

“HIV IS NOT MY BIGGEST PROBLEM”: THE IMPACT OF HIV AND CHRONIC BURDEN ON DEPRESSION IN WOMEN AT RISK FOR AIDS

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This prospective study followed 350 African American, Latina, and European American women over a 6-month period to assess the relation of HIV status, socio-economic status (SES), and chronic burden to depression over time, and examined the moderation of these effects by psychosocial resources (social support, optimism, and coping style). HIV status and ethnicity were significantly associated with depressed mood at each time point, but not with change over time. Chronic burden and low SES (Latinas only) were significant predictors of changes in depression. Although psychosocial resources were associated with lower levels of depression, they did not moderate changes in depression over time. The significance of chronic burdens for understanding the psychosocial impact of HIV is discussed.

As HIV infection has increasingly spread into low-income communities, understanding its social context has become critical to issues of impact and treatment. Low-income women, particularly those of color, account for an increasing percentage of new cases of HIV infection (Centers for Disease Control and Prevention, 2002). This population faces a broad array of chronic stressors that presage early mortality from all causes

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(Adler et al., 1994) and that may affect the psychobiological impact of HIV infection. In this article, we examine whether chronic stressors (associated with low SES) predict depression among women diagnosed with or at risk for HIV infection and whether psychosocial resources that typically enable people to manage stressors more effectively do so in this low-income population at risk for AIDS.

Drawing on a transactional process model of stress (Lazarus & Folkman, 1984), we focused on factors that would be posited theoretically to influence the primary and secondary appraisals of stress. That is, according to cognitive appraisal theory, people's subjective perception of stress and consequently their likelihood of experiencing negative psychological outcomes such as depression will depend on the primary appraisals of the situations they find themselves in (e.g., potentially stressful life events and chronic stressors) as well as their secondary appraisals. Secondary appraisals will depend in large part on the personal resources a person brings to the situation, such as psychosocial factors (e.g., optimism and coping styles), and perceived resources for coping with the situation (e.g., social support). A person experiences distress when primary appraisals of threat exceed secondary appraisals of coping ability (Folkman, Lazarus, Dunkel-Schetter, DeLongis, & Gruen, 1986).

CHRONIC BURDEN

Understanding the particular problems and burdens that women face in the context of AIDS is an important research priority (Chrisler & O'Hea, 2000; Goodman & Fallot, 1998; Sikkema et al., 1996). Chronic burden is defined by Pearlin and Schooler (1978) as ongoing difficulties in major social roles, including difficulties in employment, marriage, being single/separated/divorced, finances, parenting, and ethnic relations. Chronic burden both contributes to psychological distress (Avison & Turner, 1988; McGonagle & Kessler, 1990; Repetti, 1993) and may increase vulnerability to health problems by reducing the ability of the body to respond to a physiological challenge, such as mounting an immune response to a virus (Kiecolt-Glaser, Glaser, Gravenstein, Malarkey, & Sheridan, 1996). Chronic burden is a critical variable in the study of women at risk for AIDS, because these women often experience financial burdens, employment problems, exposure to crime, drug use, problems with housing, problematic health care access, difficulties related to child-rearing, and problems in maintaining relationships (Jenkins & Coons, 1996; Siegel et al., 1998). Contracting HIV can exacerbate this chronic burden, because some individuals

with HIV infection may be abandoned or become dependent on others (Kemeny, 1994).

ETHNICITY

Together with chronic burdens and low SES, ethnicity may also be a critical variable in the relationships among HIV status, depression, and health. There are some clear-cut differences in the mortality patterns, health status, and health risk factors between ethnic minorities and the European American population (Jillson-Boostrom, 1992; Sikkema, Wagner, & Bogart, 2000; Sue, 2000). For example, African American and Latina women account for approximately 77% of AIDS cases diagnosed among women in the United States (Wortley & Fleming, 1997). Among women, as of 1995, African American women had the highest incidence rate of AIDS (60 per 100,000), compared to 5 per 100,000 for European American women (Rosenberg & Biggar, 1998). These statistics underscore the importance of focusing on the HIV-related needs of women of diverse ethnic backgrounds. For example, is depression correspondingly a greater problem for ethnic minority women? Additional knowledge about the concomitants of depression in women with HIV across different ethnic groups is sorely needed (Sikkema et al., 2000). Accordingly, we examined ethnic differences in our sample.

PSYCHOSOCIAL RESOURCES

Just as chronic burden may exacerbate risk for depression, so psychosocial resources, including optimism, social support, and coping strategies, can reduce its likelihood. Optimism refers to generalized outcome expectancies that good things, rather than bad things, will happen (Carver, Scheier, & Weintraub, 1989). It has been related to higher natural killer cell cytotoxicity during stress (Seegerstrom, Taylor, Kemeny, & Fahey, 1998) and protection against HIV exposure by decreasing intentions to engage in unsafe sex (Carvajal, Garner, & Evans, 1998). Optimists, in general, show good psychological well-being (Armor & Taylor, 1998), suggesting that optimism may moderate depression in response to a stressor such as HIV.

Social support, defined as emotional, informational, or instrumental assistance from others (Dunkel-Schetter & Bennett, 1990), has been tied to better health, more rapid recovery from illness, and a lower risk for mortality (House, Umberson, & Landis, 1988; Sarason, Sarason, & Gurung, 2001; Uchino, Cacioppo, & Kiecolt-Glaser, 1996). Studies of people with HIV infection suggest that social support from peers is criti-

cal for emotional well-being and, in periods of crisis, family support may become an especially important determinant of emotional well-being (Crystal & Kersting, 1998; Miller & Cole, 1998). In direct relevance to the present study, Metts, Manns, and Kruzic (1996) found that higher levels of emotional support from friends and from family made independent contributions to lower depression in a sample of persons infected with HIV.

Coping strategies refer to the specific behavioral and psychological efforts that people employ to master, tolerate, reduce, or minimize stressful events (Lazarus & Launier, 1978). Researchers have especially distinguished between approach and avoidance coping strategies: An individual can approach a stressor and make active efforts to resolve it or try to avoid the problem (Moos & Schaefer, 1993). In general, people who rely more on approach coping adapt better to life stressors and experience less negative affect than those who make use of avoidance coping. As such, active coping strategies may represent a resource that can reduce the likelihood of depression in the context of HIV infection.

Drawing on cognitive appraisal theory, the present study investigated the relations of chronic burden, ethnicity, and HIV infection to depression and the moderation of these relations by optimism, coping style, and social support. We predicted that chronic burdens would enhance risk for depression over time, especially among HIV seropositive women, but that this effect would be ameliorated among women with psychosocial resources (optimism, active coping skills, social support).

METHOD

THE UCLA WOMEN AND FAMILY PROJECT

The current study draws from the Women and Family Project (WFP), a longitudinal investigation of the medical and psychological aspects of HIV in a multi-ethnic, community sample of women in Los Angeles County. HIV-positive participants were recruited from county hospitals, community-based clinics, ethnic and AIDS-specific organizations, and drug rehabilitation centers. Participating institutions included the UCLA Medical Center, Harbor-UCLA Medical Center, King-Drew Medical Center, and community service agencies such as T.H.E. Clinic, SHANTI Foundation, AIDS Health Foundation, and the Minority AIDS Project. Practitioners at participating institutions were informed about the project and given flyers to distribute to potentially eligible partici-

pants. Media sources, such as print and radio ads, were also utilized for recruitment and to publicize the project.

Each potential participant who called about the study was screened for eligibility. To be eligible, respondents had to be female, over the age of 18, and HIV-positive. All but 15 women who called were successfully screened into the study. Of the 293 HIV-positive women interviewed at baseline, 221 participated at the second interview (20% attrition at 6 months). Ten HIV-positive women died between interviews, some phone numbers had been disconnected, and others moved but left no forwarding address.

Stratified probability sampling and random digit dialing was used by the Institute of Social Science Research at the University of California, Los Angeles, to recruit an HIV-negative sample from the same neighborhoods as the HIV-positive sample, matched as closely as possible on age, ethnicity, education, and relationship status. Over 4,600 calls were made to locate the desired sample. Of the 1,855 HIV-negative women in the usable sample, 492 women were recruited for the interview, and 157 HIV-negative women were interviewed. The drop in numbers was due to several factors. First, the majority of women who declined did not want to participate in the medical part of the study or were uncomfortable about having to take an HIV test. Others reported that their partners would not let them participate. Some of the HIV-negative women could not be located for the second interview (Carvajal et al., 1998), and data for an additional 13 participants' interview tapes could not be transcribed, resulting in a Time 2 HIV-negative sample of 129.

SAMPLE

Participants completed the interviews and questionnaires between January 1997 and February 1998. The HIV-positive sample consisted of 87 African American, 80 Latina, and 54 European American women. The HIV-negative sample consisted of 45 African American, 34 Latina, and 50 European American women. For both HIV-positive and HIV-negative samples, participants who completed both interviews did not differ significantly on any demographic or psychosocial variables from those who only completed the Time 1 interview.

Table 1 summarizes the sociodemographic and psychological characteristics of the sample. The effort to match the HIV-negative and HIV-positive samples was only somewhat successful. The two samples, which were drawn from the same neighborhoods, did not differ on age or relationship status, but a chi-square analysis showed significant differences in the proportions of ethnic representation in the

two groups, $\chi^2 = 6.73, p < .05$; European American women represented the smallest proportion in the HIV-seropositive sample and Latinas represented the smallest proportion in the HIV-seronegative sample. There were significant main effects of HIV status on income, $F(1, 348) = 8.98, p < .01$, and education, $F(1, 348) = 11.53, p < .001$, with the HIV-seropositive women significantly less well educated and of lower income than the HIV-seronegative women. A significant ethnicity-by-HIV status interaction was found for income, $F(2, 348) = 3.51, p < .05$, such that the HIV-seropositive - HIV-seronegative income differential was especially high for African Americans.

PROCEDURE

Each participant was interviewed by a trained female interviewer of the same ethnicity at the participant's location of choice (usually the home or a medical facility). Spanish-speaking women were interviewed in the language of their choice by a Spanish-English bilingual interviewer. The interviews for both HIV-positive and HIV-negative women ranged in length from 2 to 3 hours and were tape-recorded for transcription to ensure accuracy. Following the interview, participants completed a brief battery of neuropsychological tests, a health interview and a physical exam conducted by a licensed nurse practitioner. Referrals to health providers and community organizations were made when necessary. Respondents received \$60 for their first interview, and \$50 for the subsequent interview. Babysitting and transportation by taxi were provided when necessary.

The interview consisted of open- and closed-ended items concerning demographics, social origins, stress and coping, self-esteem, social support, sexual behavior, sexual abuse and trauma history, depression, anxiety, and illegal drug use. The present analyses focus on the effects of stress exposure and psychological factors on concurrent depressed mood and changes in depressed mood (described in more detail below).

We determined HIV serostatus by ELISA (Nishanian et al., 1987) from serum at the time of enrollment and again at Time 2 for seronegative subjects only. Genetic System's fLAV EIA test (Genetic System Corporation, Redmond, WA) was used following manufacturer's instructions. Suspicious seroconverters as indicated by high OD values in ELISA were further tested by Western Blot (BioRad, Hercules, CA). The present study included only participants for whom HIV serostatus testing was definitive.

SES and Chronic Burden. SES was assessed by report of personal and family income and report of highest year of education completed. How-

TABLE 1. Means and Standard Deviations of Major Variables

Ethnic Group: HIV Serostatus:	African American		European American		Latina	
	Positive Mean (SD)	Negative Mean (SD)	Positive Mean (SD)	Negative Mean (SD)	Positive Mean (SD)	Negative Mean (SD)
Age ^E	37.63 (8.01)	34.91 (8.80)	37.98 (7.52)	37.76 (9.85)	33.10 (8.00)	34.02 (11.35)
Income ^{EH}	\$661 (\$457)	\$1893 (\$1307)	\$1495 (\$2262)	\$1872 (\$1389)	\$456 (\$365)	\$612 (\$793)
Education (years) ^{EH}	12.29 (1.73)	13.63 (2.08)	13.18 (2.71)	15.41 (2.33)	9.96 (3.63)	10.51 (4.02)
Percent with partner	15.20	12.50	21.60	31.00	32.10	21.90
Percent married	7.40	17.60	18.50	50.80	17.90	38.50
Optimism	29.36 (5.20)	31.49 (4.94)	28.45 (5.71)	30.31 (5.12)	28.13 (4.23)	28.75 (5.87)
Social Support	81.46 (15.21)	84.72 (9.72)	77.05 (14.63)	81.49 (11.47)	74.06 (18.86)	78.24 (14.29)
Problem-Solving Coping ^E	3.22 (0.61)	3.15 (0.61)	3.18 (0.61)	3.14 (0.61)	2.95 (0.70)	2.83 (0.66)
Avoidance Coping ^E	2.22 (0.66)	1.82 (0.49)	1.89 (0.53)	1.68 (0.44)	2.21 (0.63)	2.08 (0.58)
Support-Seeking Coping ^H	2.95 (0.92)	2.89 (0.77)	3.10 (0.75)	3.12 (0.71)	2.98 (0.80)	2.90 (0.86)
Chronic Burden ^H	36.88 (8.43)	32.49 (7.41)	36.60 (9.33)	30.24 (8.19)	35.86 (10.16)	30.71 (7.58)
Baseline Depression ^{EH}	22.48 (12.90)	11.06 (8.13)	16.47 (10.31)	11.53 (10.39)	19.62 (13.04)	15.09 (12.38)
Six-Month Depression ^H	19.75 (11.81)	14.18 (8.13)	17.13 (11.48)	11.64 (10.63)	19.53 (10.81)	16.93 (12.61)

Note. ^E indicates significant main effect for ethnicity; ^H indicates significant main effect for HIV status; ^I indicates significant interaction

ever, because illegal income, payments in cash, and nonreporting of income are fairly common in lower SES samples, education was used as a measure of SES in subsequent analyses because it was more reliably measured.¹

A 21-item scale developed from focus groups in which women drawn from the target population discussed the life stresses they faced measured chronic burden. The decision to develop our own measure of chronic burden stemmed from the fact that the burdens of very low income women are not well represented by existing measures (Lepore, 1997). For example, a number of the women in our sample are occasional or full-time prostitutes, are drug addicts or drug abusers, are transient or homeless, and are more likely to face problems such as crime victimization and having a relative sent to prison, items that are not typically included in standard chronic burden measures.

From the focus groups, a list of the most commonly mentioned stressors was compiled, and items assessing those stressors were created, pre-tested, and refined. Participants indicated whether they had experienced each stressor during the previous 6 months and then indicated the extent to which each stressor was a problem for them using a four-point scale ranging from 1 (*Not a problem for me in the last six months*) to 4 (*A major problem for me in the last six months*). The final list included financial difficulties, transportation problems, housing problems, child care or caregiving difficulties, difficulties in personal relationships, work-related difficulties, exposure to accident or injury, immigration or citizenship problems, and exposure to crime and discrimination. Test-retest reliability was moderate ($r = .60$), reflecting the fact that these stressors are chronic but do vary over time.

Life Orientation Test (LOT; Scheier & Carver, 1985). The LOT measured dispositional optimism. The 10-item scale has four positively worded items such as "In uncertain times I usually expect the best," and four reverse-coded negatively worded items such as "If something can go wrong for me, it will." Two additional items are fillers. The LOT showed moderate reliability in this sample (Cronbach's $\alpha = .75$).

Coping Inventory. The COPE (Carver et al., 1989) is a theoretically derived scale developed to assess a predetermined set of coping strategies.

1. We consulted with epidemiologist Ichiro Kawachi at Harvard University's School of Public Health on how to handle this SES measurement issue. Dr. Kawachi is an expert on SES and health. The decision to rely on education for our analyses, rather than the less reliably measured income variable, was his suggestion, and it was based on his knowledge that income reporting in populations such as this is highly unreliable.

The 30 COPE items assess 15 first-order coping strategies, with each strategy assessed by two items. Participants rated the extent to which they used each coping item from 1 (*I usually don't do this at all*) to 4 (*I usually do this a lot*).

From these strategies, three second-order factors were constructed: *Problem solving* (Cronbach's $\alpha = .80$) included Active Coping (taking action or exerting efforts to remove or circumvent the stressor), Planning (thinking about how to confront the stressor and organizing one's coping efforts), and Positive Reinterpretation and Growth (making the best of the situation by growing from it or viewing it in a more favorable light). *Avoidance* (Cronbach's $\alpha = .85$) included Denial (an attempt to reject the reality of the stressor), Mental Disengagement (psychological disengagement through daydreaming, sleep or distraction) and Behavioral Disengagement factors (giving up or withdrawing efforts to cope with the stressor). *Support seeking* (Cronbach's $\alpha = .78$) included Seeking Emotional Support (getting sympathy or emotional support from someone) and Seeking Instrumental Support (seeking assistance, information, or advice about what to do) factors. Factors of the COPE that did not clearly load on these three theoretically derived second-order factors (e.g., using humor) were not used. Consequently, each participant had three coping scores.

Social Support. A short version of the Social Support Questionnaire (Sarason, Levine, Basham, & Sarason, 1983) assessed social support. Participants were asked to list four people who were most important to them and who provided them with personal support. Participants then rated on a five-point scale (1, *not at all* to 5, *a great deal*) the extent to which each person gave them useful information or advice, listened to them when they wanted to talk, showed that they cared and helped with specific problems, or gave them things when they needed them. An additional single item with the same response scale assessed how satisfied the participant was with the support received from each person. Because the ratings of support were highly correlated with the satisfaction ratings, a total score was calculated by summing up the support received on all the items from all the providers (16 items) and the level of satisfaction with support from each person (4 items). The resulting 20-item social support scale showed strong internal reliability (Cronbach's $\alpha = .86$).

DEPRESSION

Depressed mood was measured at both time points by the Center for Epidemiological Studies Depression scale (CES-D; Radloff, 1977), a 20-item, widely used measure of depressive symptomatology, shown to

be valid and reliable in many samples. Participants rated how often they experienced each of 20 symptoms reflective of depression (e.g., how often their sleep was restless or they felt that everything they did was an effort), using a scale ranging from 0 (*Rarely or none of the time [less than 1 day]*) to 3 (*Most or all of the time [5-7 days]*). Cronbach's α in this sample was .92.

RESULTS

PLAN OF ANALYSES

We first used analysis of variance (ANOVA) to test whether the sociodemographic and psychosocial variables varied significantly across ethnicity and HIV status. Preliminary analyses were primarily exploratory in nature, given the limited research conducted on HIV-positive women of diverse ethnic backgrounds and the chronic burdens they may face. We then conducted a series of multivariate analyses of covariance (MANCOVA) and analyses of covariance (ANCOVA) to test whether depressed mood would vary as a function of HIV status and ethnicity. Finally, we used hierarchical multiple regression analyses to assess whether changes in depressed mood may be predicted from chronic burden, HIV status, ethnicity, and psychosocial resources.

PRELIMINARY ANALYSES

Ethnicity. Two (HIV serostatus: positive, negative) \times 3 (Ethnicity: African American, Latina, European American) analyses of variances (ANOVAs) revealed significant main effects of ethnicity on age, $F(2, 347) = 4.81, p < .001$, education, $F(2, 3487) = 36.15, p < .001$, and income $F(2, 347) = 13.45, p < .001$. The European American women were older, had higher levels of education, and reported higher incomes than the African American and Latina women. In terms of personal relationships, as Table 1 shows, European American and Latina women were more likely to be living with their relationship partners and more likely to be married than African American women.

Two (HIV serostatus) \times 3 (Ethnicity) ANOVAs of the psychological variables showed a main effect for ethnicity on the use of avoidance coping, $F(2, 347) = 6.54, p < .01$ and problem-solving coping, $F(2, 347) = 4.54, p < .05$. Latinas showed the highest levels of avoidance coping and the lowest levels of problem-solving coping, followed by African American women and European American women. The ANOVAs were repeated using education as a covariate (i.e., ANCOVAs) because of its associa-

tion with HIV status, and the significant effect of ethnicity dropped out, suggesting that problems of lower social class as assessed by education may elicit avoidance coping. There was also a significant main effect for HIV status on use of avoidance coping, $F(1, 348) = 12.76, p < .001$, with HIV-seropositive women using more avoidance coping. There were main effects of HIV status, $F(1, 348) = 7.12, p < .01$, and ethnicity, $F(2, 347) = 7.10, p < .01$, on social support, such that HIV-seronegative and African American women reported more social support. No significant main effects or interactions for ethnicity or HIV status on social support, coping or optimism were found.

Chronic Burden. We first conducted a multivariate analysis of covariance (MANCOVA) with education as a covariate and HIV and Ethnicity as fixed factors. Hotelling's Trace statistic showed significant main effects of HIV status, $F = 3.75, p < .001$, and Ethnicity, $F = 1.91, p < .01$, on chronic burden. In order to clarify the relations of HIV and ethnicity to chronic burden, we conducted follow-up 2 (HIV status) \times 3 (Ethnic group) ANCOVAs on each item of the chronic burden scale using education as a covariate. Although these multiple ANOVAs (for which no predictions were offered) have the potential to capitalize on chance leading to Type I errors, we believed that these descriptive results would provide a clearer picture of exactly what burdens these women were experiencing as a function of HIV status and ethnicity. These findings should nonetheless be interpreted with caution.

Table 2 shows means and standard deviations of each item on the chronic burden measure separately by ethnicity. Significant main effects for HIV status were found on 11 of the chronic burden items (after controlling for education). Women who were HIV-seropositive reported not having enough money to cover basic needs, not enough savings, no reliable form of transportation, more housing problems, a higher likelihood of divorce or separation, more difficulty with an employer and work responsibilities, a higher likelihood of a close other being sent to jail, greater likelihood of living in a high-crime area, and a higher likelihood of losing someone depended upon. Problems arranging child care showed a significant HIV-by-ethnicity interaction, with Latina women who were HIV-seropositive reporting the greatest child care problems. As indicated in Table 2, significant main effects for ethnicity were seen on three of the chronic burden items. Specifically, African American women were more likely to report not having enough money to cover basic needs and greater exposure to crime than Latinas and European Americans. Latinas were significantly more likely to report having immigration or citizenship problems than African Americans or European Americans.

RELATION OF CHRONIC BURDEN, ETHNICITY, HIV, AND PSYCHOSOCIAL MEASURES TO DEPRESSION

Correlations among chronic burden, the psychosocial variables, and depression were consistent with previous research. Women's reported optimism, social support, and (negatively) depression were significantly intercorrelated. Chronic burden was associated with greater depression ($r = .50, p < .01$), less optimism ($r = -.30, p < .01$), less social support ($r = -.10, p < .05$), and lower education ($r = -.11, p < .05$).

To further address the relations of serostatus and ethnicity to depression, we first conducted a 2 (HIV serostatus) \times 3 (Ethnicity) \times 2 (Time) ANCOVA with education as a covariate and time as the within subjects factor. There was a significant time-by-ethnicity-by-HIV status within subjects factor effect, $F(2, 300) = 4.05, p < .05$, and a significant main effect for HIV status, $F(1, 301) = 18.64, p < .001$. We conducted two follow-up 2 (HIV serostatus) \times 3 (Ethnicity) ANCOVAs with education as a covariate to examine mean differences in depression between the HIV-negative and HIV-positive women from the three ethnic groups at baseline and Time 1. There was a significant main effect in baseline depression for serostatus $F(1, 300) = 29.07, p < .001$, and the ethnicity-by-serostatus interaction was also significant, $F(2, 387) = 3.10, p < .01$; HIV-seropositive women were more depressed than HIV-seronegative women, and African American HIV-positive women showed the highest level of depression ($M = 20.49, SD = .79$; see Table 1).

A second 2 (HIV serostatus) \times 3 (Ethnicity) ANCOVA with education as a covariate was used to examine mean differences in depression at Time 2. Consistent with the baseline analysis, there was a significant main effect for HIV status, $F(1, 346) = 8.30, p < .01$, with HIV-positive participants showing higher levels of depression.

PREDICTORS OF CHANGE IN DEPRESSION

Hierarchical multiple regression analysis was used to predict changes over time in depressed mood from HIV status, sociodemographic characteristics, chronic burden, and psychosocial resources. To reduce problems of multicollinearity and to limit the number of variables entered in each equation, separate hierarchical regression analyses were run for each potential psychosocial moderator (social support, coping strategies, optimism). In each of the equations, the predictor variables entered in the first three steps were the same: (a) Time 1 depression, (b) HIV serostatus, and (c) education. The fourth step included chronic burden and each of the psychosocial variables separately (social support, optimism, and the three coping styles) for a total of five regression equa-

TABLE 2. Interview Questions Assessing Chronic Burden with Means for each Ethnic Group

	African American	White	Latina
	2.73 (1.17) ^a	2.19 (1.27) ^b	2.59 (1.16) ^c
1. † Not having enough money to cover the basic needs of life (food, clothing, housing).	2.95 (1.07)	2.61 (1.25)	2.77 (1.02)
2. † Not having any savings to meet problems that come up.	2.04 (1.27)	1.68 (1.15)	1.80 (1.21)
3. † No reliable source of transportation (such as car that works or reliable bus service).	1.79 (1.25)	1.44 (1.08)	1.53 (1.21)
4. † Housing problems (uncertainty about housing, problems with landlord, needing to find a new place to live).	1.31 (0.76)	1.19 (0.62)	1.42 (0.93)
5. Problems arranging child care.	1.43 (0.92)	1.35 (0.76)	1.35 (0.89)
6. † Being a caregiver for someone (taking care of someone sick, elderly, infirm).	1.58 (1.04)	1.27 (0.89)	1.49 (1.14)
7. Divorce or separation from partner.	2.13 (1.24)	2.05 (1.20)	1.75 (1.14)
8. † Long-term, unresolved conflict with someone very important to you (child, parent, lover/partner, sibling, friend).	1.25 (0.63)	1.17 (0.77)	1.25 (1.04)
9. Being fired or laid off.	1.35 (0.69)	1.19 (0.64)	1.28 (0.68)
10. Trouble with your employer (in danger of losing job, being suspended, demoted).	1.37 (0.61)	1.33 (0.93)	1.32 (0.74)
11. † Having work hours or responsibilities change for the worse.	1.51 (0.98)	1.25 (0.86)	1.36 (0.89)
12. Partner's work hours or responsibilities change for the worse.	1.68 (1.03)	2.06 (1.28)	1.76 (1.08)
13. Serious accident, injury, or new illness that happened to you or a close family member/spouse/partner/close friend.	1.51 (0.95) ^a	1.09 (0.52) ^b	1.19 (0.53) ^c
14. You or a close family member/spouse/partner/close friend were the victim of a crime or physical assault.			

1.67 (1.08)	1.71 (1.05)	1.48 (0.91)	15. † Chronic pain or restriction of movements due to injury or illness.
1.55 (1.14)	1.72 (1.09)	1.31 (0.82)	16. † Long-term medical problems.
1.06 (0.38) ^b	1.16 (0.48) ^b	1.52 (1.19) ^c	17. † Having immigration or citizenship problems either you or someone you are close to and depend on.
1.48 (1.07)	1.29 (0.83)	1.24 (0.76)	18. You or a close family member/spouse/partner/close friend was arrested or sent to jail.
1.63 (1.02)	1.54 (0.90)	1.32 (0.85)	19. Living in a high-crime area.
1.49 (1.03)	1.56 (1.00)	1.22 (0.79)	20. † Losing the help of someone you depend on (person moved, got sick, or otherwise was unavailable).
1.49 (0.87)	1.28 (0.85)	1.37 (0.91)	21. Being discriminated against because of your race, nationality, gender, sexual orientation.

^{a b c}Mean values with different superscripts are significantly different, $p < .05$. †Main effect of HIV status.

tions. Analyses were run using the total sample and each ethnic group separately. A summary of the analyses is shown in Table 3.

As Table 3 shows, baseline depression accounted for 36% of the variance for the sample as a whole. Contrary to expectation, change in depression was not significantly predicted by HIV serostatus. Because some of the women with HIV have no symptoms while others do, we conducted analyses to control for illness severity. Specifically, we compared HIV-seronegative women with two groups of HIV-seropositive women: asymptomatic HIV-seropositive women and symptomatic HIV-seropositive women with or without an AIDS diagnosis. Classification as HIV/symptomatic required the presence of at least one of the following symptoms in the last 6 months: diarrhea (1 to 6 times per week or more), night sweats (1 to 6 times per week or more), fevers (1 to 6 times per week or more), yeast infections (2 or more), weight loss of more than 10 pounds, thrush, or hairy leukoplakia. Classification as having AIDS required the presence of fewer than 200 CD4 T-cells and/or an AIDS-defining condition (e.g., toxoplasmosis, cryptococcus). Two dummy coded variables representing the three groups differing in illness severity were used in the hierarchical regression analyses instead of the HIV status variable. Consistent with the analyses controlling for HIV status, illness severity was not a significant predictor of changes in depression.

In each of the five regression equations, chronic burden was a significant predictor of changes in depression, such that those with greater burden at Time 1 showed increases in depression over time. It is notable that chronic burden predicted changes in depression after controlling for SES, given the significant relationship between these variables. Higher levels of social support predicted lower levels of depression over time, $F(2, 342) = 6.46, p < .01$ (see Table 3). The coping measures and optimism were not unique predictors of changes in depression when entered separately with chronic burden in the fourth step.

In order to test whether chronic burden predicted depression beyond the effects of HIV status, we conducted a further regression analysis in which we entered chronic burden alone in the fourth step (after depression at Time 1, HIV status, and education in separate steps), and an interaction term (chronic burden \times HIV status) as a fifth step. The interaction term significantly predicted an additional 1% of the variance, $F(1, 312) = 3.28, p < .05$, suggesting that the combination of seropositivity and multiple chronic burdens produced increases in depression over time. A plot of HIV-positive and negative participants high and low on chronic burden (median split of the centered variable) was conducted on a change score for depression (computing the difference in depression at two time periods). The slopes of the lines were consistent with the description and interpretation of the burden-by-HIV status interaction.

TABLE 3. Summary of Hierarchical Multiple Regression Analyses Predicting Changes in Depression in HIV-Seropositive and HIV-Seronegative Women from Three Ethnic Groups

Variable	Total Sample	African American	White	Latina
Step 1: Baseline Depression (Beta)	.60***	.58***	.58***	.62***
R^2_{ch}	.36***	.34***	.35***	.39***
Step 2: HIV Serostatus (Beta)	-.03	-.15	-.15	-.06
R^2_{ch}	.00	.00	.02	.01
Step 3: Education (Beta)	-.10*	-.12	.19	-.21
R^2_{ch}	.01*	.01	.01*	.04*
Step 4: Chronic Burden (Beta)	.16**	.11*	.04	.16
(EQ1) Social Support	-.10**	-.18*	-.01	-.07
R^2_{ch}	.03**	.06*	.00	.02
Step 4: Chronic Burden (Beta)	.16*	.27**	.05	.05
(EQ2) Optimism	-.12	-.10	-.03	-.27*
R^2_{ch}	.03*	.04*	.00	.05*
Step 4: Chronic Burden (Beta)	.18**	.29**	.03	.12
(EQ3) Problem-Solving Coping	-.09	-.12	-.05	-.18
R^2_{ch}	.03*	.07*	.00	.03
Step 4: Chronic Burden (Beta)	.18**	.26**	.05	.16
(EQ4) Avoidant Coping	.09	.10	.20	-.03
R^2_{ch}	.03*	.07*	.03	.02
Step 4: Chronic Burden (Beta)	.20**	.31**	.04	.18
(EQ5) Support Coping	-.11	-.16*	-.06	-.13
R^2_{ch}	.03*	.08*	.01	.02

Note. Four separate sets of regressions were conducted using the whole sample (Column 1), only African American women (Column 2), only White women (Column 3), and only Latinas (Column 4). For each set, five equations were run (EQ1-EQ5) varying step 4 (chronic burden with each of the five psychosocial variables). Beta = Standardized Beta weights for full equation. R^2_{ch} = Change in variance accounted for by variables in each step. * $p < .05$; ** $p < .01$; *** $p < .001$.

Each of the psychological resources of optimism, social support, and coping could conceptually either mediate or moderate the relationship between chronic burden and depression. In regression analyses testing for mediation, each of the previous equations (using chronic burden and each of the five psychological measures in step 4) were compared with equations using only chronic burden in the final step. There was no attenuation of the standardized beta coefficients in the equations including the psychological measures, suggesting that none of them mediated

the relationship between chronic burden and depression. To test for the potential moderating role of the psychological variables, interaction terms between the psychological measures and chronic burden were entered as a fifth step in separate regression equations (e.g., support \times chronic burden, optimism \times chronic burden). None of the interaction terms was significant.

Ethnicity Analyses. Follow-up regression equations were run for each ethnic group individually. No predictions were ventured, and these analyses are offered for descriptive insight only. Accordingly, these results are potentially subject to Type I error and should be interpreted with caution. As was true for the sample as a whole, HIV was not a significant predictor of depressed mood over time for any of the ethnic samples. In contrast to the results from the overall sample, for the African American women, education was not a significant predictor, but chronic burden, social support, and seeking social support as a coping mechanism were significant predictors of depression. After controlling for baseline depression, HIV serostatus, and education, chronic burden and social support predicted a further 6% of the variance in changes in depressed mood, $F(2, 118) = 6.34, p < .01$, among African American women, and chronic burden and support coping predicted a further 8% of the variance, $F(2, 118) = 3.20, p < .01$. Specifically, African American women with higher chronic burden, less social support, and less use of coping via social support were more depressed 6 months later. These variables were not significant predictors for either the European American or the Latina samples.

Education predicted a significant portion of variance in depressed mood for both the European American and the Latina samples. Of note was the fact that the direction of influence was different. For European American women, higher education was associated with more depressed mood, whereas for Latinas, more education was associated with less depressed mood. Optimism significantly predicted depressed mood for the Latina sample, such that higher levels of optimism were related to lower levels of depressed mood, $F(2, 75) = 3.36, p < .05$.

DISCUSSION

After responding to our manifold questions about how HIV had changed her life, one of our respondents remarked, "You know, HIV is not my biggest problem." Consistent with this remark, the results of this study present a picture of the chronic burdens faced by ethnically diverse low-income women infected with HIV. Being seropositive for HIV is a significant stressor associated with a substantially greater number of chronic burdens, affecting all aspects of life, including problems with

money, housing, work, relationships, and vulnerability to crime. The fact that these differences were found between the HIV seropositive and seronegative women after controlling for SES suggests that seropositivity may confer risk for these additional burdens. As such, HIV infection appears to increase vulnerability to depressed mood both in its own right and secondarily by expanding the range of chronic burdens to which these low-income seropositive women are vulnerable. Moreover, although HIV-seropositive women were significantly more depressed than HIV-seronegative women, change in depression over the 6-month period of the investigation was more strongly predicted by the chronic burdens these women faced. Indeed, chronic burden proved to be an important predictor of depressed mood at both time points in the study, and it interacted with HIV status: Although HIV serostatus did not predict changes in depressed mood on its own, HIV-seropositive participants who also reported higher levels of chronic burden showed the greatest increases in depressed mood.

The impact of chronic burden was especially evident for the African American sample, even after controlling for SES. Chronic burden predicted an increase in depressed mood over time among the African American women, despite the fact that they had psychosocial resources comparable to or exceeding those of the European American and Latina women. The particular stressors to which the African American women were differentially vulnerable were insufficient income and more often being victims of crime and assaults. The Latina sample showed a related vulnerability. They were significantly lower in SES than the African American and the European American women (although they were more likely to be living with a partner than the African American women, which may mitigate the effects of their personal low income). In terms of chronic stressors, the Latinas reported more problems related to immigration than the African American and the European American women and more often being victims of crime and assaults than European American women. Yet, in the Latina sample, chronic burden was not related to depressed mood, but SES was, such that the less educated women showed greater depressed mood over time. It is possible that chronic burdens were less reliably measured in this sample than was SES, because the chronic burden questions require greater facility with language than the simple report of highest year of education. In addition, the variable language employed with the Latina sample (English or Spanish) and the somewhat smaller number of Latina participants, relative to African Americans and European Americans, may have resulted in more measurement error. As a result, different patterns of predictors between the Latina and African American samples may be a function of

measurement error and noise, with both groups adversely affected by the low-SES-related burdens they face.

The relation of education to depressed mood was opposite for the Latina and European American samples, a fact which at first seems puzzling. The usual relation of SES to depression is linear, such that the lower the depression the higher one moves on the SES ladder (Gallo & Matthews, 1999). Why would high-SES women show enhanced depressed mood over time? In this sample, a substantial percentage of the women are infected with HIV, and perhaps it is the infected women at the higher levels of SES who are showing the higher levels of depressed mood. An internal analysis of the data confirms this hypothesis. Specifically, among the HIV-seronegative European American women, there was no significant change in depressed mood over time (Time 1 $M = 11.53$; Time 2, $M = 11.64$), whereas among the HIV-seropositive European American women, depressed mood increased somewhat over time (Time 1, $M = 16.47$; Time 2, $M = 17.13$). Thus, SES appears to have an U-shaped relation to depression among HIV-seropositive women.

CHRONIC BURDEN AND PSYCHOSOCIAL FACTORS

In general, the results are consistent with previous research showing that higher levels of optimism and social support and lower levels of avoidance coping style were associated with lower levels of depressed mood. Furthermore, higher levels of chronic burden were associated with lower social support and optimism and the use of more avoidant coping. Also consistent with previous research (Sarason et al., 2001), social support was inversely related to changes in depressed mood in the entire sample (although it was not a significant predictor of Latina and European Americans' depressed mood when each ethnic group was examined separately). A somewhat surprising result concerned the failure of coping and optimism (except in the Latina sample) to predict changes in depressed mood, or to moderate the effects of chronic burden and SES on changes in depressed mood. Substantial prior research has found that these and related resources moderate secondary appraisals of the ability to manage stressful events, with the result that distress may be lessened. It may be that these resources are not as plentiful and/or may not change as quickly as other factors that influence depressed mood such as severe stressors. These findings do not necessarily question the utility of such psychosocial resources, because participants higher in optimism and those using more social support as a coping strategy reported lower levels of depressed mood at each time point. Rather, in the face of the continual severe stressors that these women faced, personal psychological resources may not have been sufficient to moderate the

impact of chronic burdens and low SES. In contrast, social support did influence changes in depressed mood over time, especially for the African American women; it may be that in the face of substantial burdens posed by poor living conditions, HIV, and their combination, family and close friends become especially critical resources. Future research, especially work geared toward the design of intervention programs with women at risk for HIV, would do well to focus on these issues.

LIMITATIONS

There are limitations of the study that bear discussion. One qualification concerns the interpretation and generalizability of the findings for the Latina sample. Although considerable pains were taken to ensure that all the measures were reliably translated into Spanish, anecdotal evidence from the interviewers and lower reliability scores for the Spanish-speaking subsample suggest that the results be interpreted with caution. This point is consistent with the earlier argument that Latina participants may not have fully comprehended some of the questions, leading to a potential underestimation of the importance of the psychosocial variables, especially chronic burden, in predicting changes in depression.

In addition, the present analyses included only very general indicators of physical health. The sample was self-selected in ways potentially relevant to the relationship between psychological factors and health, because all the women had to be healthy enough to complete two lengthy interviews over a 6-month period. Thus, the results could have been influenced by clinical status or variability in clinical status at entry. The relatively short duration of this study may also have obscured the potential significance of illness severity to changes in depression over time.

CONCLUSIONS

AIDS is now one of the five leading causes of death among women ages 15 to 44, and it disproportionately strikes poor and minority women (Rosenberg & Biggar, 1998). The results of this study with a focus on understudied populations highlight the importance of SES-related chronic burdens that characterize the lives of these women and contribute to depressed mood. It also underscores the fact that although psychosocial resources, such as optimism, ways of coping, and social support may typically protect against psychological distress, they may not mitigate the relation between the chronic burdens of low SES and consequent depression in HIV-infected women. Both researchers and clinicians may gain insight from the realization that among women at risk for AIDS, HIV may not be their biggest problem.

REFERENCES

- Adler, N.E., Boyce, T., Chesney, M. A., Cohen, S., Folkman, S., Kahn, R.L., & Syme, L. S. (1994). Socioeconomic status and health: The challenge of the gradient. *American Psychologist, 49*, 15-24.
- Armor, D. A., & Taylor, S.E. (1998). Situated optimism: Specific outcome expectancies and self-regulation. In M.P. Zanna (Ed.), *Advances in experimental social psychology* (Vol. 30, pp. 309-379). New York: Academic Press.
- Avison, W. R., & Turner, R. J. (1988). Stressful life events and depressive symptoms: Disaggregating the effects of acute stressors and chronic strains. *Journal of Health and Social Behavior, 29*, 253-264.
- Carvajal, S. C., Garner, R. L., & Evans, R. I. (1998). Dispositional optimism as a protective factor in resisting HIV exposure in sexually active inner-city minority adolescents. *Journal of Applied Social Psychology, 28*, 2196-2211.
- Carver, C. S., Scheier, M. F., & Weintraub, J. K. (1989). Assessing coping strategies: A theoretically based approach. *Journal of Personality and Social Psychology, 56*, 267-283.
- Centers for Disease Control and Prevention. (2002). *HIV/AIDS surveillance report*. xxx, 2002, from <http://www.cdc.gov/hiv/stats/hasrlink.htm>.
- Chrisler, J. C., & O'Hea, E. L. (2000). Gender, culture, and autoimmune disorders. In R. M. Eisler & M. Hersen (Eds.), *Handbook of Gender, culture, and health* (pp. 321-343). Mahwah, NJ: Erlbaum.
- Crystal, S., & Kersting, R. C. (1998). Stress, social support, and distress in a statewide population of persons with AIDS in New Jersey. *Social Work in Health Care, 28*, 41-60.
- Dunkel-Schetter, C., & Bennett, T. L. (1990). Differentiating the cognitive and behavioral aspects of social support. In B. R. Sarason, I. G. Sarason, & G. R. Pierce, (Eds.), *Social support: An interactional view* (pp. 267-296). New York: Wiley.
- Folkman, S., Lazarus, R. S., Dunkel-Schetter, C., DeLongis, A., & Gruen, R. J. (1986). Dynamics of a stressful encounter: Cognitive appraisal, coping, and encounter outcomes. *Journal of Personality and Social Psychology, 50*, 992-1003.
- Gallo, L. C., & Matthews, K. A. (1999). Do negative emotions mediate the association between socioeconomic status and health? In N. E. Adler & M. Marmot, et al. (Eds.), *Socioeconomic status and health in industrial nations: Social, psychological, and biological pathways* (pp. 226-245). New York: New York Academy of Sciences.
- Goodman & Faldot (1998)
- House, J. S., Umberson, D., Landis, K. R. (1988). Structures and processes of social support. *Annual Review of Sociology, 14*, 293-318.
- Jillson-Boostrom, I. (1992). The impact of HIV on minority populations. In P. I. Ahmed (Ed.) *Living and dying with AIDS* (pp. 235-254). New York: Plenum Press.
- Kemeny, M. E. (1994). Psychoneuroimmunology of HIV infection. *Psychiatric Clinics of North America, 17*(1), 55-68.
- Kiecolt-Glaser, Glaser, Gravenstein et al. (1996).
- Lazarus, R. S. & Folkman, S. (1984). *Stress, Appraisal, and Coping*. New York: Springer.
- Lazarus, R. S., & Launier, R. (1978). Stress-related transactions between person and environment. In L. A. Pervin & M. Lewis (Eds.), *Internal and external determinants of behavior* (pp. 287-327). New York: Plenum.
- Lepore, S. J. (1997). Measurement of chronic stressors. In S. Cohen & R. C. Kessler (Eds.), *Measuring stress: A guide for health and social scientists* (pp. 102-220). New York: Oxford University Press.
- McGonagle, K. A., & Kessler, R. C. (1990). Chronic stress, acute stress, and depressive symptoms. *American Journal of Community Psychology, 18*, 681-706.

- Metts, S., Manns, H., & Kruzic, L. (1996). Social support structures and predictors of depression in persons who are seropositive. *Journal of Health Psychology, 1*, 367-382.
- Miller, G. E., & Cole, S. W. (1998). Social relationships and the progression of human immunodeficiency virus infection: A review of evidence and possible underlying mechanisms. *Annals of Behavioral Medicine, 20*(3), 181-189
- Moos, R. H., & Schaefer, J. A. (1993). Coping resources and processes: Current concepts and measures. In L. Goldberger & S. Breznitz (Eds.), *Handbook of stress: Theoretical and clinical aspects* (pp. 234-257). New York: Free Press.
- Nishanian, P., Taylor, J. M. G., Korn, E., Detels, R., Saah, A., & Fahey, J. L. (1987). Significance of quantitative enzyme-linked immunosorbent assay (ELISA) results in evaluation of three ELISAs and Western Blot tests for detection of antibodies to human immunodeficiency virus in a high-risk population. *Journal of Clinical Microbiology, 25*, 395-400.
- Pearline & Schooler (1978)
- Radloff, L. S. (1977). The CES-D Scale: A self-report depression scale for research in the general population. *Applied Psychological Measurement, 1*, 385-401.
- Repetti, R. L. (1993). The effects of workload and the social environment at work on health. In L. Goldberger, & S. Breznitz (Eds.), *Handbook of stress: Theoretical and clinical aspects* (pp. 368-385). New York: Free Press.
- Rosenberg, P. S., & Biggar, R. J. (1998). Trends in HIV incidence among young adults in the United States. *Journal of the American Medical Association, 279*, 1894-1899.
- Sarason, B. R., Sarason, I. G., & Gurung, R. A. R. (2001). Close personal relationships and health outcomes: A key to the role of social support. In B.R. Sarason, S. Duck (Eds.), *Personal relationships: Implications for clinical and community psychology* (pp. 15-41). Chichester, England: Wiley.
- Sarason, I. G., Levine, H. M., Basham, R. B., & Sarason, B. R. (1983). Assessing social support: The Social Support Questionnaire. *Journal of Personality and Social Psychology, 44*, 127-139.
- Scheier, M. F., & Carver, C. S. (1985). Optimism, coping, and health: Assessment and implications of generalized outcome expectancies. *Health Psychology, 4*, 219-247.
- Scheier, M. F., Weintraub, J. K., & Carver, C. S. (1986). Coping with stress: Divergent strategies of optimists and pessimists. *Journal of Personality and Social Psychology, 51*, 1257-1264.
- Seegerstrom, S. C., Taylor, S. E., Kemeny, M. E., & Fahey, J. L. (1998). Optimism is associated with mood, coping and immune change in response to stress. *Journal of Personality and Social Psychology, 74*, 1646-1655.
- Sikkema, K. J., Heckman, T. G., Kelly, J. A., Anderson, E. S., Winett, R. A., Solomon, L. J., et al. (1996). HIV risk behaviors among women living in low-income, inner-city housing developments. *American Journal of Public Health, 86*(8), 1123-1128.
- Sikkema, K. J., Wagner, L. I., & Bogart, L. M. (2000). Gender and cultural factors in the prevention of HIV infection among women. In R. M. Eiserl & M. Hersen (Eds.), *Handbook of gender, culture, and health* (pp. 299-320). Mahwah, NJ: Erlbaum.
- Uchino, B. N., Cacioppo, J. T., & Kiecolt-Glaser, J. K. (1996). The relationship between social support and physiological processes: A review with emphasis on underlying mechanisms and implications for health. *Psychological Bulletin, 119*, 488-531.
- Wortley, P. M., & Fleming P. L. (1997). AIDS in women in the United States: Recent trends. *Journal of the American Medical Association, 278*, 911-916.