2} Commonly experienced symptoms

include fatigue, stiff or painful joints, muscle aches, diarrhea, depression, and neuropathy.^{3,4} Side effects from certain antiretroviral therapies used to treat HIV include gastrointestinal distress, hyperlipidemia, and nephrolithiasis.² These illness-related experiences can negatively influence one's quality of life by impairing social functioning and physical health.^{3,5-9} Although the vast majority of people living with HIV experience HIV-related symptoms,² the degree to which the symptoms affect them varies.¹⁰ This variation raises questions about potential contributors to symptom experience,⁹ including psychosocial factors. Longitudinal studies involving diverse samples of HIV-positive people indicate that mental health variables, such as depression, hopelessness, and social support, can impact HIV-related biological markers¹¹ and symptom reports.¹² We designed this study to further understand the role psychosocial factors may play in the experience of physical symptoms.

Psychosocial functioning among HIV-positive persons likely varies as a function of sexual identity.¹³⁻¹⁷ For example, among men who have sex with men (MSM), a gay sexual identity has been associated with less loneliness and isolation,¹⁸ less depression, and better social support.¹⁹ Similarly, higher levels of distress and depression have been associated with not identifying as gay, queer, or homosexual among MSM in the Urban Men's Health Study.²⁰ Heterosexual men and women tend to have different social support experiences, coping mechanisms, and stressors than do gay men or women.²¹ Familial social support is more readily available and satisfactory for HIV-positive heterosexual women than for HIV-positive heterosexual men²² or gay men.¹⁷ Further, HIV is considered to be a more stigmatizing condition for non-gay-identifying men²³ and heterosexual women²⁴ than for gay men. Coping strategies and depression also vary by gender and sexual identity.^{14,17}

Less is known about the association between sexual identity and health or whether psychological differences among individuals with diverse sexual identities influence their particular illness experiences. Differences with regard to the role of psychological predictors of physiological functioning could have very real implications for disease morbidity and mortality among individuals of diverse sexual identities. For example, some analyses have indicated that a heterosexual identity is associated with poorer functional health status.¹³ Others found that a concealed minority sexual identity was associated with faster disease progression, at least in the pre-HAART (highly active antiretroviral therapy) era.²⁵ This association was significant, even after controlling for age, health practices (such as substance use, exercise, and sleep), psychosocial characteristics (including anxiety, depression, coping, and social support), sexual behavior, and the use of azidothymidine (AZT). More recent research has found similar associations between immune system suppression and concealed homosexual identity.¹⁹ Our study extends research on the association between psychosocial and physical functioning among HIV-positive persons by examining these relationships in a large sample of individuals of diverse sexual identities. This study also offers insight into the functioning of individuals in the era of HAART, which has been shown to lower disease morbidity and mortality rates.²⁶⁻²⁸

In addition to physiological markers, such as CD4 count and viral load, it is useful to examine subjective indicators of health status, including symptom reports,^{29,30} which can provide information about how individuals perceive illness and the effects of illness on other aspects of their functioning.³¹ Investigating symptom reports affords researchers the unique opportunity to understand the physiological markers of illness and the perceptions of illness impact.⁹ In fact, physical symptoms, rather than physiological markers, are more closely related to psychological distress.³²

First, we examine whether individuals with diverse sexual identities differ with regard to either their physical or psychosocial functioning and, second, the degree to which psychosocial indicators are associated with subjective health status. The results of this study could have

important implications for the delivery of more tailored mental health interventions for HIV-positive persons. For example, if we find that a minority sexual identity is associated with poorer physical or psychological functioning, health care providers and researchers would need to make a more concerted effort to address factors that may contribute to lowered resilience among such groups. Likewise, identifying differences in the degree to which psychosocial indicators are associated with illness experiences will help those developing targeted interventions focus their resources on the most relevant factors, contributing to better health outcomes among these groups.

METHODS

Procedure

The data reported in this article are from screening/baseline interviews from a multisite, randomized, controlled trial of a behavioral intervention designed to decrease transmission risk for HIV-infected persons.³²⁻³⁴ The Institutional Review Board from each participating institution approved the study's procedures. Eligibility criteria included being at least 18 years old and providing medical documentation of HIV-positive status. Interviews were conducted between May 2000 and February 2002 using computer-assisted personal interview technology. Participants were paid \$50 for their time.

Measures

Demographic Characteristics—Demographic characteristics assessed included participant gender, sexual identity, race/ethnicity, age, relationship status, educational level, and employment status. All items were self-reported. Sexual identity was assessed by asking participants whether they currently identify as heterosexual/straight, homosexual/gay, or bisexual.

Coping Self-Efficacy—We measured coping self-efficacy using a 15-item version of Chesney, Folkman, and Chambers³⁵ measure of self-efficacy for coping with challenges and threats. Participants rated items on a Likert scale from 0 (*cannot do at all*) to 10 (*certain can do*) according to their level of confidence in their ability to perform particular coping strategies. Examples of items included “Break an upsetting problem down into smaller parts.” The mean item score was computed for use in the analysis. For the present study, internal consistency reliability was good ($\alpha = .92$).

Social Support—We measured social support by the 24-item Social Provisions Scale,³⁶ which includes types of support, such as guidance, reliable alliance, attachment, social integration, reassurance of worth, and the opportunity to provide support to others. Respondents consider their entire support network in assessing the extent to which they believe such provisions are available to them, and they respond on a 4-point Likert scale from 1 (*strongly disagree*) to 4 (*strongly agree*), such that higher scores reflected greater provisions of social support. A mean scale score was computed. This scale has demonstrated adequate validity and reliability in other samples.³⁶ In this sample, the Social Provisions Scale was highly internally consistent ($\alpha = .92$).

Cognitive Depression—The Beck Depression Inventory³⁷ (BDI) is a 21-item measure assessing cognitive, affective, behavioral, and somatic symptoms of depression. Although we administered the full inventory, on the basis of the concerns raised by Kalichman et al³⁸ regarding the confounding of HIV symptoms with BDI items reflecting somatic symptoms of depression, we restricted our data analysis to the 12-item cognitive subscale. The items included in this subscale include sadness, pessimism, failure, dissatisfaction, guilt, punishment, disappointment, weakness, suicide, crying, irritation, and social withdrawal. Summing the item

ratings creates a score of cognitive depression. Items are rated on a 4-point scale from 0 (*representing the absence of the symptom*) to 3 (*representing greatest symptom intrusiveness*), such that higher scores reflected greater levels of cognitive depression. Following the recommendations of Kalichman et al,³⁷⁻³⁸ we considered a score of 10 or higher to indicate clinical depression. For the present study, $\alpha = .85$.

Health Status and Medication Use—We defined subjective health status as (1) the total number of HIV-related symptoms and (2) symptom intrusiveness. We measured total number of symptoms using the HIV Symptom Index.³⁹ Examples of symptoms included dizziness, nausea, nervousness, and muscle aches. (Because of confounding with the BDI, we did not include the sadness/depression item in the index.) We first asked participants to indicate which of 25 HIV-related symptoms they had experienced in the past 3 months. The number of symptoms was summed to create a total symptom report score. Participants then indicated the degree to which those symptoms bothered them (ie, symptom intrusiveness) using a 4-point scale (1 [*It doesn't bother me at all*], 2 [*It bothers me a little*], 3 [*It bothers me quite a bit*], 4 [*It bothers me a great deal*]). For the multiple regression analyses, we calculated the symptom intrusiveness score by summing the number of symptoms for which each participant indicated being bothered quite a bit or a great deal. Thus, if a particular symptom did not bother the person or bothered them only a little, it was not included in the total score. We used this method to diminish the relative influence any particular reported symptom may have on the overall intrusiveness score when it does not, in fact, disrupt one's quality of life. We conducted separate multivariate analyses using the symptom report and symptom intrusiveness scores as outcome variables. Other indicators of health status included date of diagnosis, CD4 count, and antiretroviral use. These items were self-reported. We measured CD4 count by a single, self-reported item of participants' most recent clinical measurement. A single dichotomous item measured current (in the past 3 months) antiretroviral use.

Data Analysis

We used SPSS (Version 12.0) for data analysis. Prior to multivariate analysis, we screened data for accuracy of data entry, missing values, and concordance between their distributions and the assumptions of the multivariate analyses. Descriptive statistics were computed for demographics, psychosocial scale scores, CD4 count, HIV symptom report, and antiretroviral use for each group. Tests of differences were conducted to examine differences by sexual orientation groups for the demographic variables. Bivariate correlation coefficients were computed to examine multicollinearity among the predictors. We conducted 2 separate univariate analysis of variances (ANOVAs) to test whether the number of symptoms reported or symptom intrusiveness differed by sexual identity. Ethnicity has been associated with biological markers and subjective health status among HIV-positive persons.^{3,40-43} In addition, an earlier analysis using this same sample revealed ethnic differences with regard to perceived effects of antiretroviral therapy.³ Therefore, ethnicity was entered as a covariate. Hierarchical regression analyses predicting the number of symptoms reported and symptom intrusiveness were performed (controlling for ethnicity, age, and CD4 counts) for each sexual identity group to examine the relationships with coping self-efficacy, social support, and cognitive depression.

RESULTS

Sample Description

We interviewed 3,819 participants for this project (see Weinhardt, Kelly, Brondino, et al³⁴ for a more detailed description of the sample). To examine differences on the basis of sexual identity, only men and women who identified as being heterosexual, bisexual, or gay were included in this study. Individuals who did not identify as being heterosexual, bisexual, or gay

($n = 89$) were excluded from these analyses. Likewise, because individuals who identified as being transgender or other ($n = 68$) do not represent a monolithic group with regard to either gender or sexual identity, we excluded these data from the analyses. (We excluded 13 individuals for reasons pertaining to gender and sexual identity criteria.) The participants for this study ($N = 3,670$) included 1,505 (41.0%) gay men, 840 (22.9%) heterosexual men, 365 (9.9%) bisexual men, 808 (22.0%) heterosexual women, 61 (1.7%) lesbian women, and 91 (2.5%) bisexual women.

Sexual Identity, Sociodemographics, and Health Status

Sociodemographic characteristics of participants by sexual identity groups are shown in Table 1. Preliminary analyses indicated differences by groups in terms of data collection site, ethnicity, educational level, employment status, the number of years they had been HIV-positive, and age. The presence of specific symptoms in the past 3 months and symptom intrusiveness are presented in Table 2. The 11 most frequently occurring symptoms were reported by more than half the sample. The most intrusive symptoms were fatigue, sleep disruptions, muscle/joint and nonspecific pain, and diarrhea. Eighty percent of the sample had been diagnosed with HIV prior to 1995. CD4 counts ranged widely from 0–2,675 ($M = 440.5$; $SD = 298.6$). Twenty-one percent of participants had CD4 counts lower than 200 copies, the clinical cutoff for an acquired immune deficiency syndrome (AIDS) diagnosis. Less than 9% of the study participants had never received antiretroviral therapies.

Sexual Identity and Psychosocial Indicators

Nearly one-quarter (24.8%) of the participants met the criteria for cognitive depression. Descriptive statistics for social support, coping self-efficacy, and cognitive depression are reported in Table 3 for each of the sexual identity groups. The groups differed on social support ($F[5, 3,660] = 5.8, p < .001$) and coping ($F[5, 3,664] = 2.4, p = .03$), but not on cognitive depression ($ns, p = .69$). Post hoc analyses indicate that heterosexual men reported less social support than either heterosexual women or gay men did and bisexual men reported less social support than heterosexual women did. However, heterosexual men reported greater coping self-efficacy than either gay or bisexual men did and heterosexual women reported greater coping self-efficacy than gay men did.

To test the hypothesis that sexual identity group membership was predictive of subjective health status, we performed two separate univariate ANOVAs. The results indicated that after partialing out the effects of ethnicity, the number of symptoms differed across sexual identity groups ($F[5, 3,657] = 4.14, p < .01$). Post hoc analyses revealed that heterosexual men reported fewer symptoms ($M = 10.9, SD = 5.7$) than either bisexual ($M = 12.0, SD = 5.5$) or gay ($M = 12.0, SD = 5.1$) men did. In addition, heterosexual women reported fewer symptoms on average ($M = 11.7, SD = 5.6$) than bisexual women ($M = 12.8, SD = 5.0$). Symptom intrusiveness also differed across sexual identity groups after controlling for the effects of ethnicity ($F[5, 3,643] = 7.31, p < .01$). Post hoc analyses revealed that heterosexual women and bisexual women reported greater symptom intrusiveness ($M = 8.5, SD = 5.8$ and $M = 9.7, SD = 5.3$, respectively) than either heterosexual men ($M = 7.3, SD = 5.6$) or gay men ($M = 7.7, SD = 5.4$) did.

Hierarchical multiple regression analyses were then conducted to examine the relative influence of coping self-efficacy, social support, and cognitive depression on symptom reports and intrusiveness scores in the subsamples of heterosexual, gay, and bisexual men; and heterosexual, lesbian, and bisexual women. The results for the number of symptom reports (provided in Table 4) indicate that after controlling for ethnicity, age, and most-recent CD4 counts, coping self-efficacy and cognitive depression independently explained symptom reports for heterosexual, gay, and bisexual men. Cognitive depression significantly contributed to the number of symptom reports for heterosexual and bisexual women. None of the

independent variables significantly predicted symptom reports for lesbians. When taken together, the predictors accounted for 14–23% of the adjusted variance in symptom reports for the other 5 sexual orientation groups.

Results from the examination of the relative influence of coping self-efficacy, social support, and cognitive depression on symptom intrusiveness (provided in Table 5) indicate that after controlling for ethnicity, age, and most-recent CD4 count, coping self-efficacy and cognitive depression independently explain symptom intrusiveness for heterosexual, gay, and bisexual men and heterosexual women. Cognitive depression significantly contributed to symptom intrusiveness for lesbian and bisexual women. When taken together, the predictors accounted for 10–29% of the variance in symptom intrusiveness for the 6 sexual identity groups.

COMMENT

We examined the relative contribution that social support, coping self-efficacy, and cognitive depression made on illness symptom reports among a US national sample of HIV-positive persons. In a much smaller sample, other researchers found that depression was more comprehensively related to HIV-related quality of life than either coping or social support was.⁴⁴ However, this is the first time these relationships have been examined for their association with subjective health status using a large, diverse national sample. We conducted the analyses across different sexual identity groups, controlling for the effects of ethnicity, age, and CD4 counts on subjective health status.

Our analyses indicated that heterosexual and bisexual women, in particular, experience more symptom intrusiveness than either heterosexual men or gay men do. This gender difference is consistent with research that has found that HIV-positive women have lower health-related quality of life, particularly with regard to pain and physical functioning.⁴⁵ Cultural factors may be related to the perception of pain or discomfort as well.⁴² Further, socioeconomic status, life stressors associated with poverty, racial discrimination, and single parenthood likely affect certain groups more than others, particularly HIV-positive ethnic minority women.⁴⁶⁻⁴⁷ Future research needs to be conducted to better understand the interaction between illness experiences and related cultural norms or life stressors for women in particular.

Cognitive depression was evident in a quarter of the sample, and there were no significant differences between groups on depressive symptoms. Depression independently explained symptom reports and intrusiveness for nearly all groups (although it did not explain symptom reports for lesbians). Further, cognitive depression independently accounted for the largest percentage of the variance for the number of symptoms reported and symptom intrusiveness in all groups. Consistent with other research,⁴⁸⁻⁵¹ our results demonstrate the presence of a relationship between psychological symptoms and physiological disease. When taken together, the results suggest that the most salient point of intervention with regard to illness adjustment or health-related quality of life is the alleviation of cognitive depression, regardless of sexual identity status. Therefore, identifying and treating psychological distress is likely to decrease physiological morbidity among a substantial proportion of HIV-positive persons. This has important implications for structural change with regard to standard-of-care medical practice in the treatment of HIV disease such that HIV-positive patients may experience significant improvement in overall health outcomes if infectious disease practitioners regularly assess depression and provide appropriate referrals to mental health services.

Lower coping self-efficacy also independently predicted more symptom reports and greater symptom intrusiveness for all 3 groups of men. These results suggest that a strength-based approach may assist HIV-positive men, in particular, to achieve a sense of competence in adjusting to their illness. Cognitive-behavioral interventions can promote the identification of

personal strengths and facilitate the development of skills to cope with particularly difficult or stressful life events. Individuals can then learn how to reframe life stressors as manageable challenges and develop strategies to effectively deal with them, which reduces psychological stress by improving not only their overall mental health, but also their symptom experiences.

Last, although statistically significant differences were found among the groups on a measure of social support, the degree of difference may not be clinically significant. Furthermore, social support did not independently explain symptom reports or intrusiveness as cognitive depression or coping self-efficacy did. Although social support likely plays an important role in disease management and quality of life, subjective health status may be better reflected in measures of cognitive depression and coping self-efficacy.

A paucity of quantitative research exists related to the experience of HIV-positive sexual minority women. Although we were able to recruit a small sample of lesbian ($n = 61$) and bisexual ($n = 91$) women for our study, the small sample sizes limited statistical power. For example, we failed to find differences with regard to psychosocial variables for lesbian and bisexual women, although our data suggest that lesbians may actually experience more social support and less cognitive depression than the other groups. The hierarchical regression results indicate that cognitive depression accounts for a significant amount of the variance in symptom intrusiveness for this group. Yet, limited power may have resulted in nonsignificant relationships between the psychosocial variables and symptoms reports. For example, the standardized beta indicating the relationship between cognitive depression and symptom reports was identical to that for heterosexual men (.27), although these results were not significant in the former sample. Researchers must use targeted sampling plans to further quantitative research agendas related to the experience of living with HIV among lesbians in particular. We know little about the psychosocial stressors that may influence physical symptoms in this population, and such nescience likely results in inadequate approaches to addressing sexual minority women's specific illness adjustment needs.

We used 2 measures of subjective health status for this study. The results indicate that measures of symptom intrusiveness, particularly questions about how much the symptoms bother people, may be a better indicator of subjective health status than the total number of symptoms experienced. The symptom intrusiveness model accounted for a larger portion of the variance for each subsample, and the individual predictors appear to be more strongly associated with symptom intrusiveness than the number of symptoms experienced. For these reasons, symptom intrusiveness may be a more salient measure of subjective health status, a contradiction of others' findings.³⁰ The results also suggest that it may be beneficial for health care providers to evaluate the degree to which particular symptoms influence an individual's quality of life or daily functioning. Moreover, self-report symptom checklists should be used to facilitate a discussion about symptom intrusiveness and not as the sole indicator of functional status.

There are 2 significant limitations to this study. First, this is a cross-sectional analysis. Therefore, we cannot determine causality. In this article, we chose to examine the influence of psychosocial factors on symptom reporting to test the hypothesis that poorer psychosocial functioning manifests in relation to greater experience of negative symptoms. This perspective is consistent with results from longitudinal studies that have demonstrated the influence of psychosocial factors on salient health outcomes.^{11,12,52} For example, depression and coping style could influence not only the perception of symptoms, but also important physiological processes, such as immunological functioning.^{11,49,50,53} However, illness experiences, such as a greater number of or more intrusive symptoms, could lead to clinical depression,^{54,55} although this relationship has received less research attention. Ultimately, we are able to examine 1 piece of the puzzle with these data; longitudinal studies, ideally with more frequent

assessments, are needed to provide a thorough analysis of the nature of the association between psychological and physiological symptoms and their recursive influence.

The second limitation of this study is related to the demographics and health status of the samples. There were substantial differences among the groups in terms of key demographic variables. On the basis of these differences and those that appear to be most salient in the literature in terms of illness experiences, we controlled for ethnicity, CD4 counts, and age in the hierarchical regression analyses. Beyond variability among the groups, the mean age was approximately early 40s in each group, and 80% of the participants learned of their HIV status prior to 1995. Therefore, this sample is overrepresented by those who are somewhat older and have been living with HIV for many years. In addition, more than one-fifth of the sample had an AIDS diagnosis at the time of the interview, and nearly the entire sample had taken antiretroviral therapies. Thus, these results may be more generalizable to those who have lived with HIV for a number of years compared with those who have been recently diagnosed or those who are significantly younger. Although this study contributes to a better understanding of the mental and physical health correlates of long-term survivors in the contemporary HAART era, understanding the needs of younger and newly diagnosed individuals is also necessary to address mental health, HIV-related risk behavior, and treatment adherence factors that may have serious and long-term effects on illness adjustment and disease progression.

ACKNOWLEDGMENTS

The Healthy Living Project was funded by cooperative agreements between the National Institute of Mental Health (NIMH) and Columbia University (U10MH057636); the Medical College of Wisconsin (U10MH057631); University of California, Los Angeles (U10MH057615); and the University of California, San Francisco (U10MH057616). The NIMH Healthy Living Trial Group includes members of the research steering committee (site principal investigators and NIMH staff collaborator): Margaret A. Chesney, PhD; Anke A. Ehrhardt, PhD; Jeffrey A. Kelly, PhD; Willo Pequegnat, PhD; and Mary Jane Rotheram-Borus, PhD. Collaborating scientists, coprincipal investigators, and investigators were Eric G. Benotsch, PhD; Michael J. Brondino, PhD; Sheryl L. Catz, PhD; Edwin D. Charlebois, PhD, MPH; Don C. Des-Jarlais, PhD; Naihua Duan, PhD; Theresa M. Exner, PhD; Rise B. Goldstein, PhD, MPH; Cheryl Gore-Felton, PhD; A. Elizabeth Hirky, PhD; Mallory O. Johnson, PhD; Robert M. Kertzner, MD; Sheri B. Kirshenbaum, PhD; Lauren E. Kittel, PsyD; Robert Klitzman, MD; Martha Lee, PhD; Bruce Levin, PhD; Marguerita Lightfoot, PhD; Stephen F. Morin, PhD; Steven D. Pinkerton, PhD; Robert H. Remien, PhD; Fen Rhodes, PhD; Wayne T. Steward, PhD, MPH; Susan Tross, PhD; Lance S. Weinhardt, PhD; Robert Weiss, PhD; Hannah Wolfe, PhD; Rachel Wolfe, PhD; and F. Lennie Wong, PhD. Data management and analytic support were provided by Philip Batterham, MA; W. Scott Comulada, MS; Tyson Rogers, MA; and Yu Zhao, MS. Site project coordinators were Kristin Hackl, MSW; Daniel Hong, MA; Karen Huchting, BA; Joanne D. Mickalian, MA; and Margaret Peterson, MSW. NIMH staff include Christopher M. Gordon, PhD; Dianne Rausch, PhD; and Ellen Stover, PhD.

REFERENCES

1. Halloran J. Increasing survival with HIV: impact on nursing care. *AACN Clin Issue* 2006;17:8–17.
2. Kassutto S, Maghsoudi K, Johnston MN, et al. Longitudinal analysis of clinical markers following antiretroviral therapy initiated during acute or early HIV Type I infection. *Clin Infect Dis* 2006;42:1024–1031. [PubMed: 16511771]
3. Johnson MO, Stallworth T, Neilands TB. The drugs or the disease? Causal attributions of symptoms held by HIV-positive adults on HAART. *AIDS Behav* 2003;7:109–117. [PubMed: 14586196]
4. Mathews WC, McCutchan JA, Asch S, et al. National estimates of HIV-related symptom prevalence from the HIV cost and services utilization study. *Med Care* 2000;38:750–762. [PubMed: 10901358]
5. Badia X, Podzamczar D, Casado A, Lopez-Lavid C, Garcia M. Evaluating changes in health status in HIV-infected patients: Medical Outcomes Study-HIV and Multidimensional Quality of Life-HIV quality of life questionnaires. *AIDS* 2000;14:1439–1447. [PubMed: 10930160]
6. Bastardo YM, Kimberlin CL. Relationship between quality of life, social support, and disease-related factors in HIV-infected persons in Venezuela. *AIDS Care* 2000;12:673–684. [PubMed: 11218552]
7. Corless IB, Nicholas PK, Dolan SA, McGibbon CA. Symptom status, medication adherence, and quality of life in HIV disease. *J Hosp Palliat Nurs* 2005;7:129–138.

8. Crystal S, Fleishman JA, Hays RD, Shapiro MF, Bozzette SA. Physical and role functioning among persons with HIV: results from a nationally representative survey. *Med Care* 2000;38:1210–1223. [PubMed: 11186300]
9. Spirig R, Moody K, Battegay M, de Geest S. Symptom management in HIV/AIDS: advancing the conceptualization. *Adv Nurs Sci* 2005;28:333–344.
10. Vogl D, Rosenfeld B, Breitbart W, et al. Symptom prevalence, characteristics, and distress in AIDS outpatients. *J Pain Symptom Manage* 1999;18:253–262. [PubMed: 10534965]
11. Ironson G, O'Cleirigh C, Fletcher MA, et al. Psychosocial factors predict CD4 and viral load change in men and women with human immunodeficiency virus in the era of highly active antiretroviral treatment. *Psychosom Med* 2005;67:1013–1021. [PubMed: 16314608]
12. Ashton E, Vosvick M, Chesney M, et al. Social support and maladaptive coping as predictors of the change in physical health symptoms among persons living with HIV/AIDS. *AIDS Patient Care STDS* 2005;19:587–598. [PubMed: 16164385]
13. Coleman CL. Spirituality and sexual orientation: relationship to mental well-being and functional health status. *J Adv Nurs* 2003;43:457–464. [PubMed: 12919264]
14. Coleman CL, Hummel DB. Sexual orientation: a predictor of depressive symptoms among HIV-infected African American men: a descriptive correlational study. *Arch Psychiatr Nurs* 2005;19:236–241. [PubMed: 16226675]
15. Mosack KE, Abbott M, Singer M, Weeks MR. If I didn't have HIV, I'd be dead now: illness narratives of drug users living with HIV/AIDS. *Qual Health Res* 2005;15:586–605. [PubMed: 15802537]
16. Rabkin JG, Johnson J, Lin SH, et al. Psychopathology in male and female HIV-positive and negative injecting drug users: longitudinal course over 3 years. *AIDS* 1997;11:507–515. [PubMed: 9084799]
17. Semple SJ, Patterson TL, Straits-Troster K, et al. Social and psychological characteristics of HIV-infected women and gay men. *Women Health* 1996;24:17–41. [PubMed: 8948084]
18. Williams JK, Wyatt GE, Resell J, Peterson J, Asuan-O'Brien A. Psychosocial issues among gay- and non-gay-identifying HIV-seropositive African American and Latino MSM. *Cultur Divers Ethnic Minor Psychol* 2004;10:268–286. [PubMed: 15311979]
19. Ullrich PM, Lutgendorf SK, Stapelton JT. Concealment of homosexual identity, social support, and CD4 cell count among HIV-seropositive gay men. *J Psychosom Res* 2003;54:205–212. [PubMed: 12614830]
20. Mills TC, Paul J, Stall R, et al. Distress and depression in men who have sex with men: the Urban Men's Health Study. *Am J Psychiatry* 2004;161:278–285. [PubMed: 14754777]
21. Leslie MB, Stein JA, Rotheram-Borus MJ. The impact of coping self-efficacy strategies, personal relationships, and emotional distress on health-related outcomes of parents living with HIV or AIDS. *J Soc Pers Relat* 2002;19:45–66.
22. Foley M, Skurnick JH, Kennedy CA, Valentin R, Louria DB. Family support for heterosexual partners in HIV-serodiscordant couples. *AIDS* 1994;8:1483–1487. [PubMed: 7818821]
23. Coleman CL. The contribution of religious and existential well-being to depression among African American heterosexuals with HIV infection. *Issues Ment Health Nurs* 2004;25:103–110. [PubMed: 14660319]
24. Crandall CS. AIDS-related stigma and the lay sense of justice. *Contemp Soc Psychol* 1991;15:66–67.
25. Cole SW, Kemeny ME, Taylor SE, Visscher BR, Fahey JL. Accelerated course of human immunodeficiency virus infection in gay men who conceal their homosexual identity. *Psychosom Med* 1996;58:219–231. [PubMed: 8771621]
26. Bartlett JA. Addressing the challenges of adherence. *J AIDS* 2002;29(suppl):2–10.
27. Cain LE, Cole SR, Chmiel JS, Margolick JB, Rinaldo CR Jr, Detels R. Effects of highly active antiretroviral therapy on multiple AIDS-defining illnesses among male HIV seroconverters. *Am J Epidemiol* 2005;163:310–315. [PubMed: 16371516]
28. 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;94:1133–1140. [PubMed: 15226133]
29. Pakenham KI, Rinaldis M. The role of illness, resources, appraisal, and coping self-efficacy strategies in adjustment to HIV/AIDS: the direct and buffering effects. *Behav Med* 2001;24:259–279.

30. Wu AW, Dave NB, Diener-West M, Sorenson S, Huang I-C, Revicki DA. Measuring validity of self-report symptoms among people with HIV. *AIDS Care* 2004;16:876–881. [PubMed: 15385242]
31. Teva I, Bermúdez MP, Hernández-Quero J, Buéla-Casal G. Evaluación de la calidad de vida relacionada con la salud en pacientes infectados por el VIH. *Terapia Psicológica* 2004;22:111–121.
32. Remien RH, Exner TE, Kertzner RM, et al. Depressive symptomatology among HIV-positive women in the era of HAART: a stress and coping model. *Am J Community Psychol* 2006;38:275–285. [PubMed: 16967343]
33. Morin SF, Steward WT, Charlebois ED, et al. Predicting HIV transmission risk among HIV-infected men who have sex with men: Findings from the Healthy Living Project. *JAIDS* 2005;40:226–235. [PubMed: 16186742]
34. Weinhardt LS, Kelly JA, Brondino MJ, et al. HIV transmission risk behavior among men and women living with HIV in 4 cities in the United States. *J AIDS* 2004;36:1057–1066.
35. Chesney MA, Folkman S, Chambers D. Coping effectiveness training for men living with HIV: preliminary findings. *Int J STD AIDS* 1996;7:75–82. [PubMed: 8799801]
36. Cutrona, CE.; Russell, D. The provisions of social relationships and adaptation to stress. In: Jones, WH.; Perlman, D., editors. *Advances in Personal Relationships, Volume 1*. JAI Press; Greenwich, CT: 1987. p. 37-68.
37. Beck, AT.; Steer, RA. *BDI: Beck Depression Inventory Manual*. Psychological Corporation; New York, NY: 1993.
38. Kalichman SC, Sikkema KJ, Somlai A. Assessing persons with human immunodeficiency virus (HIV) infection using the Beck Depression Inventory: disease processes and other potential confounds. *J Pers Assess* 1995;64:86–100. [PubMed: 7877094]
39. Justice AC, Holmes W, Gifford AL, et al. for the Adult AIDS Clinical Trials Unit Outcomes Committee. Development and validation of a self-completed HIV symptom index. *J Clin Epidemiol* 2001;54(suppl):77–90.
40. Dobalian A, Tsao JC, Duncan RP. Pain and the use of outpatient services among persons with HIV: results from a nationally representative survey. *Med Care* 2004;42:129–138. [PubMed: 14734950]
41. Heckman BD. Psychosocial differences between whites and African Americans living with HIV/AIDS in rural areas of 13 US States. *J Rural Health* 2006;22:131–139. [PubMed: 16606424]
42. Rotheram-Borus MJ. Variations in perceived pain associated with emotional distress and social identity in AIDS. *AIDS Patient Care STDS* 2000;14:659–665. [PubMed: 11119433]
43. Vidrine DJ, Amick BC III, Gritz ER, Arduino RC. Functional status and overall quality of life in a multiethnic HIV-positive population. *AIDS Patient Care STDS* 2003;17:187–197. [PubMed: 12737642]
44. Jia H, Uphold CR, Wu S, Reid K, Findley K, Duncan PW. Health-related quality of life among men with HIV infection: effects of social support, coping, and depression. *AIDS Patient Care STDS* 2004;18:594–603. [PubMed: 15630787]
45. Mrus JM, Williams PL, Tsevat J, Cohn SE, Wu AW. Gender differences in health-related quality of life in patients with HIV/AIDS. *Qual Life Res* 2005;14:479–491. [PubMed: 15892437]
46. Arend ED. The politics of invisibility: homophobia and low-income HIV-positive women who have sex with women. *J Homosex* 2005;49:97–122. [PubMed: 16048887]
47. Springer, E. Reflections on women and HIV/AIDS in New York City and the United States. In: Bury, J.; Morrison, V.; McLachlan, S., editors. *Working with Women with AIDS: Medical, Social, and Counseling Issues*. Tavistock/Routledge; New York, NY: 1992. p. 32-40.
48. Antoni MH, Baggett L, Ironson G, et al. Cognitive-behavioral stress management intervention buffers distress responses and immunologic changes following notification of HIV-1 seropositivity. *J Consult Clin Psychol* 1991;59:906–915. [PubMed: 1774375]
49. Leserman J, Petitto JM, Perkins DO, Folds JD, Golden RN, Evans DL. Severe stress, depressive symptoms, and changes in lymphocyte subsets in human immunodeficiency virus-infected men: a 2-year follow-up study. *Arch Gen Psychiatry* 1997;54:279–285. [PubMed: 9075469]
50. Leserman J, Petitto JM, Golden RN, et al. Impact of stressful life events, depression, social support, coping self-efficacy, and cortisol on progression to AIDS. *Am J Psychiatry* 2000;157:1221–1228. [PubMed: 10910783]

51. Simoni JM, Ng MT. Abuse, health locus of control, and perceived health among HIV-positive women. *Health Psychol* 2002;21:89–93. [PubMed: 11846349]
52. Cruess DG, Douglas SD, Petitto JM, et al. Association of resolution of major depression with increased natural killer cell activity among HIV-seropositive women. *Am J Psychiatry* 2005;162:2125–2130. [PubMed: 16263853]
53. Villes V, Spire B, Lewden C, et al. ANRS CO-8 APROCO-COPILOTE Study Group. The effect of depressive symptoms at ART initiation on HIV clinical progression and mortality: implications in clinical practice. *Antiviral Ther* 2007;12:1067–1074.
54. Davis S. Clinical sequelae affecting quality of life in the HIV-infected patient. *J Assoc Nurses AIDS Care* 2004;15(suppl):28–33.
55. Moneyham L, Sowell R, Seals B, Demi A. Depressive symptoms among African American women with HIV disease. *Sch Inq Nurs Pract* 2000;14:9–39. [PubMed: 10885342]

TABLE 1

Sociodemographics, by Sexual Identity Group

Variable	Heterosexual men (N = 840)		Gay men (N = 1,505)		Bisexual men (N = 365)		Heterosexual women (N = 808)		Lesbian women (N = 61)		Bisexual women (N = 91)	
	n	%	n	%	n	%	n	%	n	%	n	%
Ethnicity												
African American	512	61.0	454	30.2	206	56.4	498	61.6	35	57.4	56	61.5
European American	103	12.3	638	42.4	80	21.9	110	13.6	5	8.2	17	18.7
Hispanic	181	21.5	298	19.8	35	9.6	160	19.8	16	26.2	13	14.3
Other	44	5.2	113	7.5	80	21.9	43	11.8	5	8.2	5	5.5
Has primary relationship	365	43.5	543	36.1	128	35.1	422	52.2	45	73.8	49	53.8
Educational achievement												
Less than high school	291	34.6	181	12.0	70	9.2	350	43.3	21	34.4	44	48.4
High school or GED	279	33.2	347	23.1	119	32.6	204	25.2	19	31.1	23	25.3
More than high school	270	32.1	977	64.9	176	48.2	254	31.4	21	34.4	23	25.3
Employment status												
Not working for pay	605	72.0	947	62.9	265	72.6	632	78.2	41	67.2	265	72.6
Earning money from a formal job	69	8.2	342	22.7	48	13.2	97	12.0	10	16.4	9	9.9
Earning money under the table	149	17.7	204	13.6	52	14.2	74	9.2	9	14.8	11	12.1
Earning money illegally	11	1.3	11	0.7	—	—	3	0.4	1	1.6	6	6.6
AIDS diagnosis at interview	203	24.2	296	19.7	57	15.6	129	16.0	11	18.0	19	20.9
	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD
Years since HIV diagnosis	8.3	4.5	9.0	4.9	8.6	4.7	7.6	4.1	8.4	4.1	7.8	4.9
Age (y)	43.4	7.2	41.0	8.0	41.4	7.4	41.1	7.4	40.7	6.8	40.5	8.1

Note. Percentages may not sum to 100% because of missing data. AIDS = acquired immune deficiency syndrome; GED = general equivalency diploma; HIV = human immunodeficiency virus.

TABLE 2
Symptom Presentations and Intrusiveness, Past 3 Months

Symptom	Presence of symptom (%)	Symptom intrusiveness ^a (%)
Fatigue or loss of energy	79.7	56.4
Difficulty falling or staying asleep	68.5	50.9
Nervous or anxious	66.2	37.4
Muscle or joint pain	62.5	44.1
Diarrhea	61.0	39.1
Pain, numbness, or tingling	59.0	40.5
Trouble remembering	57.9	37.1
Nausea or upset stomach	57.7	36.1
Bloating or stomach pain	57.5	37.3
Skin problems	52.4	36.1
Headaches	51.8	31.1
Changes in body appearance	49.8	33.0
Vivid dreams	49.8	20.0
Dizzy or lightheaded	49.4	26.3
Problems with sex	48.3	32.3
Fever, chills, or sweats	48.0	29.3
Feeling out of it or spacey	47.7	24.8
Cough or trouble catching breath	47.5	31.4
Loss of appetite	42.9	25.9
Weight loss or wasting	31.5	22.4
Vomiting	25.9	16.6
Hair changes	22.7	15.1
Change in sense of taste	21.2	12.8
Numbness near mouth	9.3	5.5

^aPercentage of all ($n = 3,670$) participants reporting that the symptom bothered them quite a bit or a great deal.

TABLE 3
Mean Scores for Psychosocial Measures, by Sexual Identity Group

	Heterosexual men			Gay men			Bisexual men			Heterosexual women			Lesbian women			Bisexual women		
	<i>M</i>	<i>SD</i>	Range	<i>M</i>	<i>SD</i>	Range	<i>M</i>	<i>SD</i>	Range	<i>M</i>	<i>SD</i>	Range	<i>M</i>	<i>SD</i>	Range	<i>M</i>	<i>SD</i>	Range
Social support	10.4	1.6	3.3–13.8	10.7	1.6	4.3–13.8	10.4	1.7	3.8–13.7	10.8	1.5	6.0–13.8	10.9	1.6	6.3–13.8	10.7	1.6	4.8–13.3
Coping self-efficacy	6.8	1.7	0.5–10.0	6.6	1.8	0.3–10.0	6.5	1.8	0.7–10.0	6.7	1.9	0.9–10.0	6.5	1.8	0.5–10.0	6.5	1.8	1.2–9.8
Cognitive depression	6.7	5.9	0.0–31.0	6.5	5.6	0.0–31.0	7.0	5.9	0.0–33.0	6.6	5.9	0.0–30.0	6.2	6.8	0.0–27.0	6.7	5.7	0.0–24.0

TABLE 4
Hierarchical Regressions of Social Support, Coping Self-Efficacy, and Cognitive Depression on Symptom Reports^a

Variable	Gay men ^c				Heterosexual men				Bisexual men				Heterosexual women				Lesbian women				Bisexual women			
	B	SE	β	Adj. R ²	B	SE	β	Adj. R ²	B	SE	β	Adj. R ²	B	SE	β	Adj. R ²	B	SE	β	Adj. R ²	B	SE	β	Adj. R ²
Ethnicity 1 ^b	0.75	0.35	.06*		0.55	0.48	.04		1.17	0.97	.06		1.55	0.49	.11**		0.02	2.00	.00		1.49	1.43	.11	
Ethnicity 2	1.19	0.29	.12**		1.68	0.59	.10**		0.68	0.72	.05		0.98	0.56	.06		1.69	3.02	.09		2.57	1.31	.20	
Ethnicity 3	1.93	0.50	.10***		0.29	0.89	.01		0.81	0.95	.05		0.98	0.88	.04		0.85	3.14	-.04		0.33	2.12	.02	
Age	0.05	0.02	.07**		0.00	0.03	.01		0.01	0.04	.02		0.09	0.03	.11**		-0.10	0.13	-.11		-0.01	0.06	-.02	
Current CD4 count	0.00	0.00	-.17**		-0.00	0.00	-.09**		-0.00	0.00	-.10		-0.00	0.00	-.09*		0.00	0.00	.06		0.00	0.00	.06	
Social support	0.11	0.09	.03		-0.25	0.14	-.07		-0.09	0.20	-.03		-0.25	0.14	-.07		-0.20	0.68	-.05		-0.20	0.36	-.07	
Coping self-efficacy	-0.50	0.09	-.17**		-0.41	0.14	-.12**		-0.62	0.20	-.20**		-0.18	0.13	-.06		-0.16	0.57	-.05		-0.41	0.35	-.15	
Cognitive depression	0.29	0.03	.31**		0.26	0.04	.27**		0.20	0.06	.21**		0.34	0.04	.35**		0.26	0.15	.27		0.32	0.12	.37**	
				.23 ^c				.18 ^d				.14 ^e				.20 ^f				-.04 ^g				.23 ^h

^aResults from final block shown in table.

^bEthnicity was dummy-coded for the regression analysis such that Ethnicity 1 = Latino; Ethnicity 2 = European American; Ethnicity 3 = Other ethnicity. African American was the reference category.

^c $\Delta R^2 = .17^{**}$.

^d $\Delta R^2 = .15^{**}$.

^e $\Delta R^2 = .14^{**}$.

^f $\Delta R^2 = .17^{**}$.

^g $\Delta R^2 = .09$, $p = .22$.

^h $\Delta R^2 = .23^{**}$.

* $p < .05$.

** $p < .01$.

TABLE 5
Hierarchical Regressions of Social Support, Coping Self-Efficacy, and Cognitive Depression on Symptom Intrusiveness^a

Variable	Gay men			Heterosexual men			Bisexual men			Heterosexual women			Lesbian women			Bisexual women							
	B	SE	β	Adj. R^2	B	SE	β	Adj. R^2	B	SE	β	Adj. R^2	B	SE	β	Adj. R^2	B	SE	β	Adj. R^2			
Ethnicity 1 ^b	0.70	0.36	.05*		0.90	0.45	.07*		1.60	0.94	.08		2.26	0.49	.16**		2.00	1.70	.17		0.16	1.42	.01
Ethnicity 2	-0.29	0.30	-.03		0.89	0.55	.06		-0.28	0.69	-.02		-0.15	0.55	-.01		0.32	2.58	.02		1.46	1.30	.11
Ethnicity 3	0.80	0.51	.04		1.06	0.80	.04		1.01	0.92	.06		0.96	0.88	.04		-2.23	2.69	-.11		-0.73	2.11	-.03
Age	0.01	0.02	.01		-0.01	0.03	-.02		-0.02	0.04	-.02		0.06	0.03	.08*		-0.09	0.11	-.11		-0.05	0.06	-.08
Current CD4 count	-0.00	0.00	.16**		-0.00	0.00	-.08*		-0.00	0.00	-.13**		-0.00	0.00	-.08*		0.00	0.00	.14		0.00	0.00	.04
Social support	0.16	0.09	.05		-0.24	0.13	-.07		-0.09	0.20	-.03		0.10	0.14	.03		0.19	0.58	.05		0.13	0.36	.04
Coping self-efficacy	-0.65	0.09	-.21**		-0.39	0.13	-.13**		-0.78	0.19	-.25		-0.49	0.13	-.16**		-0.54	0.49	-.19		-0.32	0.34	-.12
Cognitive depression	0.36	0.03	.36**	.28 ^c	0.31	0.04	.33**	.23 ^d	0.28	0.06	.29**	.24 ^e	0.38	0.04	.38**	.25 ^f	0.34	0.13	.37*		0.48	0.11	.54**
																.10 ^g							.29 ^h

^aResults from final block shown in table.

^bEthnicity was dummy-coded for the regression analysis such that Ethnicity 1 = Latino; Ethnicity 2 = European American; Ethnicity 3 = Other ethnicity. African American was the reference category.

^c $\Delta R^2 = .24^{**}$.

^d $\Delta R^2 = .20^{**}$.

^e $\Delta R^2 = .23^{***}$.

^f $\Delta R^2 = .22^{**}$.

^g $\Delta R^2 = .18^*$.

^h $\Delta R^2 = .32^{**}$.

* $p < .05$.

** $p < .01$.