

# Effects of Psychosocial Issues on Medication Adherence Among HIV/AIDS Patients

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Health care providers recognize the importance of long-term adherence to antiretroviral therapy (ART) and health outcomes in HIV-infected patients. Does applying the behavioral-changing self-efficacy theory lead to improved ART adherence?

**H**IV/AIDS has been a major worldwide health problem for more than 20 years. With the remarkable success of newer antiretroviral therapy (ART) regimens and their ability to achieve durable suppression of HIV replication, HIV infection has been transformed into a chronic, manageable disease.<sup>1</sup> For patients with HIV infection in the United States, the availability of effective antiretroviral therapy has completely changed the course of this illness.

Although highly active antiretroviral therapy (HAART) has brightened the health prognosis for individuals living with HIV, early optimism concerning the widespread benefits of these medications is tempered by evidence that a substantial portion of patients does not achieve or sustain maximal reductions in viral load due to a lack of adherence to prescribed treatment.<sup>2</sup>

ART has demonstrated remarkable success in inhibiting viral replication and reducing morbidity, mortality, and overall health care costs for HIV-positive individuals, making adherence to prescribed treatment paramount.<sup>3</sup>

Factors associated with ART adherence are divided into 4 categories: demographic factors, medication-related factors (adverse effects), individual factors (mental health, substance use), and social context factors (social support, patient-provider relationship).<sup>4</sup> Although many of these factors were found to be facilitators to adherence, others were found to be barriers. Adherence to ART is regarded as the most important determinant of clinical outcomes in HIV-positive individuals.<sup>5</sup> As adherence decreases, viral load and the risk of progression to AIDS increase linearly. Nonadherence also allows the virus to resume to rapid replication and to potentially select multidrug resistant strains of HIV, thus endangering the patient's health as well as the health of the public should transmission of these multidrug-resistant strains to others occur.

To maintain virologic suppression, adherence levels of 95% are required for patients treated with HAART. However, community reports suggest that actual adherence levels are often far lower than those required for successful HAART therapies.<sup>1</sup> Several studies have shown that 40% to 60% of patients are < 90% adherent to their antiretroviral regimen.<sup>3,4</sup> This percentage creates a major challenge

for health care providers, since adherence to ART is critically important to the success of therapy.

## THEORETICAL FRAMEWORK

The foundation of this study is the theory of self-efficacy. This theory uses a logical, systematic approach to promote behavioral changes.

If the behavior of interest is adherence to HIV medications, the self-efficacy measure should focus on the challenges related to this specific behavior (knowledge, desire, ability, etc). This theory has a recurring theme that suggests self-efficacy and outcome expectations are important to an individual's willingness to succeed in changing negative health care behaviors.<sup>6</sup> It seems appropriate, therefore, to use this theory to help understand behavior and guide development of interventions to change behavior.

The development of efficacious intervention strategies to produce adherence in chronic illness depends in large part on the identification of key correlates of adherence and a comprehensive conceptualization or working model of their relationship to adherence behaviors.<sup>3</sup> All the concepts of self-efficacy can be used to better understand behavior and to guide the development of interven-

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tions to change behavior and increase medication adherence among HIV-positive individuals.

For this study, the relationship between self-efficacy and social power (expert and referent) and how the application of this relationship leads to patient adherence was examined. Figure 1 shows an expanded view of this relationship.

Referent power is outlined as a social power; therefore, an individual who has referent power is viewed as being benevolent and caring.<sup>7</sup> Referent power is further defined as individuals who have the ability to be a frame of reference and serve in the role of a significant other. Those having established referent power are then able to induce genuine internalized changes in attitude, values, and decisions.

Methods for using and retaining referent power by the health care provider are (a) giving acceptance statements, (b) talking and acting in a benevolent fashion, (c) encouraging self-disclosure to gain insight, (d) using selective positive feedback, (e) building a sense of personal responsibility, (f) eliciting commitment to taking actions necessary to complete specific recommendations, and (g) maintaining an attitude of positive regard.

Expert power is a social power that an individual brings into a relationship through education, knowledge, skills, and experience. The power comes from having a "special knowledge," such as the withholding or giving of information, which causes the outcomes to be worsened or improved.<sup>7</sup>

Self-efficacy is an individual's feelings and thoughts about his or her capability for accomplishing any given task.<sup>8</sup> Individuals possessing a strong sense of efficacy deploy their attention and effort to the demands of the situation and are spurred on to

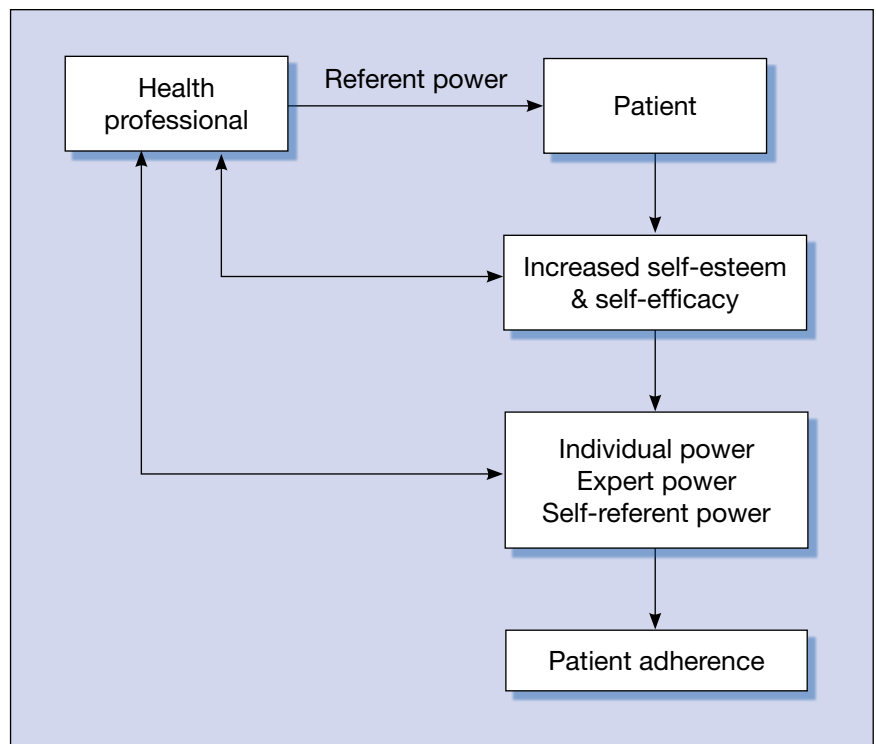


Figure 1. The application of the relationship between self-efficacy and social power, leading to patient adherence.

greater effort by obstacles.

This model works for the HIV/AIDS patient in the following ways: The health care provider brings general as well as "specialized knowledge" of the treatment for HIV/AIDS to the relationship, and the patient brings specific knowledge about his or her illness and experience with HIV/AIDS treatment to the relationship.

Because of this education effort, providing "special knowledge" regarding the condition and treatment of the condition, the patient becomes an expert. The health care provider's expert power is fostered by telling the patient about realistic expectations related to disease management. This knowledge would include information about the HIV virus, medication adverse effects, and secondary illness prevention. This information would be used to assist the patient in setting treatment goals. The health care provider demonstrates an interest in the patient's complete well-being by

focusing on all of the patient's physical and psychosocial problems. This interest indicates to the patient that the health care provider shows an unselfish willingness to provide help out of a genuine sense of caring about the patient, thus building the professional's referent power and promoting patient self-esteem and self-efficacy.

As the process and interaction between the health care provider and the patient continues, further building of expert and referent power occurs, leading to improved self-efficacy and further social-power building. As mutual respect and admiration develop between the provider and the patient, increased self-efficacy will occur. This increase in self-efficacy is why the building of the partnership "alliance" leads to improved adherence. To further assist in role modeling, education, verbal encouragement, verbal reinforcement, and exposure to other HIV/AIDS patients by participation in the monthly Detroit VA HIV/AIDS

support group, Positive Veterans, was recommended. The mission statement of the support group reads, "A social group of Veterans on a positive mission, serving as an organization to promote, support, and impact on a personal level, members of the Armed Forces community affected or infected by HIV/AIDS. This organization offers educational, referral information and support to its members."

## METHODS

A retrospective chart analysis was used to examine the relationship between the concept of adherence and the variables that affect adherence. This study assessed the role of demographic, psychosocial, social support, self-efficacy, and illness-related characteristics on adherence of 100 patients with HIV infection and adherence to ART.

Independent *t* test and correlations were used to examine measures of adherence with the sociodemographic factors (ie, sex, ethnicity, age, education, income, employment, sexual orientation, and relationship status) and medical-related variables (ie, AIDS diagnosis, time since HIV diagnosis, number of doses in the ART regimen) as well as adverse effects, substance use, and psychosocial factors.

## Sample and Setting

A convenience sample (purposive sampling) of 103 qualified patients was selected from an accessible pool of HIV-positive patients that received medical services in the last year at the VAMC in Detroit, Michigan. The study population consisted of HIV/AIDS patients receiving medical care from the infectious diseases clinic located within the Detroit VAMC.

## Measures

As a measure of adherence, viral loads were extracted from the elec-

tronic medical record (EMR) of each study participant, and actual values were recorded. Viral load was used to determine the primary measure of self-efficacy in this study. Other measures that were evaluated to determine factors that affected adherence and self-efficacy included pharmacy refill information, drug dosage and schedule, adherent to recommended follow-up provider visits, social support, pharmacological issues, and psychosocial issues. Recent HIV serum viral load levels and CD4 cell

effects the patient reported as a reason for stopping the medication. Past or present use of substances (alcohol, heroin, crack cocaine, and marijuana) was recorded and analyzed as an influencing factor on medication adherence. Mental illness was determined by reviewing the EMR. Data on participants' age, race or ethnicity, gender, transmission risk group, employment status, and other background information were collected from medical records. In addition, current medication regimens for patients were also

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counts were collected and used as measures of self-efficacy. The clinical laboratory test available at the time this study was conducted was sensitive in detecting 75 copies or more of HIV-1 RNA per milliliter of blood plasma. Viral loads are classified as either detectable (> 75 copies/mL) or undetectable (< 75 copies/mL).

Medication refill and dispensing dates were tracked through chart review of the EMR. The patients in this study received their medications from the VA system only.

To determine whether the patient was adherent to recommended follow-up clinical appointments, a review of appointment history was obtained by accessing the EMR. A list of common ART adverse effects (eg, fevers, nausea, vomiting, diarrhea, abdominal cramps, numbness or tingling in the hands or feet, rash, etc) was used to record the adverse

collected. Length of time since HIV-positive serostatus was first known and length of time since receiving an AIDS diagnosis was obtained.

Perceived social support was measured by the presence of or the availability of a close friend, main partner, or family member identified in the medical records by the study subject. This person is someone who patients previously identified as someone to share personal thoughts with, someone they trusted, or someone who expressed understanding of their health condition.

## Data Collection

A grid was developed to correspond to the variables that were extracted from patients' medical records. Social support, self-efficacy, mental illness, and substance use were the independent variables that were extracted from patients' EMR. Chart ex-

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traction was also used to examine the dependent variable components of adherence. Data analysis was done using the Statistical Package for the Social Sciences for Windows, version 16 (International Business Machines Corporation, Armonk, New York).

## RESULTS

### Description of the Sample

Self-efficacy was evaluated by comparing viral load to psychosocial factors at the .05 level of significance. The effects of demographic variables were also investigated. One hundred three charts were reviewed. Nearly all (N = 101,

aged, African American, employed veterans with identified social support.

### Psychosocial Issues

Of the 103 charts reviewed, almost two-thirds indicated no history of active drug use (N = 66, 64.1%). Of the charts indicating active drug use, marijuana was reported the most (N = 14, 13.6%), followed by cocaine (N = 9, 8.7%). Only 5 veterans reported using 3 or more illicit drugs (N = 5, 4.9%). Twenty-seven (26.2%) patients were diagnosed with hepatitis C as a result of previous or active injection drug use. Daily alcohol consumption was

HIV was 1996 (SD = 6.73). The earliest reported date of diagnosis was 1981, and 4 were reported as testing HIV positive in 2008. One-third of the charts indicated that homosexuality was the recorded risk factor (N = 34, 33%), one-third was acquired through heterosexual relationships (N = 34, 33%), and less than one-quarter from injectable drug use (N = 18, 17.4%). The number of patients on ART with suppressed viral loads (below the level of detection) and considered adherent was 65 (63.1%), and 38 (36.8%) patients had detectable viral loads. The range for those patients with viral loads above 75 was from 109 to 279,387. The T cells ranged from 1 to 1,430 (mean = 479; SD = 318).

### Medication Factors

Seventy-three study participants (70.9%) were prescribed a once-daily ART regimen, and 19 were prescribed a twice-daily regimen (18.4%). Nine patients (8.7%) were termed *non-progressors* and were not prescribed ART medication. Thirty-five patients (34%) were prescribed a daily fixed-dose regimen (3 medications within 1 pill), and 40 patients (38.8%) were on daily regimens that required taking multiple pills at one time.

### Behavioral Factors

Medication/pharmacy fill dates were consistent for more than half the patients (N = 58, 56.3%) compared with the 37 (35.9%) patients for whom medication fill times were not consistent. The 9 (8.7%) patients not on medication were excluded from this analysis. Two-thirds of the patients (N = 68, 66%) were adherent to the suggested return appointment time frame of 3 to 6 months.

Hypothesis 1: What effect does social support, self-efficacy, or psychosocial factors have on adherence?

*Individuals' beliefs about their capabilities affect what they choose to do, how much effort they put into it, how long they persevere, whether they engage in self-debilitating or self-encouraging thought patterns, and the amount of stress and depression they feel during stressful situations.*

98%) were male. More than three-quarters (N = 85, 82.5%) were African American, and 16.5% (N = 17) were white. Participants' ages ranged from 23 to 78 years with a mean of 51 years (SD = 9.45 years). The actual age of each participant was collected and then stratified into the following categories: 20 to 39 (N = 12, 11.7%), 40 to 59 (N = 70, 68.9%), and 60 to 79 (N = 20, 19.4%).

More than 75% of the charts reviewed (N = 80, 77.7%) indicated the presence of some form of social support. A family member or spouse was identified as the supportive person for 64 (62%) of the participants. More than half (N = 63, 61.2%) were actively employed. The majority of the subjects in this study were middle

reported by 6 veterans (5.8%). There were 16 patients (17.5%) who reported a history of previous alcohol dependence but no longer consume alcohol. More than half (N = 58, 56.3%) were diagnosed with some form of mental illness identified in the chart. Depression was diagnosed the most (N = 32, 31.1%), followed by anxiety (N = 10, 9.7%). Five patients (4.9%) were diagnosed with schizophrenia. Suicide was attempted in the past by 11 patients (10.7%). Of those identified as having some form of mental illness, 37 (35.9%) were being treated with antidepressants and other psychotropic drugs.

### HIV/AIDS Indicators

The mean year of diagnosis with

The independent *t* test was computed using the recoded variable of viral load as detectable or undetectable compared to social support, illicit drug use, ethanol abuse and/or use, and mental illness. There was no statistical significance found between viral load and social support or psychosocial factors that contributed to adherence. This hypothesis is rejected.

Hypothesis 2: What is the correlation between behavioral issues and ART adherence? A Pearson's correlation was used to answer this hypothesis. Viral load was positively correlated with filling of ART prescriptions ( $r = 0.58$ ;  $P = .001$ ) and returning to clinic as recommend ( $r = 0.47$ ;  $P = .001$ ). The clinical significance of this finding is that the veterans who kept scheduled appointments and refilled their medications as recommended had improved self-efficacy. Hypothesis 2 is accepted. Both *r* values for prescription refills and scheduled appointments are moderately correlated to medication adherence.

Hypothesis 3: What is the difference in drug therapy adherence in patients who are on once-daily medication vs those prescribed twice-daily medications? Pearson's correlation was calculated to answer this hypothesis. Viral load is positively correlated to dosing regimen comparing once-daily with twice-daily therapy ( $r = 0.32$ ,  $P = .001$ ) and 1-pill regimen compared with multiple pills once per day ( $r = 0.22$ ,  $P = .02$ ). Self-efficacy is positively correlated to both the number of pills and dosing schedule for ART; however, this correlation is considered low when looking at the *r* values.

## DISCUSSION

The purpose of this study was to investigate whether variables consistently identified in the adult HIV

literature (self-efficacy, social support, and psychological factors) were predictors for adherence. The study design was a retrospective chart review conducted at the VA hospital in Detroit. A total of 103 charts were reviewed. Results indicated statistical significance in adherence when patients were prescribed simplified regimens, kept their scheduled appointments, and had timely fill dates on their medications.

Like previous studies, this study found that by prescribing a once-daily, fixed-dose drug treatment regimen, adherence and overall health are improved among this population. These findings establish the importance of investigating behavioral aspects of adherence and developing interventions that may help patients more successfully benefit from AIDS treatment advances. These findings further supported the need for strategic ART dosing, even in the presence of multidrug resistance when drug selection may be limited among providers, and the continual encouragement to engage patients in their health care.

The attitudes and beliefs of HIV/AIDS patients with excellent adherence to HAART were compared with those of patients with suboptimal adherence.<sup>9</sup> This study found that the patients identified as having excellent adherence voiced the following themes when compared with the less adherent patients: (a) believed adherence rates needed to be 90% to 100% for medication efficacy, (b) trusted their primary providers greatly, (c) took medications even when actively using substances of abuse, (d) were open about their HIV status and received substantial social support, (e) cited staying healthy as their key motivator, and (f) were not actively depressed.

Individuals' beliefs about their capabilities affect what they choose to do, how much effort they put into

it, how long they persevere, whether they engage in self-debilitating or self-encouraging thought patterns, and the amount of stress and depression they feel during stressful situations.<sup>2</sup>

One patient factor that is consistently and meaningfully related to ART medication adherence is self-efficacy or confidence in one's ability to adhere to a treatment regimen in the face of challenges such as adverse effects, interference with daily activities, environmental barriers to treatment, depression, and lack of support from others.<sup>10</sup> Self-efficacy is a paramount requisite factor for health behavior change. Positive provider interactions may foster greater self-efficacy, which is associated with better adherence to medications.

Previous studies have indicated that mental illness, illicit drug use, and alcohol are major factors affecting self-efficacy and the ability to adhere to prescribed ART.<sup>10,11</sup> The results of this study showed adherence was not significantly impacted by these factors. One thought regarding possible interpretations of these results has to do with access to care. Greater access to care leads to improved health outcomes, and less access to care leads to poorer health outcomes for the HIV-infected individual. Access to care at the VAMC is not restricted by the need for prior authorization for medications, a pharmacy that does not want to shelf expensive medications, or the need for an insurance referral prior to services being rendered. However, another explanation for these negative results may be related to the small sample size and the lack of power to detect a real relationship or difference among the variables being studied or the validity of data related to drug and alcohol use among the veterans being studied. Information documented in the EMR related to the subjects' substance use patterns may

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or may not reflect what is currently being used by the veteran.

Despite the disparity of race (82% African American) and gender (98% male) identified in this study, health care providers should take a comprehensive approach to improve adherence, regardless of the race, gender, or age of the adult patient. Health care providers need to increase the patient's understanding of the disease process and assist in the removal of adherence barriers in order to improve treatment outcomes. Interventions are needed that emphasize patient understanding of HAART, integration of the regimen into the patient's daily activities, enhance patient-provider communication, and assist in problem-solving skills targeted toward adherence barriers.

Helping patients achieve and maintain a successful response to HAART takes on great significance for reasons related to both the patient's well-being and public health. If adequate viral suppression is not achieved and durability is not sustained, the patient's virus can become permanently resistant to most antiretrovirals, and subsequently, treatment efforts often fail. Thus, patients may get only "one chance" for success on these regimens. Moreover, individuals who develop drug-resistant HIV may transmit these strains to others during high-risk activities. Transmission raises the specter of a subepidemic HIV infection produced by a resistant HIV infection in which an individual who is infected by these new resistant drug strains would unlikely benefit from currently available therapy. If medical advances are to bring about full benefits for patients and for society in the "real-life" world of HIV care, it is essential to identify factors that influence HIV treatment adher-

ence and to develop approaches to promote full adherence.

As antiretroviral therapy increasingly offers the potential for prolonged survival, it is important to identify specific characteristics that may hinder efforts to adequately adhere to complex medication regimens for long periods; thus, it is prudent to implement interventions that will improve adherence. The relationship between patient and provider is seen primarily as a means to discover and apply approaches that will assist the patient to adhere to behavioral changes that will improve and maintain his or her health. Therefore, adherence can be viewed as a collaborative process designed to optimize clinical outcomes. Clinical outcomes and behavior, as they relate to adherence, is the expected area of change.

## CONCLUSION

Although this study did not look at the effects of education on adherence, it is the responsibility of health care providers to educate the HIV/AIDS patient not only about the disease, but also the medications used to treat the virus and how patients' involvement in their disease process can lead to significantly improved health outcomes. There was a statistically significant correlation between the prescribed dosing of ART, pharmacy fill dates, kept appointments, and suppression of the HIV viral load. Issues that affect medication adherence will need to be stressed to patients at each routine health care visit in order to maximize potential for success in suppressing the HIV virus. Based on the results of this study, strategies need to be developed to assist the veteran infected with HIV/AIDS to improve behaviors associated with self-efficacy, resulting in improved ad-

herence to treatment regimens and improved health outcomes. ●

## Author disclosures

The author reports no actual or potential conflicts of interest with regard to this article.

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