Human Immunodeficiency Virus Infection, AIDS, and Smoking Cessation: The Time is Now

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Treatments for persons who are infected with human immunodeficiency virus (HIV) or who have developed AIDS have advanced to the point where death is no longer the inevitable outcome of diagnosis. Combination antiretroviral therapy has made HIV infection less of a terminal condition and more of a medically manageable chronic disease. Thus, efforts to improve the health status and quality of life of HIV-infected persons have become one of the highest treatment priorities for the next decade. Cigarette smoking is highly prevalent among HIV-infected persons, and quitting smoking would greatly improve the health status of these individuals. However, to date, no studies have evaluated the efficacy of a smoking-cessation intervention specifically tailored to this population. This article reviews the evidence and rationale for advancing smoking-cessation treatments specifically tailored to the needs of HIV-infected persons and provides recommendations for future treatment studies.

Deaths attributable to AIDS have decreased in the United States for the first time since HIV infection and AIDS were first described [1, 2]. Advances in the treatment of HIV disease in recent years, via more effective prophylactic regimens and use of HIV-specific protease inhibitors [3, 4] in combination with currently available antiretrovirals [5], have dramatically improved immune function in people infected with HIV in the United States. Thus, individuals infected with HIV are faced with the prospect of living longer, healthier, and more productive lives. Given this optimistic outlook, there is a clear need to build a stronger HIV infection care model that includes improving quality of and access to health care, global health-related behaviors, and quality of life. Intervening to help HIV-infected individuals quit smoking is one area that has not yet been systematically explored.

The overall goal of this article is to review the evidence and rationale for providing smoking-cessation interventions to HIV-infected persons. First, we review the epidemiology of smoking among HIV-infected persons and why quitting smoking would uniquely benefit this population of individuals. Third, we examine the types of smoking-cessation interventions that would be best-suited to helping HIV-infected persons quit. Finally, we offer our recommendations for advancing clinical research. This review is illustrative and, by necessity, selective in order to cover the topics of interest in this article in as succinct a fashion as possible.

The Smoking Problem

The prevalence of adult cigarette smokers in the United States is ~25% [6, 7]. Smoking increases the risk of developing various cancers and lung diseases as well as respiratory infections among the general population of smokers [8]. As a result, smoking contributes to >430,000 deaths annually in the United States and is the leading cause of preventable morbidity, mortality, and excess health costs in America [8, 9]. Quitting smoking reduces the risk of developing smoking-related diseases and decreases mortality [8].

Smoking, HIV Infection, and AIDS: Scope of the Problem

Prevalence estimates. It is important to have an estimate of the scope of any problem, and smoking prevalence appears
to be much higher among HIV-infected persons; estimates have suggested that smoking rates among them are higher than in the general population [10]. We recently collected data from several HIV outpatient-care clinics in New England and found that >70% of patients smoke, and of those smokers, 80% had not considered and were not considering quitting smoking in the near future [11]. Further evidence of the probably higher prevalence of smoking among HIV-infected individuals is found in examining factors that are known to be associated with risk of HIV infection and also with cigarette smoking. Smoking rates tend to be higher among persons of lower socioeconomic status [12, 13], among drug-abusing populations [14, 15], and among certain ethnic minority groups [16]. Given that HIV infection tends to cluster among individuals in these risk groups [17], it is reasonable to infer that smoking prevalence among HIV-infected persons who generally exhibit these sociodemographic or risk profiles is higher than in the general population.

Health risks. Smoking is associated with health problems that are unique to the population of HIV-infected persons. Increased incidences of periodontal disease [18], oral candidiasis [19, 20], oral hairy leukoplasia [21], and oral lesions [20, 22] have been associated with cigarette smoking by HIV-infected individuals. Cigarette smoking has been associated with an increased risk of developing bacterial pneumonia [19, 23–25] and may increase the risk of contracting AIDS-related spontaneous pneumothorax [26, 27]. Many AIDS-defining cancers are seen with increasing frequency among HIV-infected smokers [28]. Among individuals infected with HIV, the incidence of Kaposi’s sarcoma is higher among smokers than among nonsmokers [29], and cervical cancer is more frequently diagnosed among HIV-infected women who smoke [30]. Moreover, cancers seen in the general population are seen with increasing frequency among HIV-infected smokers [31]. The incidence of genital warts in HIV-infected women has also been linked to cigarette smoking [32]. Smoking seems to pose significant risks to pregnant HIV-infected women, in that cigarette smoking after the first trimester has been linked to a 3-fold increase in the risk of transmitting HIV infection to the infant [33].

It is unclear as to whether cigarette smoking potentiates disease progression from HIV infection to AIDS. Craib et al. [34] found no evidence to link cigarette smoking with disease progression in a cohort of 299 men. In contrast, Nieman et al. [35] reported that the progression time to AIDS was significantly reduced in HIV-infected smokers. Abbud et al. [36] found that cigarette smoking increases the susceptibility of alveolar macrophages to productive infection with HIV-1, and they suggested that smoking, as such, may enhance the progression to AIDS. Most recently, Galai et al. [37] reported that smoking cigarettes was not associated with progression to AIDS.

An additional risk factor for HIV-infected smokers is, paradoxically, the use of highly active antiretroviral therapy. Recent findings indicate that individuals who use these therapies are at increased risk for lipodystrophy [38, 39]. This point may be particularly relevant with regard to cigarette smoking among HIV-infected persons because an increase in fatty deposits in the torso could increase their risk for cardiovascular disease [40].

Finally, it has been reported that increased psychological distress is associated with cigarette smoking among HIV-infected smokers. Cigarette smoking has been found to be among 5 consistent predictors of higher rates of depression in HIV-infected individuals as they developed AIDS [41]. This finding is consistent with findings that the general population of smokers have higher levels of symptoms of depression than the population of non-smokers [42]. An increased risk of neurological disease is also associated with combined HIV disease and cigarette smoking [19], as opposed to HIV disease alone.

Smoking Cessation, HIV Infection, and AIDS

In light of the particular risks that smoking poses for HIV-infected persons, it stands to reason that quitting smoking could improve disease and health risk profiles for those who smoke [43]. This point is especially important with regard to the extended survival of persons with AIDS who are receiving combinations of antiretroviral medications [5]. However, to date, no controlled clinical research studies have been conducted that specifically target smoking cessation among HIV-infected persons. Moreover, no clinical guidelines that specifically outline smoking-cessation strategies for HIV-infected persons exist. This lack of research and clinical guidelines suggests that the following questions should be answered: what currently available, effective smoking-cessation treatments may be suited to the needs of the HIV-infected population, and what direction should future research take in this domain?

Smoking cessation in the HIV-infected population. The high prevalence of smoking among HIV-infected persons suggests that this population may have more difficulty quitting and may not have access to smoking-cessation interventions; most (80%) of them are not even motivated to quit smoking [11]. Smoking-cessation interventions designed specifically to help this population of smokers therefore need to (1) reach the majority of HIV-infected smokers by providing access to treatment, (2) provide cessation interventions of demonstrated efficacy, and (3) increase motivation to quit smoking.

Reaching HIV-infected smokers: cessation services in the HIV-specific health care setting. HIV-infected persons use more medical services as infections develop and the disease progresses [44]. Because this population now takes a large amount of medication, repeated visits are necessary to ensure adequate adherence with the medical regimen and to closely monitor side effects and disease progression [3]. Thus the health care setting provides an opportunity for providers to deliver smoking-cessation interventions to their HIV-infected patients.

Medical office-based interventions have great potential to
reach a wide range of smokers, since >70% of smokers see their physicians each year [45]. Smoking-cessation interventions delivered by a physician, even when brief, are known to be effective and can significantly increase 1-year smoking-abstinence rates [46, 47]. Furthermore, research has demonstrated that the effectiveness of physician-delivered interventions is increased when physicians are provided with training, cues, or reminders to intervene with smokers, and patients are provided with pharmacological aids, supplemental educational materials, and asked to make follow-up visits [47, 48]. Given that the number of providers delivering a message may have an important impact on outcomes [49], the addition of counseling by allied health professionals (e.g., nurses), who typically have more contact with patients, may be more effective than counseling by physicians alone [50].

Providing efficacious cessation treatments for HIV-infected smokers. The Agency for Healthcare Research and Quality (formerly the Agency for Health Care Policy and Research) recently convened a panel of experts to conduct a meta-analysis of the efficacy of all currently available smoking-cessation treatments (behavioral and pharmacological) and to recommend those treatments with demonstrated efficacy for helping smokers to quit in different settings [49]. The recommendations were uniform and clear [49, 51]: the minimal standard of care for smoking treatment in health care settings is some form of nicotine replacement, combined with brief advice to quit from a health care professional.

Nicotine-replacement therapy. A number of different options for nicotine replacement are now available to smokers: nicotine gum, transdermal nicotine patches, nicotine inhalers, and nicotine nasal sprays. All of these forms of nicotine replacement have demonstrated efficacy in helping smokers to quit [49]. For example, nicotine gum has been in use for a number of years and is available as an over-the-counter medication. Nicotine gum is placed in the mouth and chewed until the user feels a slight “tingling” sensation, which indicates that the nicotine has been released. Upon the release of nicotine, the user places the gum between his or her cheek and gum in order to maximize absorption through the oral mucosa. The most common side effects of nicotine are hiccups, nausea, anorexia, oral soreness and irritation, jaw soreness, and gastrointestinal distress [52].

Transdermal nicotine replacement (TNR) involves the application of a patch to the skin once a day; it significantly reduces withdrawal symptoms and increases the likelihood of successful smoking cessation [53]. Among the most common side effects of TNR are skin irritation at the site of application of the patch and muscle soreness [54].

Brief counseling and TNR. Studies performed in medical care settings have demonstrated that TNR is effective when provided with limited adjunct therapy [53, 55–57]. When provided in addition to the patch, advice from a physician (combined with follow-up counseling by a nurse) led to impressive abstinence rates at 1 year [57].

Brief counseling to quit smoking typically consists of some variation on the 4 A’s: ask, advise, assist, arrange [46, 49]. This message (effective at <10 minutes) is a simple smoking-cessation minimal-counseling strategy with 4 discrete components: (1) ask about smoking at the time of every patient-treatment contact; (2) advise the patient to quit smoking in a strong fashion, taking into account any individualized assessment information available about the smoker; (3) assist the patient to quit by setting a specific quitting day with them; and (4) arrange follow-up to discuss the patient’s progress toward smoking cessation.

Motivating HIV-infected smokers to quit. The difficulty with provision of brief advice and TNR to smokers in health care settings is that most of these smokers are probably not ready or motivated to quit smoking. With few exceptions (e.g., [48]), studies of physician office–based smoking-cessation interventions have used standardized interventions, with little attention given to tailoring treatment to the individual smoker’s motivation to quit smoking (e.g., [50]). This approach contradicts some basic theoretical assumptions about behavioral change: interventions tend to be most effective when they are directed toward the client’s readiness to change the behavior, whereas mismatches of the intervention to the client’s readiness to change may even be detrimental to behavioral change [58].

In the general population of adult smokers, the vast majority (80%) are not ready to quit within 30 days, and 30%–45% are not intending to quit within 6 months [58]. These prevalence estimates of low motivation appear to be even higher for an HIV-infected population of smokers [11]. The challenge, then, is to motivate this population of smokers to consider quitting.

Motivational interviewing is a useful model for developing smoking interventions [59]. It can be implemented in the context of a longer treatment [59] or even in the context of brief treatment within alternative health care settings [60]. The intervention is patient-centered and -tailored in that it helps the patient to understand the role that the substance plays in his/her life when motivation is low, and it gradually gives way to more directive approaches designed to facilitate decision-making and skill-building later in treatment, when motivation increases.

Motivational interviewing may be especially suited to HIV-infected smokers. Given the perception that death from AIDS is the only inevitable outcome of a diagnosis of HIV infection, many may have believed that stopping smoking was not going to improve their health. This point is important because thoughts about the health benefits that one stands to gain by quitting can be an important determinant of motivation [61]. However, given the current extended-health outcomes and quality of life brought about by improved treatments, this concern may no longer hold for the majority of these HIV-infected smokers. Motivational interventions that focus on changing perception issues like this one may be critical.
A Research Agenda for the Future

There is a clear need to develop a stronger care model for HIV-infected persons that includes smoking-cessation services. Even though this review offers a glimpse into some factors that should be considered in cessation-service delivery to this population, the goal of future researchers should be to study the following specific factors involved in the issue of smoking cessation for HIV-infected smokers.

Test the efficacy and generalizability of proven interventions. The efficacy of both cognitive-behavioral treatments and selected pharmacological treatments for smoking cessation is no longer open to serious question. However, particular interventions may be either more or less effective for individuals who fit a particular demographic group, health status, dependence level, or comorbidity profile [58, 62]. Controlled clinical trials are needed to test whether existing interventions will have the same level of efficacy for HIV-infected smokers.

Start at a basic level to understand the special concerns that may surround cessation. It is entirely possible that current cessation treatments will not be as effective among HIV-infected smokers as among other smokers or, alternatively, that issues not addressed by current treatments must be addressed in this population of smokers. It may be necessary to take a "bottom-up" approach to the study of smoking cessation in this population; for example, by gathering information from focus groups.

Understand the basic mechanisms that regulate smoking and cessation. Basic and individual differences in mechanisms are largely ignored in smoking-treatment programs in general [63], and tailoring treatments to a specific smoker's concerns has not been well studied [64]. Clearly then, understanding the basic mechanisms that regulate smoking cessation among HIV-infected smokers is important to designing effective interventions.

Examine potential benefits of nicotine to HIV-infected persons. The health and health care costs of smoking clearly outweigh any benefits to continuing to smoke [8]. However, nicotine may have some beneficial effects for some medical conditions [65], especially some conditions that are of particular concern for HIV-infected persons. For example, progressive dementia can be a significant problem for HIV-infected persons [19, 66], and nicotine may improve cognitive performance [65]; one could speculate that nicotine, in a safer form (e.g., gum), may improve the cognitive performance of affected individuals. However, future research needs to address this issue thoroughly.

Closing Remarks

There is reason for much optimism in the world of HIV-related care in the United States. Infected individuals are living longer and more productive lives, thanks to recent advances in medical management of HIV disease. A comprehensive approach to preventive disease management is necessary, and implementing smoking-cessation treatments in this under served population is a logical next step in further improving the health status of these persons. It is time to take this critical next step toward improving the health and quality of life of HIV-infected persons.

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