

Psychosocial Factors and Medication Adherence in HIV-Positive Youth

SYLVIE NAAR-KING, Ph.D.,^{1,2} THOMAS TEMPLIN, Ph.D.,³ KATHRYN WRIGHT, D.O.,¹ MAUREEN FREY, Ph.D., R.N.,⁴ JEFFREY T. PARSONS, Ph.D.,⁵ and PHEBE LAM, M.A.¹

ABSTRACT

The purpose of this study was to test variables consistently identified in the adult HIV literature as predictors of adherence (self-efficacy, social support, and psychological distress) in a sample of 24 HIV-positive youth (ages 16–24). Self-efficacy and psychological distress were significantly correlated with adherence but social support was not. Social support specific to taking medications was correlated with self-efficacy. In regression analysis, both self-efficacy and psychological distress were independently related to adherence and together accounted for 47% of the variance. Results suggest the potential of mental health interventions that boost self-efficacy and reduce psychological distress but require replication with larger samples.

INTRODUCTION

ABETTER UNDERSTANDING of the pathogenesis of HIV and viral activity has suggested that for highly active antiretroviral therapy (HAART) regimens to be effective, nearly perfect adherence is necessary to minimize viral load and prevent drug resistance.¹ Nonadherence has public health implications as well. High viral load increases the likelihood of transmission during risky behavior,² and non-adherent individuals may be more likely to transmit drug resistant strains of virus.³

The few published studies of adherence in HIV-positive adolescents and young adults, hereafter referred to as youth, suggest adherence patterns that are inadequate to effectively manage the disease.⁴ An understanding of the

psychosocial factors associated with nonadherence is necessary to inform interventions to improve self-care and health outcomes in this vulnerable population.

In a review of the empirical literature on HIV-positive adults,⁵ psychosocial factors consistently associated with poor adherence were low self-efficacy, limited social support, and psychological distress. Substance abuse, knowledge and beliefs about medications, depression, and patient-provider relationships were inconsistent predictors of adherence. Few studies have addressed these factors in HIV-positive youth. Adherence to HAART was investigated in the REACH study,⁴ the first large-scale disease progression study of HIV-positive adolescents infected through sexual behavior or injection drug use. The study assessed rela-

¹The Carmen & Ann Adams Department of Pediatrics, ²Department of Psychiatry, ³Department of Nursing, Wayne State University, Detroit, Michigan.

⁴Department of Nursing Administration, Children's Hospital of Michigan, Detroit, Michigan.

⁵Hunter College and the Graduate School of the City University of New York, Department of Psychology, New York, New York.

tionships between mental health symptoms, social support, and adherence to antiretroviral medication. Only mental health symptoms, namely depression, were significantly related to nonadherence in this study. Self-efficacy has not been studied in relation to adherence in HIV-positive youth. Furthermore, REACH subjects were predominantly female (74%) and somewhat younger (ages 12–18) than other clinical samples of HIV-positive youth.⁶

The purpose of the present study was to replicate findings in the adult HIV adherence literature in a clinical sample of HIV+ youth (ages 16–24). We hypothesized that youth with low levels of self-efficacy, low levels of social support, and high levels of psychological distress would be more likely to be non-adherent to HIV medications.

MATERIALS AND METHODS

Study population

Youth were participants in a larger clinical trial investigating the efficacy of a motivational intervention in improving health risk behaviors in HIV-positive youth. Baseline data were used in the current study. For the clinical trial, 88 youth, ages 16–25, English-speaking, and without a thought disorder were recruited from an adolescent HIV clinic within a tertiary care children's hospital located in a major metropolitan area. Eleven youth (13%) refused to participate due to time constraints or lack of interest in participating in an intervention. Thirteen (15%) agreed to participate but did not complete data collection before the study was closed to enrollment. The full sample in the larger trial consisted of 65 participants (72% of the 88 who were study eligible). Ages ranged from 16 to 25 ($M = 21$ years). The current study included all youth who were prescribed medications ($n = 24$; 38% of the 65 participants). Of these 24 youth, 38% were male and 62% female. Ages ranged from 16 to 24 ($M = 21$ years). The majority (79%) was infected through sexual contact, and the remainder were perinatally infected. The sample was 88% African American and 12% of mixed ethnicity. More than half of the sample (58%) had less than a high school education.

Procedures

Youth were referred by their clinical care team. The protocol was approved by the university's Institutional Review Board (IRB). Informed consent was obtained from all participants, and a waiver of parental consent was permitted by the IRB for youth under the age of 18. A certificate of confidentiality was obtained from the National Institutes of Health. Baseline assessments were completed immediately after consent or at a mutually agreed upon time. Youth were assured that their responses would be kept confidential from members of the treatment team. Questionnaires were self-administered unless reading difficulties required that the research assistant read questionnaires. Participants received \$25.00 for their time.

Study variables

Medication adherence. Youth rated the percentage of the time they took their medications, took all their doses, and took medications according to instructions in the past month and in the past 3 months. These six items are averaged for a summary adherence score. The measure has been successfully piloted with a pediatric HIV sample⁷ as well as with the current population. Youths also completed module 1 of the Adolescent Adherence Questionnaire developed by the Pediatric AIDS Clinical Trials Group. Module 1 asks the number of missed doses of each medication over the last three days. These two measures were averaged for subsequent analyses. To corroborate adherence reports, viral load was obtained from flow cytometry in the local Clinical Immunology Laboratory, certified by the AIDS Clinical Trials Group. If viral load had been obtained in the previous month as part of clinical care, the result was gleaned from medical records and utilized instead of a new blood draw.

Self-efficacy. The construct of self-efficacy was operationalized as an individual's confidence in their ability to engage in a behavior as well as their belief in their ability to engage in the behavior in the face of situational temptation to not engage in the behavior.⁸ Self-reported confidence to take HIV medications was

measured with a scale developed during pilot work. Youth responded to three items: (1) How sure are you that you can take the right amounts of your medicine at the right times?; (2) How sure are you that you can do better with taking the right amounts of your medicine at the right times?; and (3) How sure are you that you can take the right amounts of your medicine at the right times even if you were very tempted not to? The items are rated on a five-point likert scale from very sure I can to very sure I cannot. The measure showed excellent internal consistency ($\alpha = 0.89$) in the current study. The Temptation Scale was developed in studies of medication adherence with HIV-positive adults.⁹ Youth were asked to rate how tempted they would be to miss HIV medications in 14 situations from 1 (not at all tempted) to 5 (extremely tempted). In the current study, the internal consistency of this measure was excellent ($\alpha = 0.95$). These two measures were standardized and summed to yield a single self-efficacy score.

Social support. Youth reported how much they agreed with 12 items from a shortened Social Provision Scale¹⁰ regarding their relationship with people in their lives. These items were selected during previous pilot work and showed good internal consistency within the current sample ($\alpha = 0.75$). In addition to general social support, subjects rated a single item, "There are people in my life are supportive about taking HIV medications" using the same five-point response format (strongly agree to strongly disagree).

Psychological distress. The Brief Symptom Inventory (BSI)¹¹ includes 56 items designed to measure psychological distress and symptom patterns including depression and anxiety. The

BSI has been used extensively in medical, psychiatric, and nonpatient populations.¹¹ Analyses in the present study utilized the Global Symptom Index of the Brief Symptom Inventory, which showed excellent internal consistency in the present sample (0.95).

RESULTS

Adherence scores ranges from 0 to 100% ($M = 63.3\%$, standard deviation [SD] = 43.15). Viral load ranged from undetectable to 475,000 copies (median = 15,000). Viral load was significantly correlated with adherence ($r(24) = -0.58, p < 0.01$), supporting the construct validity of the adherence measure. More than half the sample (54%) was above the clinical cut-off for the psychological distress. Table 1 shows the bivariate correlations among the primary variables. As expected, adherence was significant correlated with self-efficacy and psychological distress; however, neither general or specific social support was correlated with adherence. Social support specific to taking medications was correlated with self-efficacy. Multiple regression analysis revealed that self-efficacy (standardized beta of $t = -2.41, p < 0.01$) and psychological distress (standardized β of $-0.37, t = 3.80, p < 0.05$) each contributed unique variance to the prediction of the adherence outcome and together accounted for 47% of the variance in adherence ($F(2,23) = 11.15, p < 0.01$).

DISCUSSION

The goal of the present study was to test the psychosocial factors consistently associated with adherence in HIV-positive adults in a sample of HIV-positive youth. As in previous

TABLE 1. CORRELATIONS BETWEEN ADHERENCE AND PSYCHOSOCIAL VARIABLES

	2	3	4	5
1. Medication adherence	0.62 ^a	-0.01	0.13	-0.42 ^b
2. Self-efficacy		0.13	0.43 ^b	0.10
3. General social support			0.30	-0.08
4. Social support for taking medications				0.18
5. Psychological distress				

^aCorrelation is significant at the 0.01 level (2-tailed).

^bCorrelation is significant at the 0.05 level (2-tailed).

studies of HIV-positive youth,⁴ rates of adherence were inadequate for effective disease management and have significant individual and public health implications. As hypothesized and consistent with the adult literature, self-efficacy and psychological distress were associated with medication adherence, and together accounted for almost half the variance in adherence. Social support was not associated with adherence, but social support specific to taking medications was correlated with self-efficacy. Thus, future studies should test the mediating role of adherence self-efficacy in the relationship between social support and adherence as has been shown in HIV-positive adults.¹² The lack of significance of general social support is consistent with the one published study of HIV-positive youth.⁴

Limitations and suggestions for future research

Findings require replication in larger samples of HIV-positive youth because of the small sample size in the current study. Furthermore, this sample was drawn from a single clinic site, and generalizability to other populations of HIV-positive youth requires further study. Participants appeared honest in reporting adherence because the reported adherence was negatively associated with viral load. However, multimethod approaches to adherence measurement such as pill counts and electronic monitoring systems can lend further accuracy to adherence measurement. Despite these limitations, results suggest that interventions that boost self-efficacy (e.g., motivational interventions) and reduce emotional distress (e.g., cognitive behavioral therapy) may be beneficial for improving adherence. Parsons et al.⁹ have successfully piloted an intervention combining these two approaches with HIV-positive adults, and future studies testing such interventions with youth are warranted.

ACKNOWLEDGMENTS

This project was funded by National Institute of Drug Abuse, R21 DA14710. Special thanks to Joni Zwemer for her hard work in manuscript preparation.

REFERENCES

1. Paterson D, Swindells S, Mohr J, et al. How much adherence is enough? A prospective study of adherence to protease inhibitor therapy using MEMSCaps. Paper presented at the 6th Conference on Retroviruses and Opportunistic Infections. Chicago, IL: 1999.
2. Quinn TC, Wawer MJ, Sewankambo N, et al. Viral load and heterosexual transmission of human immunodeficiency virus type 1. Rakai Project Study Group. *N Engl J Med* 2000;342:921-929.
3. Tang J, Pillay D. Transmission of HIV-1 drug resistance. *J Clin Virol* 2004;30:1-10.
4. Murphy DA, Wilson CM, Durako SJ, Muenz LR, Belzer M; Adolescent Medicine HIV/AIDS Research Network. Antiretroviral medication adherence among the REACH HIV-infected adolescent cohort in the USA. *AIDS Care* 2001;13:27-40.
5. Ammassari A, Trotta MP, Murri R, et al. AdICoNA Study Group. Correlates and predictors of adherence to highly active antiretroviral therapy: Overview of published literature. *J Acquir Immune Defic Syndr* 2002;S15:S123-S127.
6. Rotheram-Borus MJ, Murphy DA, Kennedy M, Stanton A, Kuklinski M. Health and risk behaviors over time among youth living with HIV. *J Adoles* 2001;24:791-802.
7. Naar-King S, Frey M, Secord E, Harris M, Arfken C. Assessing adherence to treatment of pediatric HIV: The validity of parent report. *AIDS Care* (in press).
8. Velicer WF, DiClemente CC, Rossi JS, Prochaska JO. Relapse situations and self-efficacy. *Addict Behav* 1990;15:271-283.
9. Parsons JT, Rosof E, Punzalan JC, DiMaria L. Integration of motivational interviewing and cognitive behavioral therapy to improve HIV medication adherence and reduce substance use among HIV-positive men and women: Results of a pilot project. *AIDS Patient Care STDs* 2005;19:31-39.
10. Cutrona CE, Russell D. The provisions of social relationships and adaptation to stress. In: Jones WH, Perlman D, eds. *Advances in Personal Relationships*. Greenwich, CT: JAI Press, 1987:37-67.
11. Derogatis L, Spencer P. *Brief Symptom Inventory: Administration, Scoring, and Procedures Manual—I*. Baltimore: Clinical Psychometric Research, 1982.
12. Simoni JM, Frick PA, Lockhart D, & Liebovitz D. Mediators of social support and antiretroviral adherence among an indigent population in New York City. *AIDS Patient Care STD* 2002;16:431-439.

Address reprint requests to:

*Sylvie Naar-King
Pediatric Prevention Research Center
University Health Center
4201 St. Antoine
Detroit, MI 48201*

E-mail: snaarkin@med.wayne.edu