



January 2005

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Recommended Citation

Moneyham, L., Murdaugh, C., Phillips, K. D., Jackson, K., Tavakoli, A., Boyd, M., & Vyavaharkar, M. (2005). Patterns of risk for depressive symptoms among HIV+ women in the southeastern United States. *Journal of the Association of Nurses in AIDS Care*, 16(4), 25-38.

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Patterns of Risk of Depressive Symptoms Among HIV-Positive Women in the Southeastern United States

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Depressive symptoms are a common response to HIV disease, and women appear to be at particularly high risk. The authors report results from a cross-sectional analysis of data collected from 280 rural women with HIV/AIDS in the Southeastern United States aimed at identifying risk factors of depressive symptoms. Stress theory provided a framework for identification of potential risk factors. Descriptive statistics, measures of association, and regression analyses were used to systematically identify patterns of risk. The final regression model included 22 factors that accounted for 69% of the variance in depressive symptoms. The majority of variance in depressive symptoms was accounted for by only six variables: the frequency of HIV symptoms, recent experiences of sadness/hopelessness, the availability of social support, and the use of three coping strategies: living positively with HIV, isolation/withdrawal, and denial/avoidance. The results suggest a number of intervention strategies for use with rural women with HIV/AIDS.

Key words: HIV/AIDS, women, depression, rural environments

Depression is one of the most common symptoms reported by HIV-infected individuals. Recent reports indicate that up to two-thirds of HIV-positive individuals meet the diagnostic criteria for major depression, rates that are significantly higher than those reported for other chronic conditions (Chandra, Ravi, Desai, & Subbakrishna, 1998; Walker, McGown, Jantos, & Anson, 1997).

There is evidence to suggest that certain HIV-positive subgroups may be at particularly high risk of depressive symptoms. A consistent result among the general population is that women report significantly higher rates of depressive symptoms than men

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(Blazer et al., 1985; Hudson, Miramontes, & Protilot, 2001; Walker et al., 1997; Weissman, 1987). Recent investigations of HIV-positive women (Bennetts et al., 1999; Cook et al., 2002; Hudson et al., 2001; Kaplan, Marks, & Mertens, 1997; Miles, Burchinal, Holditch-Davis, Wasilewski, & Christian, 1997; Moneyham, Sowell, Seals, & Demi, 2000; Moore et al., 1999; Morrison et al., 2002) report high rates of depressive symptoms. In the limited number of studies of depression in HIV/AIDS populations that included females, women consistently reported significantly higher levels of depressive symptoms than their male counterparts (Bennetts; Berry, 1993; McCain & Cella, 1995). Although studies of depressive symptoms have not included rural women with HIV/AIDS, evidence suggests that these women may be at particularly high risk. As many as 40% of rural women have been reported to have high levels of depressive symptoms (Berry; Blazer et al; Carwein, Sabo, & Berry, 1993; Hoyt, Conger, Valde, & Weihs, 1997; McKinney, 1998; Marx, Bollmann, Dunbar, & Jenkins, 2001). The population of rural women at greatest risk of depressive symptoms (i.e., poor, young mothers of minority status, the unemployed, and the poorly educated) is also at high risk of HIV/AIDS.

A better understanding of factors contributing to depression among rural women with HIV disease would help target women in need of additional resources and services. It could also guide the development of interventions that are predictably effective in preventing depression among this high-risk population. The authors had the opportunity to examine some of these issues in cross-sectional analysis of data from a longitudinal study of rural women with HIV disease. First, the investigators sought to identify antecedent variables (HIV-related stressors including HIV-related symptoms and function and sample background characteristics to be controlled in multivariate analyses, including sociodemographic variables and history of depression and HIV) and process variables (social support and coping) that could serve as markers of risk of depression. The hypothesis was that the level of depressive symptoms reported by rural women with HIV disease would be predicted by HIV-related stressors, social support, and coping responses. Second, the investigators sought to assess the mediating effects of coping and

social support. Another hypothesis was that social support and coping would mediate the strength of the relationship between HIV-related stressors and depressive symptoms.

Theoretical Perspective

The theoretical perspective guiding this study is from the cognitive-phenomenological model of psychological stress and coping of Lazarus and Folkman (Lazarus, 1991; Lazarus, 1999; Lazarus & Folkman, 1984), which identifies the antecedents and processes that account for individual differences in adaptational outcomes of stressful life situations. Important to the present study are those variables that mediate the relationship between the stressors posed by HIV/AIDS and the outcomes of the disease.

Stressors are defined as antecedent personal and environmental factors that increase vulnerability to psychological stress (Lazarus & Folkman, 1984). The stressors posed by HIV/AIDS that are of interest in the present study are those socioeconomic and disease-related variables that predispose individuals to depression.

Negative emotional states are major outcomes of psychological stress. The emotional state of interest in the present study is depression. As previously noted, depression is the most common symptom of psychological distress reported by HIV-infected individuals (Chandra et al., 1998). Depression is a common response to chronic long-term stress that is indicative of poor adaptation (Lazarus & Folkman, 1984).

The mediators of interest are social support and coping responses. Social support is conceptualized as one of a number of stress-resistance resources that contribute to positive adaptational outcomes (Lazarus, 1991; Lazarus, 1999; Lazarus & Folkman, 1984). Having people in one's life during a stressful episode from which one receives emotional, informational, and/or tangible support is a major factor in mediating such outcomes. It is postulated that individuals who have access to resources such as social support are more likely to be effective in managing stressful situations and less likely to experience symptoms of psychological stress (e.g., depressive symptoms). Conversely, those who are deficient in

resources such as social support are less able to manage the situation effectively and thus are more likely to experience symptoms of psychological stress (Lazarus & Folkman). There is extensive evidence that social support contributes to positive adaptational outcomes, even in the most difficult of situations, and its absence contributes to poor outcomes. For example, social support has been reported to mitigate depressive symptoms of HIV-infected individuals (Heckman, Somali, Kalichman, Franzoi, & Kelly, 1998; Hudson et al., 2001).

Social support is a complex construct that is difficult to define and measure. The general consensus is that social support is a multidimensional construct that includes the sources of support (ones in the social network who provide support), the types of support (e.g., emotional, informational, or tangible), and one's satisfaction with the support received (Thoits, 1982). There is less agreement concerning what constitutes social support, how it works, and what types of support are most effective in a particular context. Although the emphasis of research has been on the positive dimensions of social support, it is acknowledged that some attempts at support are actually perceived by the recipient to be unhelpful or negative and undesirable (Tilden & Gaylen, 1987). The desirability and potential effectiveness of different types of support depend to a great extent on the context of the situation and the type of support needed, and support may be perceived negatively when the support provided does not match the needs of the situation (Lazarus & Folkman, 1984).

Coping responses include all cognitive and behavioral strategies used by individuals to manage a stressful situation. There are two major functions of coping: (a) management of emotional distress, and (b) management of those problems causing psychological stress (Lazarus & Folkman, 1984). A number of coping strategies, primarily cognitive in nature, focus on managing one's emotional distress; such strategies are called emotion-focused coping strategies. In contrast, coping strategies that focus on managing the situation causing distress are called problem-focused coping strategies. It is postulated that the effectiveness of any one coping strategy is dependent upon the match between the strategy and what is needed in the situation (Lazarus & Folkman). In situations of chronic illness, there is extensive

evidence that problem-focused coping strategies are more effective in producing positive adaptational outcomes over the long term than emotion-focused strategies (Fleishman & Fogel, 1994; Heckman et al., 1998; Hudson et al., 2001). Similar results have been reported in studies of coping with HIV disease (Moneyham et al., 1998). As with social support, coping strategies must match the demands of the situation to be effective (Lazarus & Folkman).

A model of depressive symptoms within the context of HIV disease is shown in Figure 1. The model shows the link between antecedent variables (HIV-related stressors) and the outcome of depression. Additionally, social support and coping responses are included as process variables that serve to mediate the relationship between stressors and outcomes and account for individual differences in depressive symptoms.

Methods

The data reported here were collected in the first of three interviews of a longitudinal study of the health-related outcomes of rural women with HIV disease. The sample of 278 HIV-infected women was recruited from 10 community-based HIV/AIDS organizations serving rural areas of South Carolina, Georgia, and Alabama. The recruitment sites each provided a range of standard HIV/AIDS-specific services, including HIV testing and counseling, early intervention, case management, and treatment of persons with HIV/AIDS.

Sample

Selection criteria included: (a) residence in rural area or town with a population less than 50,000 (The U.S. Bureau of the Census, 1999); (b) age 18 or older; (c) verified HIV-positive status; (d) English-speaking; (e) no evidence of dementia verified by medical records; (f) no previous peer counseling experience; and (g) a score of 16 or higher on a measure of depressive symptoms (Center for Epidemiological Studies Depression Scale; CES-D). The cutoff point of 16 was selected because scores at this level or higher have been shown to be significantly correlated with a clinical diagnosis of depression

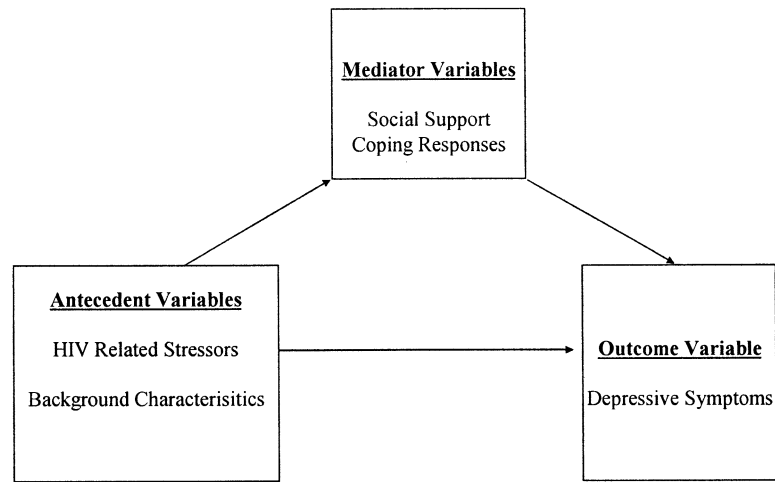


Figure 1. Model of depressive symptoms among rural women with HIV disease.

(Radloff, 1977). Only 20 (7%) of the 300 rural women screened for depressive symptoms did not meet the criteria.

Procedures

Participants were recruited by female research assistants hired from the local area who received intensive training in recruitment and interviewing techniques. Research assistants worked with staff members of cooperating agencies who distributed information about the study to potential participants. Additionally, flyers that explained the study and provided contact information for the research team were posted in cooperating agencies. With their permission, research assistants contacted those women interested in participating in the study, and an initial meeting was scheduled to explain the study procedures and to complete the process of informed consent. Those individuals completing informed consent were screened to determine whether or not they met the study inclusion criteria. Those who met the criteria were scheduled for an initial interview conducted at the participant's home or other mutually agreed upon site where privacy and confidentiality could be maintained. Research assistants read all interview questions to the participants and recorded their responses verbatim. Interviews lasted approxi-

mately 2 hours, and women were paid \$30 for their participation.

Instruments

The characteristics and psychometric properties of the measures of major study variables are summarized in Table 1. In addition to major study variables, standard sociodemographic background characteristics were assessed (age, race, education, religion, income, marital status, and so on). Additional background variables assessed included participants' history of both HIV disease and depression. History of HIV disease was assessed by three open-ended items about the length of time since the diagnosis of HIV and AIDS (if applicable) as well as hospitalizations in the past 3 months. History of depression was assessed by five open-ended items focused on family history, previous diagnosis and treatment of depression, suicidal ideation, and behaviors.

HIV symptoms. HIV symptoms were measured by the HIV Symptom Distress Scale, a 31-item Likert-type scale that measures both frequency and distress of symptoms commonly reported in HIV disease. The scale was developed from a review of the HIV literature as well as qualitative reports of persons at all stages of HIV disease (Murdaugh &

Table 1. Properties of Study Instruments

Measure	Subscales	Items (no.)	Statistics for Sample			
			Range	Mean	SD	Alpha
HIV Symptom Distress Scale	Frequency experienced	31	0-108	37.22	25.62	.94
	Distress due to symptoms	31	0-111	37.16	25.98	.94
Functional Status Questionnaire	Activities of daily living	12	0-44	36.12	7.76	.89
	Work	6	6-17	10.10	3.30	.66
Medical Outcomes Study Social Support Survey	Availability of support	19	19-95	67.49	18.35	.96
Social Support Questionnaire	Sources of support	6	0-6	5.12	1.74	.97
	Satisfaction with support	6	5-36	29.04	10.01	.97
Family Doping Project Coping Scale	Total coping	54	49-142	100.16	17.40	.87
	Living positively	9	1-27	20.96	4.74	.80
	Managing the illness	8	6-24	19.18	4.14	.78
	Seeking support family	7	0-21	12.14	5.01	.82
	Isolation/withdrawal	7	0-21	11.64	4.43	.69
	Spiritual activities	5	1-15	11.74	2.90	.76
	Seeking information	2	0-6	4.47	1.56	.65
	Denial/avoidance	6	0-18	9.32	3.90	.66
Seeking peer support	9	0-23	10.73	4.89	.67	
Centers for Epidemiologic Studies Depression Scale		20	0-56	23.66	12.61	.90

Walther, 1995). The items assess the frequency each symptom has been experienced using a 5-point response format ranging from 0 (*did not have*) to 4 (*almost constantly*). Participants also rated the degree of distress caused by each symptom experienced using a 5-point response format ranging from 0 (*not at all bothersome*) to 4 (*extremely bothersome*).

Function. Function was defined to include both daily activities and work. Function in activities of daily living was assessed with the Functional Status Questionnaire (Jette et al., 1986). The Functional Status Questionnaire provides a comprehensive assessment of physical and role functioning in ambulatory persons. The scale was designed to screen for disability and monitor clinically meaningful changes in function. The scale contains six dimensions of various levels of limitation ranging from minor to severe. However, because study participants were very unlikely to have severe functional limitations, the basic and intermediate activities of daily living

subscales were combined for a measure of daily activities. Together, the two subscales included 12 items, each measured on a 4-point scale ranging from 4 (*no difficulty doing the activity*) to 1 (*do not do because of health*). An additional response option is available for those who do not perform the activity for other reasons. Higher scores reflected higher levels of functioning.

Work function was measured by a subscale of the Functional Status Questionnaire (Jette et al., 1986) consisting of six items asking participants to rate how often their health affected their work on a 4-point scale ranging from 4 (*none of the time*) to 1 (*all of the time*). Higher scores reflected fewer limitations.

Social support. Social support was measured using two scales that together measure the three major dimensions of social support identified in the literature: the functional components (availability of different types of support), the source of support (network), and the quality of available support (e.g.,

satisfaction). The functional component of social support was measured by the Medical Outcomes Study Social Support Survey (Sherbourne & Stewart, 1991). Developed for use with chronically ill patients, the scale is designed to measure the individual's perception of the availability of support along four dimensions: emotional/informational, affectionate, tangible, and positive social interaction. The 19 items describe the different types of support, rated on a 5-point response format of how often a type of support is available if needed, with responses ranging from 1 (*none of the time*) to 5 (*all of the time*). Higher scores reflect higher levels of perceived availability.

The short form of the Social Support Questionnaire (Sarason, Sarason, Shearin, & Pierce, 1987) was used to measure both the source of support and satisfaction with social support. The short-form Social Support Questionnaire contains six items derived from the original 27-item Social Support Questionnaire (Sarason, 1983). Social support is measured in two parts. The number of available support persons is measured by asking the respondent to list up to nine people on whom they can rely for the set of circumstances described in each item. The degree of satisfaction with available support is then measured for each item using a 6-point response format ranging from 6 (*very satisfied*) to 1 (*very dissatisfied*)

Coping. Coping responses were measured by the Family Coping Project Scale (Demi, Moneyham, Sowell, & Cohen, 1997; Moneyham, Demi, Mizuno, Sowell, & Seals, 1998). The scale was developed by the principal investigator and colleagues using 516 descriptions of coping determined from 267 HIV-infected women from rural and urban areas enrolled in a longitudinal study of women's responses to HIV/AIDS. Using qualitative analysis, major categories of coping were identified, and items representing each category were developed; a 54-item scale resulted. Exploratory factor analysis using data determined with the instrument in subsequent interviews with the women generated five valid and reliable subscales: avoidance/denial, managing the illness, spiritual activities, seeking social support, and focusing on others. The construct validity of the instrument for the current sample of rural women with HIV was assessed using principal components factor analysis. Eight valid and reliable coping factors were

Table 2. Mean Depressive Symptoms by Sociodemographic Category (N = 280)

Variable/Category	%	F	Mean Depressive Symptoms
Race			
African American	84	234	23.85
Other	16	44	22.71
Age, years ^a			
18-30	22	62	23.13
31-45	52	143	23.80
>45	26	73	23.86
Education ^a			
Less than HS degree	43	119	26.38 ^d
HS degree	32	90	21.67 ^d
College/technical training	25	71	21.68 ^d
Annual household income			
<\$5,000	47	130	26.60 ^d
\$5,000-\$9,999	31	87	18.93 ^d
\$10,000 and higher	22	60	22.55 ^d
Employed full or part time			
No	77	214	24.44
Yes	23	63	21.93
Marital status			
Single ^b	83	231	23.62
Nonsingle ^c	17	46	23.89
Living situation			
Live alone	16	44	27.59 ^e
Live with others	84	233	22.92 ^e
Live in town?			
No	50	139	22.81
Yes	50	137	24.35

NOTE: HS = high school. Analysis of variance was used to assess differences in depressive symptoms among categories of each demographic variable. Significance levels reflect overall *t*-tests of difference in category means, where *p*-values are as indicated in footnotes d and e.

a. These variables are presented in categorical form here to illustrate where significant differences, if any, occurred. Multivariate analyses were conducted using the interval level measures of these variables.

b. This category includes those never married, separated, divorced or widowed.

c. This category includes those married or living with a partner.

d. $p < .001$.

e. $p < .05$.

identified for the study sample (see Table 2). Each item is rated on a 4-point response format of the frequency each strategy has been used in the past 3 months, with responses ranging from 1 (*never*) to 4 (*always*). The items that each factor is composed of are summed for a total subscale score.

Depressive symptoms. Depressive symptoms were measured using the CES-D (Radloff, 1977). The CES-D is a self-report scale designed for use in research of general populations. The 20 items reflect six components of depressive symptomatology: depressed mood, feelings of guilt and worthlessness, feelings of helplessness and hopelessness, psychomotor retardation, loss of appetite, and sleep disturbance. Respondents are asked to indicate how frequently they have experienced the symptoms in the past week. Items are rated on a 4-point response format ranging from 0 (*rarely or none of the time*) to 3 (*most or all of the time*). Scores range from 0 to 60, with higher scores indicating higher levels of depressive symptomatology. The CES-D has high internal consistency reliability ($\alpha = .90$) and has been validated in household surveys and clinical settings.

Analysis Strategy

Data were initially analyzed with descriptive statistics to determine the distribution of participants on the dependent variable (depressive symptoms), independent (antecedent) variables (HIV-related stressors and background characteristics), and mediator variables (social support and coping). Correlations and analysis of variance were used to determine which variables were significantly related to depressive symptoms and should be included in subsequent analyses. Significant background characteristic variables were included in subsequent analyses as a method of control.

Regression analysis was conducted in three stages. In the first stage, the antecedent variables that would serve as independent variables in the analyses (HIV-related stressors and sample background characteristics) were regressed on the dependent variable to determine which antecedent variables were significant predictors of depression. In the second stage, both social support and coping were regressed on HIV-related stressors. To be considered mediators of the relationship between HIV-related stressors and depressive symptoms, social support and coping must first be shown to be covariates of the independent variables. In the third stage, all antecedent and mediator variables found to be significant in Stages 1 and 2 were included in a final model with depression

as the outcome. The significance level for all analyses was set at $p \leq .05$.

Results

The demographic characteristics of the sample reflect that of the clinic populations from which the sample was drawn (see Table 2). The sample was largely single (83%), African American women (84%) living alone with their children. Forty-seven percent of the sample reported annual household incomes less than \$5,000, with 78% less than \$10,000. Half of the sample lived in a small town and half lived on rural routes. Participants ranged in age from 18 to 66 years, with a mean age of 39.75 years ($SD = 10.37$ years). Close to half of the sample (47%) had not earned a high school degree. Only a small portion of the sample (23%) was employed either full or part time.

History of Depression

Of the 300 women screened for eligibility, only 20 (7%) had depression scores less than 16 and were excluded from participation. The sample's scores for depressive symptoms ranged from 16 to 56, with a mean score of 24.05 ($SD = 12.72$). One hundred fifteen of the women (41%) reported that they had been diagnosed as depressed in the past; of those, 94 (33.8%) had been treated with medication. Only 58 participants (20.8%) reported they were currently receiving treatment for depression; of those, 53 were being treated with antidepressant medications. A much smaller number were being treated with individual counseling ($n = 15$) or group therapy ($n = 7$). Eighteen percent of the sample ($n = 51$) reported experiencing suicidal thoughts in the past 12 months, with 7% (22) reporting one or more suicide attempts in the same time period.

Relationships Among Variables

Data determination was scheduled to occur within 2 weeks of the initial screening of participants and, as expected, a few participants scored lower than 16 on the CES-D, changing the range from the initial screening (from 16 to 56) to 0 to 56. However, the

Table 3. Mean Depressive Symptoms by History of Depression and HIV (*N* = 280)

Variable	Category	%	<i>n</i>	Depressive Symptoms
History of depression				
Family member treated for depression?	No	215	78	9.22 ^a
	Yes	62	22	9.90 ^a
Subject ever diagnosed with depression?	No	166	60	20.75 ^b
	Yes	112	40	27.96 ^b
Ever stopped usual activities?	No	160	58	19.46 ^b
	Yes	118	42	29.33 ^b
Ever have serious suicidal thoughts?	No	229	82	21.80 ^b
	Yes	49	18	32.33 ^b
Ever have a suicide plan?	No	257	93	22.60 ^b
	Yes	21	7	25.62 ^b
History of HIV				
Year diagnosed HIV positive	1996-2001	149	84	22.75
	Before 1996	29	16	24.71
Year diagnosed with AIDS?	96-2001	40	71	26.58
	Before 1996	16	29	25.19
Hospitalized past 3 months?	No	231	84	22.78 ^a
	Yes	45	16	27.61 ^a

NOTE: Analysis of variance was used to assess differences in mean depressive symptoms scores among categories of each variable.

a. $p \leq .05$.

b. $p \leq .01$.

mean score for the sample remained high (mean = 23.72, $SD = 12.62$).

The results of analysis of variance of mean depressive symptoms by sociodemographic variables are reported in Table 2. Depressive symptoms varied significantly by education level, annual household income, and living situation. For education, participants with less than a high school degree reported a significantly higher level of depressive symptoms than those with a high school degree or higher education. Also, participants with household incomes less than \$5,000 per year reported significantly higher levels of depressive symptoms than those with higher incomes. Additionally, those participants living alone reported significantly higher levels of depressive symptoms than participants who lived with others.

The results of analysis of variance of depressive symptoms by history of depression and HIV are reported in Table 3. All the depression history variables were significant such that higher levels of depressive symptoms were reported by participants who also reported a family history of depression and in the past had been treated for a diagnosis of de-

pression. Additionally, there were significantly higher levels of depressive symptoms among participants who in the past 12 months had experienced periods in which they had stopped engaging in usual activities, had serious suicidal thoughts, or had a suicide plan. Also, there were significantly higher levels of depressive symptoms among participants who had made actual suicide attempts and/or had suffered injury from a suicide attempt in the past 12 months. There were no significant differences in depressive symptoms based on length of time diagnosed as HIV positive or length of time diagnosed with AIDS. However, those who reported being hospitalized in the past 3 months reported significantly higher levels of depressive symptoms than participants who had not been hospitalized. Correlations between interval level variables and depressive symptoms are reported in Table 4.

Variables positively and significantly correlated with depressive symptoms included HIV symptoms (frequency of symptoms experienced and level of distress caused by symptoms), function at work, and the use of coping strategies that included seeking support of family/friends, isolation/withdrawal, spir-

Table 4. Correlations Between Depressive Symptoms and Selected Variables

	Depressive Symptoms
HIV symptoms: frequency	.53 ^a
HIV symptoms: distress	.50 ^a
Function: activities of daily living	-.35 ^a
Function: work	.58 ^a
Availability of social support	-.31 ^a
Source of social support	-.18 ^a
Satisfaction with social support	-.13 ^a
Coping: seeking peer support	.06
Coping: living positively	-.38 ^a
Coping: managing HIV disease	-.15 ^a
Coping: seeking support of family/friends	.31 ^a
Coping: isolation/withdrawal	.50 ^a
Coping: spiritual activities	.18 ^a
Coping: denial/avoidance	.21 ^a
Coping: seeking information	-.15

a. $p < .05$.

itual activities, and denial/avoidance. In contrast, variables negatively correlated with depressive symptoms at a significant level included fewer limitations in activities of daily living, the availability of social support, the sources of social support, satisfaction with social support, and coping strategies that included living positively with HIV, managing HIV disease, and seeking information. Additionally, depressive symptoms were negatively correlated with annual household income.

Those variables found to be significantly associated with depressive symptoms in analysis of variance and correlational analyses were entered into regression analyses in several preliminary stages. First, antecedent variables including HIV-related stressors (HIV symptom distress and frequency, function in activities of daily living) and background characteristics (sociodemographic variables and history of HIV and depression) were each regressed on depressive symptoms. Those variables found to be significantly associated with depressive symptoms in analysis of variance and correlational analyses were entered into regression analyses in three preliminary stages. Two of the three HIV-related stressor variables (HIV symptom frequency and function in activities of daily living) were significant predictors of depressive symptoms; the model was significant ($p =$

.0001) and accounted for 28% of the variance in depressive symptoms. Two of the 12 background variables (feeling sad/hopeless and having suicidal thoughts in the past 12 months) were significant predictors of depressive symptoms; the model was significant ($p = .0003$) and accounted for 40% of the variance in depressive symptoms.

In the second stage of analysis, the role of social support and coping in mediating the relationship between HIV-related stressors and depressive symptoms was examined by regressing HIV-related stressors first on social support variables (availability of social support, sources of social support, and satisfaction with social support), and secondly on coping variables. In terms of social support, HIV-related stressors were significant predictors of availability of social support ($p = .003$; 6% of variance accounted for), and satisfaction with social support ($p = .0239$; 2% of variance accounted for). In terms of coping, HIV-related stressors were significant predictors of five of the seven coping variables: living positively with HIV, promoting health and managing illness, seeking support from family/friends, isolation/withdrawal, and denial avoidance ($p < .001$). HIV-related stressors accounted for 3% to 9% of variance in coping variables. Significant associations between coping variables and both the antecedent stressor variables and the outcome variable (depressive symptoms) provided support for the role of coping in mediating the relationship between antecedent and outcome variables.

In the final stage of regression analysis, all the significant variables from the previous stages were regressed on depressive symptoms. The results are reported in Table 5. Within this model, 6 of the 22 variables entered were significant predictors of depressive symptoms. The frequency of HIV symptoms, feeling sad/hopeless in the past 12 months, and coping with HIV by isolation/withdrawal and denial/avoidance were all positively associated with depressive symptoms, whereas the availability of social support and coping by living positively with HIV were both negatively associated. The model was significant ($p < .001$) and accounted for 69% of the variance in depressive symptoms.

Table 5. Regression of Antecedent and Mediator Variables on Depressive Symptoms

Variables	Variable Statistics			Model Statistics			
	Beta	Standard Error	<i>p</i>	<i>F</i>	<i>p</i>	<i>R</i> ²	Adjusted <i>R</i> ²
Antecedent variables							
HIV symptoms: frequency	0.2567	0.1257	.0494*	6.40	<.0001*	.8149	.6877
HIV symptoms: distress	-0.1794	0.1280	.1707				
Functions: activities of daily living	0.1080	0.1994	.5920				
Income < \$5,000 vs. \$5,000-\$10,000	-1.4433	2.5572	.5764				
Income < \$5,000 vs. > \$10,000	-5.9821	3.4294	.0907				
Education < HS vs. HS degree	4.3829	2.5955	.1086				
Education < HS vs. > HS degree	1.8619	2.6294	.4840				
Current living situation	1.0947	2.5477	.6703				
Family history of depression	0.8576	2.4567	.7293				
Past treatment for depression	-0.1029	3.9650	.9795				
Felt sad/hopeless past 12 months	7.4588	2.3303	.0031*				
Thoughts of suicide past 12 months	4.2502	2.9233	.1557				
Planned suicide past 12 months	-3.4027	4.1270	.4158				
Number of actual suicide attempts	4.1924	3.0751	.1823				
Suicide attempts resulted in injury	-8.3437		4.8849	.0947			
Mediator variables							
Availability of social support	-0.1844	0.0813	.0302*				
Satisfaction with available support	-0.0193	0.1579	.9035				
Coping: living positively with HIV	-1.0034	0.2953	.0018*				
Coping: promoting health/managing illness	-0.0622	0.3006	.9374				
Coping: seeking support from family and friends	0.1654	0.2885	.5705				
Coping: isolation/withdrawal	0.6472	0.2995	.0383*				
Coping: denial/avoidance	1.2028	0.3646	.0024*				

NOTE: HS = high school. Asterisk indicates significance.

Discussion

The combination of female gender, rural residence, poverty, and HIV disease creates a subpopulation within the HIV/AIDS epidemic that is at significantly high risk for depression. We conducted a series of analyses to identify a core group of variables that contribute to or mitigate against depression and account for individual differences within this subpopulation. Identification of such factors is the first step in the development of interventions that are predictably effective in both prevention and reduction of depressive symptoms for this high-risk group. Stress theory and research provide a strong foundation for identification of contextual factors that increase vulnerability to depression. Perhaps more important, stress theory and research also provide clues

to factors that contribute to stress resistance and key points for intervention.

The results of the study provide evidence supporting the significance of the problem of depressive symptoms for the population of rural women with HIV disease. Although high rates of depressive symptoms have been reported in other populations of women with HIV disease (Bennetts et al., 1999; Cook et al., 2002; Hudson et al., 2001; Kaplan et al., 1997; Miles et al., 1997; Moneyham et al., 2000; Morrison et al., 2002; Moore et al., 1999), the results suggest that the prevalence of depression among rural women with HIV disease may be much higher than for other populations of HIV positive women. Because the rate of high levels of depressive symptoms reported in the study population are much higher even than that reported among rural women in general (as high as 40%) (Berry, 1993; Hoyt et al.,

1997; Marx et al., 2001), it appears that the onset of a chronic illness such as HIV disease has a devastating effect on women already vulnerable to depressive symptoms because of the characteristics of the rural environments in which they live. Rural women with HIV disease are in double jeopardy because the population of rural women at greatest risk for depressive symptoms (i.e., poor young mothers of minority status, the unemployed, and the poorly educated) is also at high risk for HIV/AIDS.

Key to impacting the problem of depression for rural women with HIV disease is identifying points of intervention. Descriptive data are useful for identifying patterns of risk as well as for increasing understanding of factors that may serve a protective function. The results reported here are useful for identifying a risk profile that can be used to begin to identify rural women at risk for depression and interventions that are predictably effective in both preventing and decreasing depressive symptoms for this high-risk population. The most vulnerable women were those with deficiencies in antecedent resources that have been associated with psychological distress and include poverty, poor education, and inadequate social support (Bunting, 1996; Lang, 1991; Nyamathi, Flaskerud, Leake, & Chen, 1996; Pizzi, 1992; Wood, Valdez, Hayashi, & Shen, 1990). Such resources are critical to being able to effectively cope with and manage HIV disease as well as any of life's challenges. Lack of social support is particularly problematic for rural women with HIV disease, not only because of the physical characteristics of rural areas such as physical isolation and lack of transportation, but also because of conservative values and norms that intensify the stigma of HIV disease and make women reluctant to reveal their HIV status to others, even family, friends, and health care/social service providers (Berry, 1993; Bigbee, 1993; Heckman et al., 1998; Sowell & Christensen, 1996). Concerns about stigma make rural women unlikely to participate in peer support programs, and thus they are denied the opportunity to explore and learn ways of coping with the disease (Moneyham et al., 1996). It is not surprising, then, that those women who were most depressed were restricted in their strategies for coping with their HIV disease to passive means such as avoidance, denial, isolation, and withdrawal. It is

also not surprising that they also reported greater symptom distress and functional impairment.

In contrast, those women with fewer depressive symptoms were significantly different from high-symptom women in expected ways. They had higher income and education, possessed a sense of control over their HIV disease and self-advocacy skills, and reported less symptom distress and functional limitations. They also were satisfied with the support available to them. Most significantly, they were more likely to use active coping strategies to cope with HIV disease.

The results are consistent with the extensive body of research on chronic illness in which deficits in social support and the use of passive coping strategies such as avoidance, denial, isolation, and withdrawal have consistently been associated with poor outcomes, including higher mortality rates (Korniewicz, O'Brien, & Larson, 1990; Lenderking, Testa, Katzenstein, & Hammer, 1997; Lesserman, Perkins, & Evans, 1992; Nannis, Patterson, & Semple, 1997; Wong-Reiger & David, 1993). For HIV-positive rural women, however, these deficits are magnified within the combined contexts of a stigmatizing disease, poverty, and rural life. In the battle with chronic illness in which resources are the name of the game, rural women with HIV are poorly equipped. The high rate of depressive symptoms within the study sample, which is higher than that reported for any other population with HIV disease or other chronic illness, is further evidence that these women are especially vulnerable. Because the data were determined from women from 10 rural sites across the state of South Carolina and there were no significant differences in depressive symptoms across sites or between intervention/control groups at baseline, there is a level of consistency in the results that cannot be accounted for by selection bias. Even though HIV symptoms and functional impairment are also significantly associated with depressive symptoms, the relationships are mediated by social support and coping such that women with few or no HIV symptoms/functional impairment can have a high level of depressive symptoms if they are lacking social support and effective coping skills. Conversely, even those with an AIDS diagnosis can have few depressive symptoms if they have the needed support and effective coping skills.

The results inform practice and future research in several ways. The significance of the frequency of HIV symptoms for depressive symptoms raises the question of which came first, HIV symptoms or depression. Because many of the symptoms of depression and HIV are the same (e.g., fatigue), it is possible that many of the symptoms attributed to HIV disease are actually a manifestation of undiagnosed depression or vice versa. Confounding of measures of this type make it difficult to interpret the results with confidence. However, it is logical that the frequency of HIV symptoms does in fact contribute to the development of depression at some level. The result points to the need for interventions focused on symptom management. Because medications are key to symptom management, interventions promoting medication adherence are essential. However, interventions should also focus on other self-care activities for symptom management such as exercise, nutrition, and stress management strategies. Such interventions might counter the development of depressive symptoms by enhancing the individual's sense of control of the illness.

The result that recent experiences of sadness/hopelessness predicted depressive symptoms suggests that many of the participants have been depressed for an extended period of time but have never been diagnosed. Although the need for depression screening has recently been recognized by the Centers for Disease Control and Prevention and advocates for the HIV-infected, there is little evidence that any systematic approach to screening is occurring in clinical settings. Strategies for increasing depression screening for this population are needed. Also needed are interventions focused on educating HIV-infected women about depressive symptoms and their options for treatment and symptom management.

The availability of social support is a key issue in HIV disease because of the extreme stigma attached to the disease. For rural women, however, obtaining social support is further complicated by the characteristics of rural environments. Conservative values and norms serve to intensify the stigmatization of HIV disease, increasing the reluctance of HIV-infected individuals to disclose their HIV status to others, even health care and social service providers (Berry, 1993; Bigbee, 1993; Heckman et al., 1998;

Sowell & Christensen, 1996). Disclosure is essential to obtaining support (Moneyham et al., 1996). Also, lack of transportation and the necessity of traveling long distances to access supportive resources and services are key barriers to obtaining support (Berry; Bigbee; Heckman, et al.; Sowell & Christensen). A frequent complaint of health care and social service providers is that HIV support groups do not work in rural areas because most people will not attend. New approaches to providing social support to rural women with HIV disease are needed that are responsive to the barriers posed by rural environments.

Identifying coping strategies that support positive outcomes is essential to the development of interventions that use cognitive and behavioral strategies to build adaptive coping skills. The results give a clear directive for coping skills training. If we examine the coping behaviors used by those women with lower levels of depressive symptoms, key coping behaviors include focusing on, helping, or taking care of others, taking a positive view and avoiding negative thinking, and trying to carry on with life as always. Focusing outside oneself and caring for and helping others may be a way of finding meaning to HIV disease. A common refrain of women who have been successful in living a full and satisfying life despite having HIV disease is the desire to help others with HIV. Also, the ability to change one's perceptual lens to a more constructive and positive view of life's circumstances is essential to taking an active approach to managing life's problems. Carrying on as always may be a way of normalizing that allows individuals to continue to engage in and enjoy life and not allow their disease to dominate their life. The coping strategies that are a part of living positively with HIV disease can be learned, and interventions can be developed that facilitate such behaviors.

The positive association of both avoidance/denial and isolation/withdrawal to depressive symptoms was not unexpected. Negative emotional states such as depression are very uncomfortable and drive affected individuals to seek relief from the discomfort. Avoidance/denial and isolation/withdrawal are natural responses to overwhelming, uncomfortable feelings, especially when the individual feels hopeless and helpless in changing the situation or circumstances causing the distress (Lazarus & Folkman, 1984). Although such passive coping strategies can

give immediate, temporary relief, if used to the exclusion of more active, problem-directed approaches, stressful situations can be prolonged and a pattern of chronic stress can develop. The good news is that coping responses are learned behaviors, and patterns of chronic stress can be changed through interventions that support development of a broad repertoire of coping skills.

Although the results of the study serve to increase understanding of depressive symptoms as a response to HIV disease, several limitations are evident. The sample may have underrepresented those women most impaired by depressive symptoms, because they may be less likely to engage in structured research studies. Cross-sectional data only provides a snapshot of the processes involved in the generation of depressive symptoms, and a longitudinal, repeated measures approach would allow for examination of change in depressive symptoms across time, contexts, and populations. Further study is warranted to increase the depth of understanding of the variables and processes that account for differences in depressive symptoms across various subgroups of women with HIV disease.

Acknowledgment

The study was funded by a grant from the National Institute of Nursing Research, the National Institutes of Health (Grant # 1 R01 NR004956-01).

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