BEHAVIORAL MEDICINE INTERVENTIONS CAN IMPROVE THE QUALITY-OF-LIFE AND HEALTH OF PERSONS WITH HIV DISEASE[1]

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ABSTRACT

Interventions to enhance the quality-of-life and health of persons with human immunodeficiency virus (HIV) disease are becoming increasingly important as the number of people with HIV increases and as medical treatment regimens extend their life expectancy. Behavioral medicine approaches carry considerable promise for the treatment of disorders associated with HIV disease, including HIV-related nutritional disorders, pain management, sleep disorders, and treatment adherence. This article summarizes the literature on the prevalence of these disorders in HIV disease, reviews established behavioral medicine interventions for the disorders, and discusses how behavioral medicine interventions might be applied to the HIV manifestation of the disorders. Efforts to apply behavioral medicine approaches to improve life quality, alleviate sequelae of illness, and improve health outcomes in persons with HIV disease are urgently needed.

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INTRODUCTION

Since the first cases of acquired immune deficiency syndrome (AIDS) were identified in 1979, nearly 600,000 Americans have been diagnosed with the disease, and between 1 and 1.5 million persons in the United States are believed to have human immunodeficiency virus (HIV) infection (1). AIDS/HIV disease is now the leading cause of death among American men aged 18 to 45, and is the fourth leading cause of death among women in this age group (2). The HIV epidemic is global in scope; nearly 20 million people in the world are presently HIV-infected, with 38 to 110 million infections expected worldwide by the end of the decade. HIV incidence continues to grow at alarming rates in many developing countries (3). In this context, it is understandable and appropriate that most behavioral research related to HIV/AIDS has focused on the primary prevention of new infections. HIV infections are preventable through behavior change and, absent a cure, success in preventing HIV infections will always carry health, public health, and social benefits of enormous proportions.

At the same time, it is becoming clear that HIV/AIDS is now an established part of the American health landscape and will be with us for a long time. Although most public health attention to HIV and AIDS focuses on the numbers of people becoming infected and the demography of the epidemic, there have also been steady advances in medical management of HIV disease, early intervention medical regimens to forestall certain acute illness, and improved treatment for some opportunistic infections that had initially contributed to the rapid mortality of persons with HIV disease. As a result of these medical management advances and the fact that people with HIV infection are learning earlier of their status through antibody testing, individuals with HIV are living longer than just a decade ago (4,5). Interventions to enhance the quality-of-life of persons with HIV disease take on increasing importance as the number of people with HIV increase, as people learn earlier of their HIV-infected status, and as medical treatment regimens extend the life expectancy of those with HIV disease.

It has long been known that HIV infection carries a wide range of sequelae that adversely affect quality-of-life and hasten mortality. Nutritional insufficiency, weight loss, and wasting syndrome are now leading causes of health decline among persons with advanced HIV disease, whereas sleep disturbance, fatigue, pain, neuropsychological impairment, and dementia are associated with mid- and later-stage HIV disease (6,7). Many of these disorders may be amenable to behavioral medicine interventions.

Over the past several years, there has been considerable research attention directed to the study of the incidence of psychological, psychiatric, and emotional disorders in HIV disease, as well as interventions to improve adaptive coping, reduce depression, and alleviate disruptive anxiety in persons with HIV infection. Many of these important advances are reported in other articles of this special issue. However, there have been few reports in the literature of the application of behavioral medicine interventions to treat the consequences of HIV disease, which worsen the life quality and, in some cases, hasten the death of people with HIV and AIDS. This is of particular concern because behavioral medicine interventions developed for the treatment of eating disorders, pain, sleep disorders, and sequelae of other serious chronic illnesses such as cancer (8) may be of considerable benefit to persons with HIV disease. In addition, medical regimens that can extend the life and improve the life quality of people with HIV disease—as well as medical regimens that can protect others from contracting certain communicable secondary illnesses at elevated prevalence among persons with HIV, such as tuberculosis—generally require adherence to long-term treatment regimens. Enhancing patient adherence to prophylactic regimens is also a challenge for applications of behavioral medicine approaches to HIV/AIDS.

In this article, we will review four areas in which behavioral medicine research and treatment approaches can play important

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roles: adherence with secondary prevention medical regimens, as well as the treatment of HIV-associated nutritional disorders, sleep disorders, and pain. The search strategy in each of these areas for HIV-related literature included AIDSLINE (1980–1994) and PsycInfo (1990–February 1995). AIDSLINE provides comprehensive coverage of research, clinical, and policy issues about AIDS, and the data sources include MEDLINE, HEALTH, CancerLit, CATLINE, AVLINE, and the International Conference on AIDS. PsycInfo covers the professional and academic literature in psychology and related disciplines such as medicine, nursing, and pharmacology. This article will differ from the usual approach taken in review papers because there have been few behavioral medicine interventions focused on these disorders among persons with HIV disease. Consequently, for each issue and disorder, we review research on that problem as it affects people with HIV infection, briefly consider behavioral medicine approaches used successfully to treat the disorder in non-HIV contexts, and discuss clinical research strategies that might be used to identify useful treatments for the disorder among persons with HIV disease. Our objective will be to highlight roles for behavioral medicine interventions in improving life quality, alleviating sequelae of illness, and improving health outcomes in patients with HIV disease.

NUTRITIONAL DISORDERS AND WASTING

Profound weight loss, malnutrition, and depletion of body mass are extremely common and debilitating among persons with mid- to late-stage HIV disease, and wasting syndrome is one of the sequelae most often leading to death in AIDS patients. In Africa, AIDS has long been colloquially known as "thin disease" because of the chronic and progressive weight loss experienced by persons with HIV disease. The prevalence of profound weight loss increases markedly over the course of HIV illness, occurring infrequently in early stages of infection but progressively increasing in prevalence and severity in later-spectrum HIV disease. Weight loss and wasting are a frequent complication of AIDS (9,10), with weight loss less severe and less prevalent among persons who have not yet experienced major AIDS-defining opportunistic infections (11). In addition to the adverse effects of weight loss, nutritional insufficiency, and fatigue on life quality, substantial loss of body mass and wasting accelerate physical deterioration and may hasten death in those with HIV disease.

It now appears that a range of different mechanisms are related to AIDS-associated nutritional insufficiency and weight loss. Impairment in intestinal protein and caloric nutrition absorption, previously established in other immune system disorders (12), has also been identified in persons with advanced HIV disease (13). Intestinal damage due to secondary viral, parasitic, or bacterial infections, or to the effects of HIV itself, can interfere with nutritional absorption, resulting in chronic, severe wasting (14). Oral lesions, HIV-related periodontitis, and esophageal and upper gastrointestinal tract disorders complicate eating and may contribute to pain, nausea, and vomiting (15,16). Food aversion, anorexia, nausea associated with food sight and smell, and inability to swallow or hold food down worsen nutritional insufficiency in some patients (17,18), and depression contributes to weight loss in others (19).

Because HIV nutritional disorders that contribute to weight loss and wasting have varied etiologies, many of which reflect disease processes in the gastrointestinal tract itself, there is no single medical regimen for HIV-related nutritional insufficiency; medical treatments usually attempt to stimulate appetite, control nausea, and manage underlying secondary infections that contribute to mechanical and nutritional absorption problems. A number of recent clinical trials have also established benefits of steroid and testosterone treatment regimens for weight gain and in preserving or increasing body mass in some patients with advanced HIV disease (20–22). However, the prevalence of eating and nutritional disorders and the clinical importance placed on assisting patients with advanced HIV disease to maintain nutritional well-being (23) indicate that behavioral medicine paradigms used to treat eating disorders may prove useful in the maintenance of nutritional adequacy of people with HIV disease.

Established Behavioral Medicine Interventions Pertinent to Nutritional Disorders

Cognitive-behavioral interventions have long been used successfully for the treatment of anorexia nervosa and bulimia nervosa (24–26). There are obvious differences between anorexia, bulimia, and HIV-associated weight loss and eating disorders. Persons with HIV-related nutritional disorders (as opposed to anorexia or bulimia) want to maintain or increase their weight, have extreme difficulty doing so, and do not typically experience disturbance in body image, which is characteristic of the eating disorders. The inability to eat adequately or, in some cases, to avoid nausea following eating are secondary to HIV disease sequelae and are not due to intentional fasting, purging, or body image distortion. Nonetheless, elements of cognitive–behavioral interventions that promote appropriate eating in patients with anorexia or bulimia appear useful for treating HIV-related nutritional disorders. These include self-monitoring of food intake; graded daily eating assignments emphasizing frequent small-to-moderate portions of nutritious foods well-tolerated by the individual; external or self-administered reinforcement contingencies for attaining goals related to eating and maintaining or gaining weight; and cognitive–modification strategies to strengthen perceived self-efficacy of efforts to regain or maintain appropriate weight (27–29).

A large body of literature has evaluated behavioral treatments of the side effects of cancer chemotherapy and found regimens including hypnosis, muscle and imaginal relaxation, biofeedback, systematic desensitization, and attentional diversion/redirection to be efficacious in the treatment of nausea and vomiting (30). While focused on cancer chemotherapy side effects, similar intervention modalities may be beneficial for HIV-related food or taste aversions that contribute to wasting.

Application of Eating Disorder Interventions to HIV-Related Nutritional Disorders

Even though cognitive–behavioral interventions have been used to treat eating and nutritional disorders in many non-HIV contexts, we are aware of no published reports of the application of these approaches to HIV-related nutritional and eating difficulties. Nutritional disorders in persons with HIV disease are varied in their nature and etiology, and different steps are needed to treat patients with differing reasons for their nutritional insufficiency. Potential approaches to treatment are also likely to benefit from combined behavioral and medical treatment regimens. Several behavioral medicine intervention strategies appear promising and should be the subject of clinical research.

Operant- and Reinforcement-Based Interventions May Be Useful in Treating HIV-Related Anorexia and Wasting: Persons

with late-stage HIV disease often report loss of appetite, inability to eat large meals, or anticipatory nausea with respect to certain food odors, sights, or tastes. Interventions that incorporate self-monitoring of eating and goal-setting with respect to dietary intake and focus on frequent small portions of bland but high-density and nutritious food (23) with external and self-reinforcement for eating behavior goal attainment merit attention and evaluation. A functional analysis of present eating habits, dietary preferences and aversions, and stimuli (olfactory, taste, appearance, or situational) relevant to eating seems as important in developing behavioral interventions to enhance the nutritional status of patients with HIV disease as it is in developing treatments for eating disorders of other etiologies (28,29). Given the relationship between nutrition and clinical health, as well as the potential role of adjunctive medical regimens to stimulate appetite, behavioral interventions focused on eating behavior require coordination among the behavior therapist, physician, clinical nutritionist, and other allied health professionals involved in the patient's care.

Cognitive, Imaginal, and Conditioning Approaches May Assist in the Control of Nausea and Food Aversion: In addition to their role in behavioral medicine interventions for bulimia, interventions incorporating cognitive self-statements, distraction, and imaginal and muscular relaxation coping techniques may be useful in helping patients who exhibit food aversion, nausea, and other negative consequences associated with eating. These techniques have been used successfully for patients with chemotherapy-related nausea (30) and merit trials in persons with HIV disease as well. Because food aversions can be exacerbated by thoughts, smells, or tastes of certain foods, attention to food selection may constitute an important practical aspect of behavioral treatment (23).

PAIN MANAGEMENT

Pain is a symptom commonly experienced in HIV-infected patients, creating discomfort and disability that significantly affects quality-of-life. The prevalence of pain increases with disease progression, as indicated by reports that approximately 50% of hospital inpatients (31), 68% of patients at home (32), and up to 97% of patients close to death (33) suffer from pain-related syndromes. In HIV disease, the most frequently reported pain syndromes are those involving the gastrointestinal tract, headache, chest pain, back pain, and pain related to peripheral neuropathies and musculoskeletal pain (34–36).

Gastrointestinal manifestations include oropharyngeal candidiasis that occurs in up to 75% of patients (37), oral ulcerations related to herpes simplex virus, cytomegalovirus, cryptococcal infection, unknown infectious agents, esophageal symptoms of dysphagia and odynophagia (38) that may reduce food intake and exacerbate a patient's debilitated state, and abdominal pain. Headache is a frequent symptom in patients with HIV disease and may signal the presence of HIV-associated central nervous system (CNS) involvement (34,35). The potential underlying causes of headache include cerebral toxoplasmosis, cryptococcal meningitis, progressive multifocal leukoencephalopathy, or CNS lymphoma. Other causes include vascular pathology, stress, migraine, and sinus infections. Additionally, one study reported that nearly 50% of patients on zidovudine developed headache as a side effect (39). Peripheral neuropathy is the most frequently encountered neuropathy. It occurs most often in late-stage illness and has, as the predominant symptom, pain in the soles of the feet (see 34 and 35 for detailed reviews of pain syndromes and recommendations for pharmacological treatment).

The painful symptoms associated with HIV infection and its treatment have been examined in a prospective longitudinal study of HIV effects on the nervous system in relatively healthy, ambulatory men over a two-year period (34). As noted previously, painful illnesses were reported at all stages of systemic disease but were more common in late-stage disease (and in men who progressed to an advanced stage during the study period). Associations were found between multiple new pains, decreased Karnofsky scores, and higher depression scores as measured by the Brief Symptom Inventory. Pain was found to be relatively common in preterminal stages of HIV disease and associated with decreased quality-of-life. Further study of prevalence and effect of pain in HIV-infected patients is recommended.

Pain in HIV disease is often inadequately assessed and treated. Pain experienced by HIV-infected patients is typically chronic and punctuated with acute exacerbations (35). Pain is recognized as a multidimensional experience interrelating physical, affective, and cognitive dimensions of the individual's perception of pain. Brietbart (40) recommended that the optimal treatment for HIV-related pain involves pharmacological, psychological, anesthetic, and other complementary approaches. Although non-pharmacological interventions should not be used as a substitute for proper analgesic management of pain, the principles for management of cancer-related pain should be applied to HIV disease (34,35).

Established Behavioral Medicine Interventions for Pain Management

Behavioral medicine interventions, primarily cognitive and behavioral approaches, have been researched extensively in the management of pain. The non-pharmacological interventions recommended for treatment of chronic pain include cognitive therapies (e.g. distraction, imagery, pain redefinition), relaxation or self-hypnosis, contingency management, problem-solving training, communication skills training, and coping skills training (41,42). These approaches are designed to bring about changes in pain behavior through environmental management and modification of cognitive influences. For example, a recent study demonstrated that improved functioning and decreased health care utilization was associated with changes in pain-related beliefs and cognitive coping strategies implemented within a multidisciplinary treatment for chronic pain patients (43).

Behavioral medicine interventions are also recommended for cancer-related pain (44–46). For example, group therapy and hypnosis have been found to reduce pain and suffering in breast cancer patients (47) and group therapy involving relaxation, imagery, and cognitive strategies reduced pain related to bone marrow transplantation for cancer (48). Mood disturbance and pain-related beliefs, anxiety and depression, and patient perception of pain as related to disease progression have been shown to influence the experience, perception, and reporting of cancer pain (49,50). The influence of family members and the marital system in the perception and management of cancer pain has been suggested as another area for psychological intervention (51,52).

The effectiveness of cognitive–behavioral techniques in the treatment of headache pain is well-documented (53). Progressive muscle relaxation and biofeedback have been shown about equally effective in relieving headache pain, with relaxation

somewhat more effective with migraine headache and biofeedback somewhat more effective with muscle-contraction headache (54). In earlier reviews of the psychological treatment of headache (55), biofeedback procedures were helpful in reducing tension headache pain, but not more effective than other less expensive procedures such as relaxation training. In a recent meta-analytic review of clinical trials for recurrent migraine headache, combination relaxation and biofeedback were found to be as effective as chemical treatment (56).

Application of Pain Management Interventions to HIV-Related Pain Syndromes

Although cognitive–behavioral interventions have been successfully used for pain management and are recommended as a key component of a multidisciplinary approach to pain treatment, we are aware of no published reports of the application of these behavioral medicine principles to HIV-related pain syndromes. Pain syndromes may change as a function of HIV disease stage, are varied in their nature and etiology, and are sometimes adequately managed with pharmacological interventions. However, treatment approaches that combine behavioral and medical approaches are likely to be especially beneficial. Behavioral medicine interventions have been recommended for HIV-related pain syndromes and should be evaluated in clinical trials.

Interventions Involving Imagery, Relaxation, and Cognitive Strategies May Assist in the Management of Pain: Psychological interventions incorporating imagery or self-hypnosis, relaxation training, and cognitive strategies such as distraction or cognitive restructuring may be useful in reducing the pain and suffering of HIV-related pain syndromes. These behavioral medicine approaches may alter the patient's perception of pain, influence pain-related beliefs, and/or, in combination with pharmacological treatment, assist in alleviating the physical dimension of pain. Interventions for oral cavity or esophageal pain associated with food intake and nutritional consequences could be evaluated in combination with the cognitive–behavioral strategies discussed earlier to improve nutritional and eating patterns.

Interventions Involving Group Therapy, Coping Skills Training, and Cognitive–Behavioral Techniques as a Multidisciplinary Approach to Pain Management: In addition to the cognitive strategies described above, psychological interventions that also address affective influences on the perception of pain, such as depression, anxiety, family and relationship issues, and premorbid psychopathology (e.g. substance abuse and dependence, personality disorders) merit evaluation in terms of effectiveness on pain management. Clinical trials might examine the effectiveness of cognitive–behavioral interventions for pain management implemented at various stages of HIV disease to examine the effectiveness of early intervention pain management and its appropriateness at middle and later stages of HIV disease. Within a multidisciplinary approach to HIV-related pain syndromes, the patient–provider relationship also warrants evaluation because unwarranted fears (of patients and providers) and social isolation of HIV-infected patients continue to distance health care providers from patients and may impair comprehensive care and effective pain management.

Cognitive-Behavioral Techniques May Assist in the Treatment of Headache in Patients with HIV Disease: Headache has been reported as a frequent pain syndrome in HIV disease, and even though underlying causes related to CNS involvement have been identified, stress and anxiety may be contributory factors. Relaxation and biofeedback have long been shown to be effective in the treatment of headache, and they should be evaluated in the treatment of headache pain in HIV disease, particularly if underlying causes related to CNS involvement have been ruled out. However, cognitive–behavioral techniques focused on stress management and development of adaptive coping skills in combination with medical interventions may also provide additional benefit in the management of headache pain originating from CNS involvement.

SLEEP DISORDERS

A large number of studies have established the prevalence of sleep disorders among persons with HIV infection and AIDS. Between 14% and 79% of patients with HIV disease report significant sleep disturbance and exhibit elevated scores on standardized measures of sleep disorders, with the prevalence and severity of sleep difficulties more pronounced in advanced stages of HIV disease (57–59). Initially, it was believed that sleep disturbance in persons with HIV disease might be an artifact of depression, anxiety, and other psychosocial distress in response to serostatus knowledge and preoccupation with worsening health. Although some reports show that patients with advanced HIV disease and sleep disorders are also depressed (58), other investigations have established the presence of sleep disorders—including patient clinical complaints, elevated scores on sleep disturbance measures, and atypical sleep architecture—as independent of depression, anxiety, and other psychosocial causes (60–62).

The reasons why sleep disorders are prevalent in persons with HIV infection are not known, although HIV affects CNS structures that are related to sleep regulation; there are also associations between sleep and the immune system (61). Together, these influences may have a direct effect on neurological mechanisms that regulate sleep. In addition, some, but not all, investigations have found that antiviral zidovudine therapy exacerbates sleep problems in some patients (63). A variety of sleep disturbances have been described in patients with HIV infection, including delayed sleep onset, early morning awakening, nocturnal awakening, and feelings of tiredness and lack of well-being on awakening (64). Although sleep architecture studies of patients with HIV disease have not been reported extensively, those that have been conducted reveal differences between HIV-infected and control patients in distribution of wakefulness, slow-wave, and rapid eye movement (REM) sleep patterns, with these differences apparent even in asymptomatic, early-stage HIV infection (60,61). Effects of chronic and ongoing sleep disturbances among persons with HIV disease have been considered as one factor potentially contributing to feelings of tiredness, to fatigue, and to interference with daily functioning and employability (65).

In spite of the prevalence of sleep disorders in patients with HIV disease, there have been few reports on the treatment of sleep disturbances in HIV/AIDS patients. We suspect that most are treated, with varying levels of success, with medications to promote sleep. In one polysomnographic study, AIDS patients with sleep disturbance treated with flurazepam had reduced times awake at night and increased effective sleep time, but did not have improved levels of REM sleep or delta (slow wave) sleep characteristics, which are indices of sleep quality (66).

Established Behavioral Medicine Interventions for Sleep Disorders

Pharmacotherapy, usually with short-acting benzodiazepines, is the most widely used treatment for insomnia and sleep disorders; over 7% of adults report the use of some kind of sleep medication in the past year (67). However, extensive research has examined the effectiveness of non-pharmacological interventions for sleep disorders; these are often preferred because they are suitable for chronic sleep problems, do not adversely alter sleep stages, and do not present side effects such as residual daytime tiredness, tolerance, and drug dependence.

In a recent meta-analysis of 59 outcome studies evaluating psychological treatments for sleep disorders, Morin, Culbert, and Schwartz (68) categorized interventions based on their primary behavioral intervention elements. These elements included stimulus control therapies, sleep restriction therapies, relaxation approaches, paradoxical intention interventions, and sleep education. Across the 59 trials and using sleep diary data as the outcome data source, strong effects were shown for behavioral interventions on two sleep disorder target symptoms, sleep onset latency and time awake after sleep onset, with more modest effects for number of awakenings and total sleep time. The approaches producing the greatest effects—usually improvement rates of 50% to 60%—were behavioral interventions using stimulus control methods, sleep restriction, and both cognitive/imaginal and physiological/deep muscle relaxation techniques (see 68 for a detailed discussion). Although these findings confirm the effectiveness of psychological interventions to treat sleep disorders, no studies have evaluated these interventions for the treatment of sleep disorders among persons infected with HIV.

Application of Sleep Disorder Interventions to HIV-Related Sleep Problems

In the absence of evaluated trials of behavioral interventions for sleep disorders in patients with HIV and AIDS, the effects of non-pharmacological treatments for sleep disturbance are not yet known. Because the prevalence and severity of sleep disorders vary as a function of HIV disease stage, it may be that the effectiveness of behavioral interventions will depend on the patient's HIV illness stage. If HIV-related sleep disorders are due to HIV influence on CNS sleep-regulation mechanisms as opposed to psychological factors, it will be informative to learn whether behavioral treatments are effective.

There are several reasons why non-pharmalogical approaches for treating sleep disorders may particularly benefit persons with HIV disease. First, avoiding the chronic use of unnecessary medications may benefit patients who often receive many other medications for the management of HIV disease and, frequently, for the treatment of multiple secondary infections. Second, to the extent that hypnotic drugs can create residual daytime drowsiness and "hangover," they may worsen fatigue, lethargy, and difficulties in daily routines, all problems common in advanced HIV disease. Finally, persons with HIV infection frequently feel that they have little control over their health and their future. Interventions that instill feelings of control, self-efficacy, and mastery—characteristics likely to be reinforced in behavioral treatments—are likely to carry important psychological benefits for the individual in regaining a sense of control over life and health events.

TREATMENT ADHERENCE

Adherence to antiretroviral therapy, treatment and prophylaxis of opportunistic infections, and clinical drug trials are expected to impact the health outcome of persons with HIV disease. Medication adherence is typically the initial concern of health care providers in HIV/AIDS treatment adherence, although adherence to other health-related behaviors, such as mental health and substance abuse treatment, diet, and sexual risk reduction, are also significant in terms of disease progression, quality-of-life, and public health.

The research on treatment adherence in HIV disease has focused on assessment of compliance in clinical trials, adherence to tuberculosis treatment regimens, and compliance with procedures and treatment while hospitalized. In spite of this assessment attention, there have been no studies evaluating the effectiveness of interventions to improve treatment adherence in HIV disease.

The importance of compliance in clinical trials has been reviewed (69) and applied specifically to HIV clinical trials. In a review of compliance monitoring used in HIV clinical trials evaluating antiretroviral agents, Besch (69) emphasized the importance of investigating models that can predict compliance with preventive and therapeutic treatments. A recent study evaluated determinants of compliance among HIV-seropositive patients within an experimental drug protocol examining the effectiveness of zidovudine (70). Higher levels of compliance were related to social stability, greater perceived social support, increased perceived benefits of participation, and reduced perception of barriers to protocol adherence (70). Following from the Health Belief Model (71), the authors concluded that early screening and identification of participants lacking support and stability in their social environment, in combination with a supportive health care setting, should provide strategies to maximize compliance.

Adherence to tuberculosis (TB) treatment and a comparison of methods to promote completed TB screenings were evaluated in a comprehensive care setting for HIV-positive adolescents (72). Engaging adolescents to complete a two-step TB screen was less successful than providing one-step screens for both CD4 monitoring and sexually transmitted disease (STD) testing, indicating the need to simplify TB screening to a single step. However, adherence for TB treatment in these HIV-positive adolescents was complicated by their homelessness and substance use, and the authors recommended the need for innovative community outreach strategies.

Treatment non-adherence has also been documented in hospitalized AIDS patients, who were found to refuse more procedures and treatments than a control sample of leukemics (73). These authors also reported more psychiatric consultations and mental status changes in the AIDS patients. Depressive symptoms, feelings of helplessness, impaired judgment related to organic mental syndrome, and negative attitudes of the treatment staff were all cited as potential contributors to the observed non-compliance (73). However, 70% of the AIDS patients (as compared to none of the leukemics) in this study were prisoners, which may have affected compliance.

Established Behavioral Medicine Interventions for Treatment Adherence

Adherence has long been studied in behavioral medicine, particularly as it relates to treatment for chronic diseases such

as hypertension, diabetes, and heart disease as well as to disease prevention (e.g. breast cancer screening). We will consider briefly the behavioral medicine approaches used in these areas to identify predictors of treatment adherence and interventions to enhance adherence.

A review of research conducted in the 1980s on compliance with antihypertensive regimens described the extent of noncompliance, determinants of appointment-keeping and medication compliance, and intervention and measurement strategies (74). Most interventions to improve compliance have been multicomponent, primarily educational and/or behavioral, and directed at medication compliance (74). Interventions directed at social support enhancement, reminder calls, or an eight-week self-help group intervention showed improvement in medication compliance.

Interventions for enhancing adherence with medical regimens also include improving patient–provider communication and using adjunctive services. Approaches utilize behavior modification and self-management skills, graduated regimen implementation, the involvement of significant others, use of supervision, and integrating treatment regimen into the patient's normal life (75). Common to many of the successful adherence enhancement intervention programs is the active involvement of patients in their own health care and treatment planning (75).

The Medical Outcomes Study (MOS) provides an example of a longitudinal study conducted to identify antecedents of adherence to medical recommendations (76). The strongest predictor of non-adherence in patients with chronic medical diseases (hypertension, heart disease, diabetes) was non-adherence two years earlier at the beginning of the study, followed by avoidance coping, such as making oneself feel better by eating, smoking, or drinking. Patients with lower levels of adherence were those with more severe physical health symptoms and less satisfaction with the interpersonal quality and financial aspects of their medical care (76). Investigators have also established the influence of physicians' attributes and practice style on patients' adherence to medication, exercise, and diet recommendations (77). Predictors of adherence include the physician's job satisfaction, number of patients seen per week, scheduling follow-up appointments, tendency to answer patients' questions, number of tests ordered, seriousness of illness, physician specialty, and patient health distress.

Curry and Emmons (78) reviewed the theory-based research on compliance with breast cancer screening. Investigators have evaluated methods for increasing knowledge and awareness of the importance of screening, invitations or reminders for screenings, and methods to improve physician recommendations for mammography. Theories of communication, social marketing, and community organization were suggested by these investigators as potentially useful approaches for intervention development for increased compliance with breast cancer screening.

The research on treatment adherence to antihypertensive regimens, other chronic diseases, and breast cancer screening provides a foundation that can be applied to adherence in the treatment of HIV disease. Treatment adherence has also been examined in other contexts including cancer control (79) and chemotherapy (80), medication compliance among schizophrenics (81–83), oral antibiotic treatment (84), and appointment-keeping for medical services (85). Adherence in these studies is often associated with previous level of adherence, emotional status and coping skills, health beliefs and intentions, self-efficacy, substance use, and/or influence of side effects. In general, interventions have utilized behavioral reminders, contracts and commitments, and psychoeducational family programs to influence health-related beliefs and intentions.

Application of Treatment Adherence Interventions to HIV-Related Treatment Adherence

Behavioral medicine approaches for enhancing adherence to both disease-specific treatment and other health promotion behaviors have utilized cognitive–behavioral techniques, social support, and health care system approaches. To date, HIV-related treatment adherence has been examined only in AIDS clinical trials and not patient adherence to HIV-related treatment. As medical treatments evolve to increase length and quality-of-life, behavioral medicine strategies for improving adherence with these regimens should be implemented and evaluated.

Factors Associated with Treatment Adherence in HIV-Specific Domains Need to be Identified: Unlike other chronic illnesses, HIV/AIDS remains a disease that is socially stigmatized because it is associated with taboo subjects such as sex and drugs; can precipitate psychiatric comorbidity; may include even more psychosocial sequelae; and affects disproportionately disenfranchised and medically underserved subgroups including ethnic and racial minorities, inner-city women, gay men, and injection drug users. Research is needed to identify associations between HIV treatment adherence and the following: substance abuse, psychiatric comorbidity, homelessness, socioeconomic disadvantage, length of asymptomatic HIV period, HIV-related mental status changes, health care system characteristics, and the patient–provider relationship. These factors should be examined separately for antiretroviral therapy, treatment of specific opportunistic infections, prophylaxis of opportunistic infections, and promotion of other health-related behaviors.

Adherence with Antiretroviral Therapy May Be Enhanced through Cognitive–Behavioral and Communication-Focused Interventions: Due to the preventive nature of antiretroviral treatment and the sometimes conflicting reports of the medical effectiveness of the therapy, a variety of behavioral medicine interventions may be useful. Cognitive–behavioral techniques such as behavioral reminders, self-management skill training, and incorporation of antiretroviral therapy into the patient's daily routine may improve treatment adherence related to appointment-keeping and taking of medications. Interventions focused on the patient–health care provider relationship and enhanced communication to educate patients regarding toxicities and side effects, to identify health beliefs, and to address costs and benefits of treatment are recommended. The goal of such interventions should be to empower the patient and make him or her a coparticipant in medical decision-making. Social support interventions involving significant others, health care workers, or professionally-led support groups also merit evaluation. Similar interventions should be evaluated in adherence to treatment and prophylaxis of opportunistic infections such as Pneumocystis carinii pneumonia and Mycobacterium avium complex.

Interventions to Enhance Adherence with TB Screening and Treatment are Urgently Needed: Persons with HIV infection are at elevated risk for TB; in addition to its deleterious effects on the immunocompromised patient, TB is easily transmitted to

others. The importance of adherence to TB treatment is well-documented due to its contagious nature and the potential for multidrug resistant TB. Innovative community outreach interventions are needed to improve adherence in populations frequently affected by TB, primarily HIV-infected substance abusers and the homeless. Interventions may include behavioral reminders, contingency management, environmental restriction, improvement of patient–provider communication, and use of adjunct services such as methadone treatment, homeless shelters, and social services.

Cognitive–Behavioral Interventions to Improve Health Behaviors Related to HIV Disease May Be Useful in Enhancing Overall Treatment Adherence and Quality-of-Life: Sexual risk reduction, substance abuse treatment, and health promotion (e.g. exercise, cigarette smoking cessation) may be related to disease progression and quality-of-life among persons with HIV disease. These issues have not been well-addressed with HIV-infected persons.

Most research on HIV-related risk behavior change has focused on helping people to protect themselves from becoming infected with HIV. We are aware of little carefully evaluated research directed to the issue of risk behavior change among persons who are already infected, with the intent not only of protecting others from HIV but also protecting the infected person from contracting additional sexually transmitted pathogens (such as hepatitis, parasitic infections, or herpes) detrimental to the health of immunocompromised individuals. Although research indicates that most persons who know their positive HIV serostatus do make substantial behavior changes to protect others (86), some seropositive persons have difficulty enacting these steps and require assistance changing behavior to protect both others and themselves.

There have been few data regarding the value of smoking cessation, exercise, and curtailment of heavy alcohol or recreational drug use among those with HIV disease. The issue of whether—and to what extent—behavioral cofactors may influence disease course is the subject of much debate. Poor health habits undoubtedly carry the same negative consequences for persons with HIV infection as for those who are not infected, and may hasten the deleterious consequences of HIV. Smoking, for example, seems imprudent among HIV-infected persons vulnerable to pneumonia and pulmonary diseases; exercise may prove useful for stress management and perhaps immune function among those with early-stage infection (87). Research is needed to evaluate the effects of interventions to promote adherence to health promotion regimens among persons with HIV disease.

CONCLUSIONS

Most behavioral research to date on HIV and AIDS has focused on the primary prevention of HIV infection and, to a lesser extent, the identification of mental health needs of persons with HIV/AIDS. These are appropriate and important topics of study. However, there are also important roles for behavioral medicine research and practice that have received much less attention. In this article, we have addressed four behavioral medicine topics of clear pertinence to the more effective care of HIV-infected patients: nutritional disorders, pain treatment, the treatment of sleep disorders, and improving adherence to medical and health-behavior regimens. Patients with HIV disease confront other problems not discussed in this article but also potentially amenable to behavioral medicine interventions. These include neuropsychological impairment and neuropsychological rehabilitation/coping intervention approaches, substance use treatment, stress management, and treatment of stress-related traumatic disorders of persons (chiefly gay men and injection drug users) who may experience bereavement due to the loss of entire social networks to AIDS.

As we have pointed out in this review, there is compelling evidence that problems and disorders amenable to behavioral medicine interventions are associated with HIV disease, and for many of these problems, there are already established behavioral medicine treatment approaches used successfully in non-HIV contexts. It is troubling that there have been few applications of behavioral medicine interventions to the difficult health problems that adversely affect quality-of-life and perhaps the health course of patients with HIV and AIDS. Efforts to apply behavioral medicine approaches to treat sequelae of HIV disease are urgently needed.

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