Increasing drug users’ adherence to HIV treatment: results of a peer-driven intervention feasibility study

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Abstract

Active drug users with HIV infection suffer from both low utilization of, and adherence to, primary care. Combining drug treatment and primary care on-site reduces these problems significantly because it creates a social support structure; treatment program staffs can monitor patients’ adherence and provide ongoing encouragement. But in the United States, only a very small minority of HIV+ drug users receive this demonstrably effective form of care. We report the results from a feasibility study of an alternative support structure, termed a “peer-driven intervention”, that serves as a functional equivalent to drug treatment for increasing drug users’ adherence to HIV therapeutics. The six-month study included 14 adult active drug users receiving medical care for HIV disease in New Haven, Connecticut. As a health advocate, each subject was assigned and asked to meet with another subject once a week at the project’s storefront to provide peer support and counseling. As a peer, each subject was assigned and asked to meet with another health advocate once a week to receive support in keeping up his or her medical care. No two subjects played both roles for one another. Advocates earned nominal monetary rewards for eliciting positive responses from their peers in keeping clinical appointments, responding to physicians’ referrals, picking up prescriptions on time and attending weekly meetings with the advocate. The results of the study suggest that an alternative social support structure to drug treatment is feasible for increasing active drug users’ adherence to medical care. Innovative mechanisms that harness drug users’ peer pressure to promote positive behavioral changes deserve greater study. © 2002 Elsevier Science Ltd. All rights reserved.

Keywords: HIV/AIDS; Adherence; Health care utilization; Injecting drug users; Substance abuse; Intervention; Antiretroviral therapy; Social supports; USA

Introduction

HIV-infected drug users (HDUs), whether active or in recovery, have derived less therapeutic benefit from antiretroviral therapy than other at-risk populations. Much of the difference has been attributed to decreased access to and underutilization of health care and HIV therapeutics (Samet et al., 1998). Programs that combine drug treatment and on-site primary care can overcome many of the obstacles to care (O’Connor, Molde, Henry, Shockcor, & Schottenfeld, 1992; Umbricht-Schneiter, Ginn, Pabst, & Bigelow, 1994). Such services bring patients into direct, daily contact with providers. As a
result, staff can not only monitor and respond to changes in patients’ health status but also remind them of upcoming appointments, reinforce their adherence to treatment, and provide ongoing counseling and information. A social support mechanism develops that strengthens HDUs’ commitment to health care and enhances adherence.

However, the availability of this approach is severely limited because only 10–15% of HDUs are in drug treatment at any given time, and drop-out rates are high (Haverkos, 1991; Bux, Iguchi, Lidz, Baxter, & Platt, 1993). Furthermore, the vast majority of drug treatment programs do not provide HIV care on-site (Selwyn & Batki, 1995). The result is that only a small minority of HDUs receive this demonstrably efficacious form of care. Hence, a need exists for a functionally equivalent social support system that can be made broadly available to HDUs who are not in drug treatment, whose drug treatment facilities do not offer primary care on-site, or who are receiving HIV care in conventional clinical settings. Below, we report the results of a study that assessed the feasibility of a new intervention model to provide this alternative form of social support.

The design of the intervention model was first developed as part of an HIV-prevention project for drug injectors (Broadhead, Heckathorn, Grund, Stern, & Anthony, 1994). The model, termed a peer-driven intervention (PDI), provided active drug injectors with structured incentives and guidance to harness peer pressure to promote HIV risk reduction. In the PDI, drug injectors are enlisted to play active roles in providing their peers with HIV-prevention services traditionally provided by professional outreach workers. The PDI proved far more efficient and efficacious than the traditional model, which relies on professional outreach workers, in recruiting HDUs, reducing their risk behaviors, and disseminating prevention information in the community. The PDI was also approximately 30 times less expensive to operate (Broadhead et al., 1998).

The feasibility study reported below extends the PDI model. Although the original prevention project focused on drug users accessing their peers in the community and reducing their drug and sex-related HIV risk behaviors, the feasibility study focuses on HDUs working with their peers to increase their utilization of primary care services and adherence to HIV therapy.

Background

Studies of peer support among drug users

Stereotypical descriptions of drug users convey a predatory and antisocial image. But extensive research, especially on HIV prevention efforts, has documented that drug users also cooperate with one another (Grund, 1993; Stephens, 1991; Waldorf, Reinerman, & Murphy, 1991). As Des Jarlais, Friedman, Sotheran and Stoneburner (1988, p. 163) emphasized, “The IV-drug use subculture would not be able to persist over time without some positive social relationships...The primary positive social relationship within the subculture is the small friendship group”. These groups are linked to larger networks through informal exchanges and the sharing of information, money, drugs, and other necessities. Although satisfaction of individual craving is an important objective of these interactions, they are also an expression of community solidarity, aimed at the maintenance of an interdependency network.

Numerous federally funded studies of HIV outreach efforts throughout the United States report that drug users in substantial numbers volunteer and help professional outreach workers carry out prevention efforts in many ways (Brown & Beschner, 1993; Valentine, 1994). An evaluation of outreach efforts in San Francisco documented that it is common for drug users to introduce outreach workers to others and vouch for them in new communities. They also help outreach workers prepare and distribute bleach bottles, condoms, and prevention information, locate users for interviews and find users who are eligible for services, including needle exchanges (Broadhead & Heckathorn, 1994; Broadhead & Fox, 1990, 1993). Other studies of outreach projects around the country have reported similar findings (Grund, Blanken, Adriaans, Kaplan, & Barendregt, 1992; Rivera-Beckman, 1992; Johnson, Williams, & Kotarba, 1990). As the directors of the San Francisco outreach project stated:

In short, the IV drug users became deeply involved in helping us gather health information regarding AIDS and its means of transmission. They generally looked favorably on such efforts to involve them voluntarily and encouraged their friends to cooperate in a similar fashion (Feldman & Biernacki, 1988, p. 32).

A program in New York City found that “users will often volunteer to help you set up your table and to bring their friends to it or distribute literature on the street...” (ADAPT, 1988, p. 2). Similarly, an outreach project in Chicago reported: “In fact, we have found that, as addicts become aware of the threat that AIDS poses, they are quite capable of assimilating a strong sense of social responsibility which can be readily channeled to include an assumed role of prevention advocacy” (Wiebel, 1988, p. 147). In sum, there is substantial evidence of informal peer support among drug users that has improved intervention efforts, and of drug users’ willingness to help one another in dealing with problems of mutual concern.
Drug users' relationship to primary care

The past several years have witnessed stunning advances in antiretroviral therapy, in particular, dramatic delays in HIV progression, improved survival, and decreased hospitalization for HIV-infected patients (Update, 1997; Palella et al., 1998). Despite marked reductions in AIDS incidence overall, however, the benefits to drug users and people of color have not been as impressive as for white men (Brown, 1993). Among HDUs in the United States and Canada, as few as 50% received antiretroviral therapy, and only 14% received what would be considered recommended care (Celentano et al., 1998; Strathdee et al., 1998). Potentially alterable factors associated with not receiving antiretroviral therapy included lack of health insurance and entitlements, homelessness, not enrolled in drug treatment, not having a clinician with HIV skills, having no continuity of care, and not having recently visited an HIV provider (Strathdee et al., 1998; Brown, 1993). Therefore, the first step to improving health outcomes is to bring HDUs into care, which will often involve stabilizing their living situation and obtaining their insurance entitlements, followed by establishing continuity of care.

Approaches for HDUs include a comprehensive set of therapeutic measures to address the wide spectrum of co-morbid conditions associated with HIV infection, substance use disorders, mental illness, and an array of psychosocial problems common among HDUs (O'Connor et al., 1992). One of these interventions is drug treatment. Clinicians are strongly advised to "initiate treatment for drug abuse if there is to be good compliance and follow-up of treatment for AIDS" (O'Connor, Selwyn, & Schottenfeld, 1994, p. 455). This is a challenge because many HDUs either do not seek drug treatment or drop out relatively quickly.

HDUs who do enroll in drug treatment programs that deliver on-site services, however, readily accept and adhere to HIV care. On-site delivery of health care at drug treatment programs has resulted in high enrollment in medical care (Umbricht-Schneiter et al., 1994), adherence to prevention and treatment recommendations (O'Connor et al., 1992), and high levels of utilization of HIV services and tuberculosis treatment (Selwyn, Feingold, & Iezza, 1989; Selwyn, Budner, Wasserman, & Arno, 1993; Gourevitch, Wasserman, Panero, & Selwyn, 1996). In a recent study, administration of liquid isoniazid in an admixture with methadone to PPD+ drug users enrolled in methadone maintenance resulted in an increase in the completion rate of tuberculosis chemoprophylaxis from 3% in historical controls to 70% (O'Connor et al., 1999). Since such services bring patients into direct and frequent contact with providers, a social support mechanism develops that facilitates HDUs' adherence to health care.

Research also indicates that even for patients in substitution drug treatment, social supports are crucial for increasing patients' adherence to primary care. For example, Umbricht-Schneiter et al. (1994) compared methadone patients offered primary care on-site at a drug clinic with methadone patients referred to a nearby medical clinic, where a physician was available twice a week. The referred patients were given the clinic's telephone number and directions but were responsible for making an appointment; there was no waiting list, and appointments could be obtained within four days. The primary care at both sites was free for all patients. Of the on-site group, 92% entering addiction treatment received medical care, with a treatment rate per diagnosis of 88%. Only 35% of patients in the referred group received medical care for the same conditions, with a treatment rate per diagnosis of 28%. Umbricht-Schneiter et al. (1994, p. 209) concluded that it was the social support the on-site patients received from the integration of services and staff that bolstered their adherence:

Coordination with the nurses dispensing methadone was of prime importance: they reminded patients of their medical appointment and...administering other medications along with the methadone could foster compliance with medical treatment. No patient was coerced into accepting medical treatment, but avoiding interaction with the medical staff was difficult.

Active, out-of-treatment drug users' utilization of primary care services is disappointing. Although their already high morbidity and mortality rates are exacerbated by the AIDS epidemic, active drug users are known to use primary care services erratically, and only after they are very sick (Mor, Fleishman, Dresser, & Piette, 1992; Cherubin & Sapira, 1993). This pattern of avoiding primary care services and over-relying on emergency rooms and acute care hospitalizations has been well documented since the 1960s (Sapira, 1968; Louria, Hensle, & Rose, 1967). Several studies have reported that active drug users are less likely to receive antiretroviral therapy than other HIV+ patients, and such findings have been replicated in many other national studies (Samet et al., 1998; O'Connor et al., 1992; Moore, Hidalgo, Bareta, & Chaisson, 1994). The ALIVE study of primary care utilization patterns of more than 1800 Baltimore drug users found that "Asymptomatic HIV seropositive subjects were estimated to be no more likely to use (medical) services than are HIV seronegative individuals" (Solomon, Frank, Vlahov, & Astemborshi, 1991, p. 1288).

These observations are especially critical now that more effective antiretroviral therapy—particularly combination regimens that include protease inhibitors—has become available (Palella et al., 1998; Vittinghoff et al.,...
Studies of drug users’ utilization of therapy outside structured settings like methadone treatment programs (Palella et al., 1998; Vittinghoff et al., 1999; Gourevitch et al., 1996) suggest that as a group, drug users are less likely to benefit from new therapies (Strathdee et al., 1998). Indeed, the stunning benefits of highly active antiretroviral therapy have not been shared equally by drug users. Rates of new AIDS diagnoses and mortality among this group have fallen but not as steeply as in other populations with HIV disease (Update, 1997).

As Selwyn et al. (1992, p. 1702) observed, “HIV-infected drug users have readily accepted primary medical care services in the setting of our methadone program. For the above reasons, the development of such services is also urgently needed for drug users not enrolled in drug-treatment programs”. A social support mechanism is therefore required for HDUs who do not have the structured support afforded by drug treatment programs. For instance, nonadherence to antiretroviral therapy was strongly correlated with lack of social supports even among HDU prisoners (Mostashari, Riley, Selwyn, & Altice, 1998; Altice, Mostashari, Thompson, & Friedland, 1997). Such a support mechanism might be expected to bolster HDUs’ adherence to a wide spectrum of primary care services, including drug treatment and HIV care, and to promote behaviors that reduce their risks of re-infection or transmission of HIV to others.

**Study design and theory**

The design of the feasibility study is adapted from a peer-driven intervention (PDI) model that rewards active drug users who recruit their peers to a storefront for interviews and HIV counseling and testing, educate those peers in the community, and distribute prevention materials. The model contrasts sharply with the traditional provider–client model that characterizes medical and social services, including professional outreach-worker projects. In the latter, drug users are expected to be altruistic and are offered no direct incentives to combat the spread of HIV or help their peers, because these services are performed by professional staffs (Broadhead & Heckathorn, 1994).

*Theoretical basis for a peer-driven intervention*

The PDI model is based on the theory of “group-mediated social control” (Heckathorn, 1990). According to the theory, relationships of social influence are never strictly dyadic because most individuals are members of groups with whom they are interdependent. These include family members, friends, neighbors, coworkers, and others with whom the individual interacts on a daily basis. To the extent that members of a group are interdependent, sanctions or other means of control directed at any individual have consequences that extend to other group members. For example, when one person is promoted in a job (or fired), that individually targeted sanction also affects family members and friends, thereby constituting a collective sanction. Except in the extremely rare cases of individuals who are social isolates, nearly all social sanctions generate collective rewards (or punishments) that affect the significant “others” of any given individual. This means that social sanctions are strictly individualized.

Given that most social sanctioning includes both an individual- and a collective-sanction component, behavioral adherence can arise from two theoretically distinguishable sources (see Fig. 1).

First, adherence may arise from an individual-sanction-based control common in everyday life (i.e., sanctions targeted directly at the individual). For example, by assigning grades, teachers attempt to influence directly the behavior of individual students. Second, adherence can arise from group-mediated control, as when students respond to teachers because their parents may augment the rewards or punishments administered by the school. Likewise, HIV-infected patients adhere to distasteful or complex therapeutic regimens because of social support from peers or family. Whereas the operation of individual sanctions is readily visible (individuals are directly rewarded for adherence or punished for noncooperation), the operation of collective sanctions is usually hidden. It occurs “off premises,” in settings that organizations can neither observe nor control, for it arises when the individual’s family members or peers exert their influence.

![Fig. 1. Group-mediated social control. The hollow arrow represents individual-sanction-based control. For example, this involves individualized rewards or punishments targeting the actor. The solid arrows represent the two steps in group-mediated social control. First, based on whether the actor complies, the actor’s group is either promised a collective reward or threatened with a collective punishment. Second, the group responds to that incentive by controlling the actor.](image-url)
According to the theory of group-mediated social control, all social behavior originates from two sources: inclinations and regulatory interests. Inclinations are individuals' preferences regarding how they would like to behave. Regulatory interests are individuals' preferences regarding how they would like others to behave. Control based on individual sanctions works by altering a person's inclinations using primary incentives, such as performance-specific rewards or punishments. In contrast, group-mediated social control works by altering regulatory interests using what may be termed secondary incentives, which are rewards or punishments. A person receives based on the performance or response of significant others, such as peers. With secondary incentives, individuals are rewarded only if they elicit certain preferred behaviors from others. Secondary incentives change the ways and extent to which individuals exercise influence over one another by altering the structure of their mutual interdependence.

The PDI adapted for the feasibility study is designed to harness peer pressure on behalf of increasing HDUs' adherence to medical care. For participating in the study, HDUs are offered primary incentives, which are the health benefits they receive from their medical care. They are also offered secondary incentives which are nominal, direct monetary rewards based on their success in eliciting positive responses from a peer (i.e., increasing a peer's adherence to primary care). But note that subjects are rewarded for the success of their efforts, not simply their efforts. Consequently, the PDI model relies on explicit outcomes and a system of secondary incentives that redirect peer pressure toward adherence.

Each subject in the feasibility study plays two roles. As promoters of adherence, the subjects are health advocates. As recipients of an advocate's efforts, they are peers. No two subjects serve as both health advocate and peer for each another; so networks of health advocate-peer relationships take the form of cells; e.g., if A is the advocate for B, B for C, and C for D, then D may be the advocate for A. Larger cells are also possible. In any case, each subject is both the source and the recipient of peer counseling and education.

The most enduring and successful behavioral interventions are those that affect group norms and members' willingness to enforce them, because they draw upon a force of great power—peer pressure (Frank, 1988; Broadhead & Heckathorn, 1994). Strictly individualized sanctions, which affect only one person's inclinations, tend to have results that are transient and erratic. When individual incentives are withdrawn, people easily revert to prior patterns of behavior. For example, as discussed above, improving HDUs' access to and retention in health care simply by relying on primary incentives (e.g., free medical care) has proven inadequate. In contrast, secondary incentives affect the way in which individuals exercise influence over one another as peers.

A simple economic model would not suffice to explain how secondary incentives motivate and enable individuals to exercise influence over their peers. First, when an intervention is based on peers working with peers, the rationale for change is always expressed in terms that are culturally relevant—peers know how to talk to one another (Heckathorn, Broadhead, Anthony, & Weakliem, 1999). HDUs serving as advocates can be expected to exercise creativity and cultural sensitivity in devising rationales for inducing their peers to keep up with their primary care. In this way, the intervention will harness both cultural capital (Bourdieu, 1985), consisting of informal interpersonal skills and linguistic styles, and social capital (Coleman, 1988), consisting of commonly shared social network positions and statutes that provide a basis for both mutual identification and interpersonal influence.

Second, latent norms and incentives among HDUs (i.e., to take better care of themselves) become stronger and more manifest as peers begin to share their wisdom and experiences, and to encourage one another to help themselves. Such behaviors should strengthen intrinsic motivations to act in health-promoting ways. Though material rewards can undermine intrinsic motivation when they are framed as "pay" rather than as "recognition" for achievement—a finding termed "the acknowledgment effect" (Deci & Ryan, 1985)—this does not arise when secondary incentives harness peer pressure (Heckathorn & Broadhead, 1996). This is because advocates must rely on nonmaterial rewards, such as peer influence, local savvy and credibility to secure cooperation. Thus, whatever intrinsic motivation exists will not only be preserved, it can be expected to grow because of peer support.

Finally, the exercise of peer influence by advocates entails a commitment. When an advocate publicly affirms to a peer the value of taking steps to protect one's health, it impacts on the advocate's own attachment to that value. Public affirmations are a fundamental and powerful social mechanism for creating and maintaining commitments (Ostrom, 1990). This is why the PDI is designed to permit all subjects to serve as advocates. The impact of the intervention is reflexive; it results from receiving peer counseling or education, and, perhaps more importantly, from providing it to others. Thus, we hypothesize that the PDI model, which relies on secondary incentives to reward subjects for eliciting positive responses from one another, is a far more complex and dynamic mechanism than a simple economic model can account for or explain. With subjects serving as both providers and recipients of service, the PDI mechanism entails a collective cause and effect that draws off and reinforces shared norms and commitments.
Methods

A six-month feasibility study of the PDI model was implemented in January 1996, administered by a full-time Health Educator. The study was conducted in a centrally located storefront in New Haven on a major bus line. The site is well known to the drug-using and homeless community in New Haven because a food pantry operates next door. 15 HIV-infected subjects were recruited, of which 14 were accepted into the study. One subject was excluded because of inability to assign him a peer for whom he could serve as a health advocate.

The 14 subjects (see Table 1) included eight males (three whites, five African-Americans), and six females (five African-Americans, one white).

We recruited HDUs who had at a minimum one or more appointment at a site providing HIV care. Subjects were recruited through referrals from local health care providers and peers. Prior enrollment in HIV care was a prerequisite because gaining access to medical treatment can be a lengthy and complex process, and time and resources for the feasibility study were limited. We did, however, want to select subjects for whom adherence to HIV care had been problematic. Criteria for referral were based on the subject being an HDU and the clinician’s perception that the subject was poorly adherent to medical visits or to taking medication. All of the subjects were injecting drug users, but 13 of them (93%) were active drug injectors, having injected heroin and/or cocaine within 30 days of entry into the feasibility project. Therefore, the feasibility study included the most challenging subset of HDUs—active drug users with a clinician’s perception of low adherence to clinical care.

Prior to joining the study, each subject read and signed a consent form that had been approved by the University of Connecticut’s Institutional Review Board. The consent form explained the subjects’ roles and responsibilities, and detailed the possible risks their participation could theoretically entail and the ways in which the project would attempt to minimize those risks. Each subject promised in writing that he or she would not discuss any information that the subject learned about another subject’s medical condition or personal problems except with the project’s health educator.

Table 1
Demographics and selected outcomes of study subjectsa

<table>
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<tr>
<th>Subjects</th>
<th>Demographics</th>
<th>Medication adherence</th>
<th>Healthcare appointments (adherence)</th>
<th>CHAMPS appointment (adherence)</th>
<th>Entered drug treatment</th>
<th>Client-driven outcomes</th>
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<tr>
<td></td>
<td>Race</td>
<td>Sex</td>
<td>Age</td>
<td>Type of HIV therapyb</td>
<td>Number of medications</td>
<td>Adherence score (%)</td>
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<td>89.6</td>
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a 1–Moved back home to stable living circumstances.
2–Began taking HIV medications only through Project CHAMPS and achieved 100% adherence.
3–Obtained gainful employment.
4–Disclosed HIV status to long-term sexual partner.
5–Discontinued commercial sex work.
6–Reduced “drug runs”.
7–Repaired car.
8–Options include no therapy, monotherapy, dual nucleoside therapy and triple combination therapy.
9–Outpatient drug free program, all others entering drug treatment entered methadone maintenance.
10–Incarcerated for three weeks.
In serving as a health advocate, each subject was assigned a peer of the same sex by the health educator. Each advocate agreed to meet with the peer once per week at the project’s storefront to assess how well the peer was keeping up with his or her medical care, and to provide counseling and support. Each subject also participated as a peer being served by another health advocate. After each advocate and peer concluded their weekly meeting, the advocate then met with the health educator to discuss the peer’s treatment progress. In total, therefore, each subject participated in three advocate–peer meetings per week—once as a peer being helped by an advocate, another meeting as an advocate helping a peer and a third meeting as an advocate meeting with the health educator to report on his or her peer’s progress.

Health advocate–peer interactions

Health advocates were trained to perform their respective duties by the health educator a week before they were assigned their peers. At the first health advocate–peer meeting, following introductions by the health educator, the health advocate began by providing the peer with a week-at-a-glance calendar. The advocate showed the peer how to record in the book all upcoming medical appointments—whether they were kept, rescheduled, or missed—and any nonscheduled visits to ERs or other acute-care facilities. The advocate also explained to the peer that after each appointment with a clinical provider, he or she was to obtain a customized sticker from the provider and place it in the calendar book. The advocate also asked the peer to collect the receipt that the peer received for every prescription he or she picked up and place it in the calendar book.

Consistent with the project’s focus, advocates were rewarded based on the responses they elicited from their peers. To ensure the integrity of the incentive system, this included only peer responses that were objectively documented. The meetings between advocates and peers took place in the project office and were observed by the health educator. Clinic appointments were validated by stickers that the peers obtained from their clinical providers, and prescriptions picked up in a timely manner were validated by the stamped receipts.

At each of their weekly meetings, the advocate received from the health educator the peer’s folder, which contained a health advocate questionnaire. The advocate then administered the questionnaire to the peer.

The questionnaire began with the advocate’s recording the date and time of the meeting, along with the peer’s and the advocate’s initials. The advocate then asked to review the peer’s calendar book. The advocate recorded the number of medical appointments the peer had scheduled and kept during the last week. The advocate removed the verification stickers from the peer’s calendar book and affixed them to the questionnaire. The advocate also recorded the number of prescription receipts the peer had collected during the last week and stapled them into the questionnaire. The advocate then calculated the total number of appointments the peer kept, the number of appointments the peer rescheduled, the number missed, and the number of prescriptions picked up. With this information, the advocate was able to calculate the rewards that he or she would be paid for the peer’s success in keeping up with his or her medical care, according to a reward schedule (see Fig. 2).

The advocate then asked the peer to indicate why he/she had missed an appointment or neglected to reschedule appointments that were not kept, and the advocate recorded these responses in the questionnaire, as well as any recommendations the advocate offered to the peer. The advocate then asked the peer how he or she was feeling, compared to their last meeting, whether he/she had gone to an ER or some other medical facility without an appointment during the last week, and if so, why. The advocate recorded the peer’s responses in the questionnaire.

The advocate then recorded the peer’s responses to a series of questions about the peer’s drug use during the last week, whether such use caused any problems, and also the peer’s responses to questions bearing on drug- and sex-related risk behaviors in which the peer may have engaged. The advocate was directed to discuss these possible risk behaviors with the peer in a nonjudgmental manner, and the advocate recorded a summary of this discussion.

Both the peer and the health educator then signed the advocate’s report, attesting to its accuracy, and the advocate encouraged the peer to keep up with his or her treatment plan for their mutual benefit. After the advocate addressed any remaining issues or questions the peer wished to discuss, in the presence of the health educator, the meeting ended.

In the fifth month of the feasibility study, we added a new component. Peers were asked to bring all their

(1) $10 if their peers succeeded in keeping their weekly appointment at the project storefront with the Advocate, and completed a semi-structured interview bearing on their adherence to primary care and HIV risk behaviors. These meetings were validated by the on-site Health Educator.

(2) $3 for each scheduled medical appointment their Peers succeeded in keeping, as validated by a sticker that providers put in each Peer’s appointment book;

(3) $2 for each time their Peer picked up a filled prescription on time, as validated by a stamp a pharmacist stamped on each Peers’ prescription receipts (and that the Peers then placed in their appointment books).

Fig. 2. Health advocate rewards.
medications to each weekly meeting with their advocates at the storefront. After administering the questionnaire, the advocate asked to see the peer's medications. Using a large pill tray, like the ones pharmacists use, the advocate observed the peer count the number of pills in each prescription bottle. Beginning with the number of pills initially recorded, the number of pills the peer was prescribed to take during the week (as recorded on each prescription bottle), and any additional pills the peer obtained through a prescription refill, the advocate then calculated an “adherence percentage score” per medication for the peer since their last meeting. In a nonjudgmental manner, the advocate then discussed with the peer and recorded any significant nonadherence issues with each medication, and the reasons for it.

Debriefing the health advocate and calculating PDI rewards

Following each meeting between an advocate and a peer, the advocate met with the health educator to discuss his/her peer’s progress. The advocate was asked to discuss only the peer’s adherence status, not his/her own. The health educator reviewed the findings that the advocate recorded in the questionnaire, and the advocate was invited to discuss any significant findings. The health educator and advocate then discussed any additional options that the advocate wanted to consider in helping his or her peer improve with his or her adherence. Finally, the health educator issued the advocate a check for the rewards he/she earned, based on the advocate’s documented success in supporting the peer in his or her medical care. The health educator then filed the advocate’s questionnaire in the peer’s folder in a locked filing cabinet, to be retrieved by the health educator and given to the advocate in his or her next meeting with the peer.

Recall that the rewards the subjects received as peers, were the health benefits that came from keeping up with their medical care. The rewards subjects received as advocates, were the weekly monetary payments they earned for their success in encouraging their peers to keep their clinical and study appointments, and to refill and pick up their prescriptions. The incentive system did not include rewards for peers’ actually taking medications because this could not be objectively documented. Consequently, though the advocates’ role in the feasibility study was expanded to include a weekly pill count, the advocates were not offered any incentives for their peers’ adherence to medications because such rewards could have encouraged peers to discard their pills in order to appear to be adhering. Advocates were asked to encourage their peers to take their medications and meet with their physicians to discuss any problems they were having with their medications.

Results

The results support the feasibility of HDUs’ willingness and ability to play active roles in helping one another keep up with their medical treatments (see Table 1). The 14 peers succeeded in keeping 84% (130/154) of the appointments they had scheduled with various primary care providers and HIV-related support services. If rescheduled appointments are removed from “missing” appointments, the subjects kept 95% of their appointments. Only seven appointments were missed altogether.

As subjects were enrolled in the feasibility study at different times, there were 122 subject-weeks during which peers were theoretically able to meet their advocates. Of these 122 subject-weeks, the peers succeeded in keeping 80% (97/122) of their health advocate appointments. Of the 27 appointments that were not kept, some were simply missed, but others did not happen because of scheduling conflicts and other business that required peers or their advocates to be elsewhere. Advocates were consistently responsible in handling the sensitive information the peers shared with them. During the required weekly debriefing sessions with the health educator, no breaches of confidentiality were reported.

Having advocate–peers conduct pill counts and calculate adherence scores was found to be a viable, additional activity that could be part of subjects’ weekly interactions with one another. This component of the study was devised and implemented in the fifth month of the study, inspired, in part, by the enthusiasm the subjects exhibited in working together. The addition of a pill tray was also well received. As pill counts were added late in the study, only 36 meetings between advocates and peers included a count. For 30 of those 36 meetings, the peer’s medication adherence scores for the previous week were 80% or higher. The overall adherence score for all subjects was 90%. Based on the health educator’s observations, the advocates demonstrated consistency in encouraging peers to discuss with their physicians if they were having difficulties in taking their medications as prescribed.

Although only 2 subjects were enrolled in drug treatment at the time of enrollment, 9 of the 12 remaining subjects (75%) enrolled in drug treatment by the end of the study, 7 in a methadone program and 2 in an ambulatory drug free program.

Though not a primary goal of this intervention, drug-related HIV risk behaviors decreased during the study. Although 36% (5/14) of the clients reported sharing injection equipment in the last 30 days at baseline, only 7% (1/14) reported any sharing of equipment during the remaining feasibility study period. The system of structured incentives operated smoothly. No subject complained of an advocate’s excessive zeal or pressure.
On average, advocates earned approximately $15 per week in working with a peer. Based on the health educator’s observations, none of the subjects appeared to be overburdened by the responsibilities placed on them by the intervention design. None complained that the tasks were too difficult, or that the many meetings were an imposition. Indeed, subjects responded well and frequently enthusiastically to the opportunity to play an active and constructive role in the intervention. This may explain why none of the subjects dropped out of the study. Consistent with feasibility studies in general, the sample size was modest—too small for tests of statistical significance. However, the results suffice to demonstrate that the intervention has potential as an alternative social support mechanism that can help HIV+ drug users adhere to medical care, and that it is worthy of further investigation.

**Lessons learned**

Several important lessons were gleaned from the feasibility project that have implications for future implementation of the model. First, this study was conducted in early 1996 before guidelines were issued for the implementation of potent combination therapy. This is evidenced in our population where several of the subjects were not receiving what would now be considered standard combination therapy. We did implement pill counts toward the end of the project as patients were beginning to be prescribed more complex regimens fraught with increased adverse side effects. Further development and implementation of the intervention will require more consideration of how advocates can address poor adherence with medications, especially, when the number of medications is likely to be higher than found in this early study. Recent studies have demonstrated that adherence to medical appointments is the most important correlate of whether patients achieve a nondetectable HIV-1 RNA level (Lucas, Chaisson, and Moore, 1999), and that levels of adherence should exceed 90–95% to achieve viral nondetection and avoid the development of resistance (Paterson et al., 1999). PDIs in the future will need to address adherence to both medical appointments and HIV medications.

While nearly 80% of subjects did not miss their regularly scheduled weekly meeting, 20% did. Some peers may not have attended because they had no appointment with a provider to report during the last week. One implication of this is that single dyads may not be especially feasible for projects that work with larger numbers of individuals. If an individual does not show up, then both a peer and a health advocate in attendance will be missing their dyadic counterpart. Thus, we would recommend the use of “chains” consisting of between five and eight participants. This would allow subjects to substitute for no-shows at the weekly meeting by serving as both a peer and an advocate for those in attendance. A collective approach that relies on chains of participants can also pool and divide the rewards that participants-in-attendance collectively earn in any given week. Such a reward arrangement may further enhance the pressure that peers exert on one another to maintain high rates of adherence for the good of the group overall.

One of the challenges to replicating this project on a larger scale will be the recruitment of HDUs who are not receiving any medical care. Such programs will need to establish direct liaisons with HIV clinics to expedite access and to ensure that appropriate medical entitlements are in place to enable entry into care. Case managers may need to be employed in such scenarios when HIV clinics do not have the necessary resources to help patients gain entitlements in a timely fashion.

**Conclusion**

The feasibility study suggests that a peer-driven intervention, first developed as a HIV prevention mechanism for drug users, may be adapted to improve HIV+ drug users’ health-seeking behaviors. Subjects maintained high levels of keeping medical and peer-support appointments and were willing to meet regularly for the purpose of helping one another. The subjects also demonstrated that they were capable of administering questionnaires about one another’s risk and health behaviors and calculating weekly medication adherence scores. The large proportion of subjects who entered drug treatment during the short period of the study suggests that peer norms may be changed. Although the study was small and findings are only suggestive, it demonstrated the feasibility of involving active drug users in helping one another keep up with their medical care. This is an important finding, given that the sample consisted primarily of active HDUs who were referred to this project based on their clinician’s baseline assessment of poor adherence with medical appointments and medications. The PDI model also holds considerable potential in that it appears to contain all six factors that, when offered in combination, have been demonstrated to produce behavioral change in individuals: an increase in medical knowledge (including belief in efficacy), cues and reminders, positive rewards, improved self-management skills, expressed concern from others (especially peers and family), and repetition (Haynes, Wang, & Da Mota, 1987; Leventhal & Cameron, 1987; Levine et al., 1979; Nessman, Carnahan, & Nugent, 1980).

Nevertheless, a much larger study is required to determine whether the PDI model can produce...
statistically significant increases in HDUs’ adherence to HIV care, sufficient to serve as an alternative social support mechanism for those not in drug treatment, or for those in drug treatment programs that do not offer HIV services on-site. Such programs may also serve to hasten patients’ entry into drug treatment. A randomized, controlled study comparing a peer-driven with a usual standard-of-care intervention, based on a much larger sample, is required to validate these preliminary data. Such a study will also need to include HIV-infected individuals not already within the health care system; this study was limited to individuals already in care who exhibited poor adherence. Despite these limitations, the preliminary data are compelling and may offer a new structure of support, other than drug treatment, for health care programs poorly adapted to address the needs of HIV-infected active drug users.

Acknowledgements

This research was partially supported by grants from the National Institute on Drug Abuse (RO1 DA08014, RO1 DA12112) and the University of Connecticut Research Foundation. We thank our colleagues Steve Farber, Wayne Villemez, our present program staff of Health Educators, the many clinicians and pharmacists in the New Haven area who collaborate with us, our project officer at NIDA, Elizabeth Lambert, and the anonymous reviewers of this journal.

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