Association of Social Stress, Illicit Drug Use, and Health Beliefs with Nonadherence to Antiretroviral Therapy

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OBJECTIVE: To assess the roles of socioeconomic status, social stability, social stress, health beliefs, and illicit drug use with nonadherence to antiretroviral therapy.

DESIGN: Cross-sectional study.

SETTING: Urban hospital clinic.

PARTICIPANTS: One hundred ninety-six consecutive HIV-infected patients taking at least 1 antiretroviral medication, awaiting a visit with their primary care provider.

METHODS: Patients were interviewed while waiting for a clinic appointment and were asked to fill out a 4-part survey with questions regarding antiretroviral adherence, illicit drug use, health beliefs, and social situation. Adherence was defined as the percentage of doses taken, i.e., the number of doses taken divided by the number of doses prescribed over a 2-week interval. Univariate and multivariate logistic regressions were performed to identify factors associated with nonadherence in different patient subgroups.

MAIN RESULTS: Nonadherence to antiretroviral therapy was associated with active illicit drug use (adjusted odds ratio [AOR], 2.31; 95% confidence interval [95% CI], 1.17 to 4.58), eating fewer than 2 meals per day (AOR, 3.31; 95% CI, 1.11 to 9.92), and feeling as though pressures outside of the clinic affected patient’s ability to take antiretroviral medications as prescribed (AOR, 2.22; 95% CI, 0.99 to 4.97). In patients with a history of injection drug use, nonadherence to antiretroviral therapy was independently associated with eating fewer than 2 meals per day (AOR, 15.74; 95% CI, 1.92 to 160.4) and active illicit drug use (AOR, 4.18; 95% CI, 1.68 to 10.75). In patients without any injection drug use, nonadherence was only associated with feeling as though pressures outside of clinic affected patient’s ability to take antiretroviral medications as prescribed (AOR, 3.55; 95% CI, 1.07 to 11.76). Male-to-male sexual contact was associated with lower adherence in patients with an HIV risk factor other than injection drug use (AOR, 0.35; 95% CI, 0.13 to 0.95). A history of drug use but no illicit drug use within 6 months of the interview was not associated with an increased rate of nonadherence.

CONCLUSIONS: Although our sample size was limited and variables that are not significant in subgroup analysis may still be associated with adherence, our results suggest that correlates of nonadherence are HIV risk factor specific.

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Highly active antiretroviral therapy has been shown to reduce morbidity and mortality in HIV patients and has transformed HIV from a progressive, terminal illness into a chronic, treatable disease. Successful treatment with these medications can result in undetectable viral loads; however, strict adherence to complicated antiretroviral regimens is critical to maintaining durable viral suppression and clinical well-being. The beneficial effects of these regimens can quickly be offset by even short-term nonadherence and the development of resistant HIV. Resistant virus generates both individual and public health concerns as transmission of multi-drug-resistant strains of HIV have been reported.

Self-reported adherence to HIV therapy has been shown to range from 56% to 88%. With some regimens requiring up to a dozen pills 2 to 3 times per day and multiple side-effects, long-term adherence can be difficult for even the most compliant patient. Therefore, greater attention is now being placed on identifying risk factors for nonadherence in HIV-infected patients.

Many biomedical barriers have been linked to nonadherence to antiretroviral regimens, including depression and side-effect severity. Although some work has been done in evaluating the interaction of nonadherence with self-efficacy, lack of social support, illiteracy, and educational level, little research has looked at the effects of social and psychosocial factors and their potential interactions with nonadherence. In most studies in which socioeconomic status (SES) has been evaluated, the commonly used measures of education and current income have not fully encompassed the multiple dimensions of SES. Available resources may differ in persons with equivalent education and income because of previous debts or owning other assets, and standard measures may fail to capture variability in SES. Therefore, in this study, we attempted to evaluate material hardship and deprivation to more fully understand the effects of SES and its association with adherence to antiretroviral medication.

The changing epidemiology of HIV has resulted in more female patients and more indigent patients, and these patients are often living under great social stress and in conditions of considerable social instability. We hypothesized that social stresses differed by gender as well as HIV risk factor category. Therefore, we chose to evaluate the
impact of social stresses and social stability on nonadherence to antiretroviral medication, with stratification by gender and HIV risk factor.

METHODS

We performed a cross-sectional study of 196 consecutive patients enrolled in the Johns Hopkins University HIV Clinic between June 1, 1999 and January 15, 2000 who were taking at least 1 antiretroviral medication. No patient who was approached refused to participate in the study. Patients were approached about the study in the clinic waiting room while waiting for a visit with their primary care provider. Patients were administered a previously validated questionnaire with 3 sections regarding antiretroviral adherence, health beliefs, and alcohol, tobacco, and substance abuse.\textsuperscript{10,11} In addition, 12 questions regarding SES, social situation, and perception of social stress were administered. Finally, demographic and clinical information was also collected including age, gender, race/ethnicity, HIV risk factor, CD4 cell count, and antiretroviral drug(s) prescribed.

After obtaining informed consent, a research assistant administered the survey in a private room adjacent to the main clinical area. To increase the validity of self-report, an introduction to the survey gave “permission” to admit to nonadherence.\textsuperscript{12,13} Patients were instructed that we were investigating reasons why patients may not be able to adhere to their antiretroviral regimen, because we understood that many patients are not able to take all of their pills as prescribed. The entire survey took approximately 15 minutes and patients were compensated $5 for participating.

The research assistant interviewed patients 5 days per week, at an average of 2 patients per half-day session. This represents every clinical session in the clinic. In addition, she interviewed all new enrollees to the clinic on the day of their appointment (approximately 400 per year). Only 50% of the patients interviewed were on antiretroviral therapy at the time of the interview. Our sample comprised 196 consecutively interviewed patients who were taking at least 1 antiretroviral medication and who were longitudinally followed in our clinic, and represents a continuous effort.

For our analysis, HIV transmission risk factor was self-defined and included injection drug use (IDU), male-to-male sexual contact, and heterosexual transmission, which was defined as heterosexual activity with a known HIV-positive individual. CD4 count was defined as the CD4 count on enrollment into the clinic. Illicit drug use was defined as use of any illicit drug, injected or inhaled, and current drug use was defined as use of any illicit drug, injected or inhaled, within 6 months of the interview.

Material deprivation was evaluated with questions assessing the adequacy of resources for necessities including housing, meals, medications, or transportation in the past 90 days. The resources variable was dichotomized into having or not having adequate resources for essentials. Material deprivation was further analyzed by another variable, having access to a telephone. In addition, social stability was evaluated by the number of planned meals per day, the number of places slept in the past 90 days, the number of people residing in the household, and the length of time at that residence. Social stress was evaluated by recent incarceration, recent court appearance, responsibility for children or elders, and the patient’s perception of their outside stress.

Many of our patients live in transient housing arrangements, often in unstable living situations with extended families or with other substance abusers. Many of these patients have suggested that living with more people than a dwelling is designed to hold can increase the likelihood of nonadherence due to privacy issues with medications as well as a lack of safe place to leave their medicines; therefore, we chose to assess this factor by asking patients about the number of people living in their household.

Health beliefs were measured using 4 questions, each with a 5-point Likert scale, on the depth of belief that antiretrovirals would prevent hospitalization and HIV symptoms and would increase longevity, and that sickness would result if medications were not taken as prescribed.

Adherence rates were calculated as the percentage of doses taken—the total number of doses taken divided by the total number of doses prescribed—for each antiretroviral medication for the 2-week period prior to the interview. Adherence rates were then dichotomized into adherent (≥90% adherence for all antiretroviral medications) or nonadherent (<90% adherence with any antiretroviral medication). Adherence was defined as 90% adherent because this level of adherence has been shown to delay progression to AIDS.\textsuperscript{14}

Statistical analysis was performed using Stata 6.0 (Stata Corp., College Station, Tex). Univariate analyses to evaluate the relationship of each factor with overall adherence were done using the $\chi^2$ test for categorical variables and $t$ tests for continuous variables (age, CD4 count). All significant factors were then tested in multivariate analysis using stepwise logistic regression. Possible interaction effects between pairs of significant variables were tested by combining variables in a logistic regression analysis. Variables reaching statistical significance at the .05 level were included in the final multivariate regressions.

RESULTS

Our clinic population is predominately African American (77%) and male (69%), and the mean age at enrollment is 37 years. Injection drug use is the predominant HIV risk factor (48%). Overall demographic and clinical characteristics of the study population were very similar to those of our clinic population (Table 1). The population was predominately African American and male, with a mean age at enrollment in the clinic of 37 years. Injection drug