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Attitudes toward addiction, methadone treatment, and recovery among HIV-infected Ukrainian prisoners who inject drugs: Incarceration effects and exploration of mediators

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Abstract

In this study, we use data from a survey conducted in Ukraine among 196 HIV-infected people who inject drugs (PWID), to explore attitudes toward drug addiction and methadone maintenance therapy (MMT), and intentions to change drug use during incarceration and after release from prison. Two groups were recruited: Group 1 (n=99) was currently incarcerated and Group 2 (n=97) had been recently released from prison. This paper's key finding is that MMT treatment and addiction recovery were predominantly viewed as mutually exclusive processes. Group comparisons showed that participants in Group 1 exhibited higher optimism about changing their drug use, were less likely to endorse methadone, and reported higher intention to recover from their addiction. Group 2 participants, however, reported higher rates of HIV stigma. Structural equation modeling revealed that in both groups, optimism about recovery and awareness of addiction mediated the effect of drug addiction severity on intentions to recover.

Keywords

HIV; prisoners; Opioid Agonist Therapy; Addiction; Ukraine; Structural Equation Modeling

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Introduction

Despite reductions in HIV incidence and mortality globally, the epidemic in Ukraine remains volatile and continues to expand, especially among people who inject drugs (PWID), who often interface with criminal justice systems (1). In 2011, HIV prevalence among adult Ukrainians was 1.1%, the highest among reporting countries of Eastern Europe (data unavailable for Russia), and more than twice that of Western European countries where it varies from 0.1% in Finland to 0.4% in the UK (2). In 2014, Ukraine reported an alarming increase of 18,781 new HIV cases (3).

Though previous surveillance suggested a generalizing epidemic in Ukraine (4), new information triangulating multiple data sources confirms that HIV remains concentrated in key populations (5). Among PWID, who account for the majority of cumulative HIV cases, HIV prevalence exceeds 40% (6, 7). Moreover, HIV prevalence among Ukrainian prisoners is the highest in Europe (8) and approaches 20% nationally with drug injection of opioids as the major driver of transmission (9, 10). Due to the concentration of PWID among prisoners (11), especially those with HIV (10), interventions targeting prisoners may play a central role in HIV prevention since nearly all prisoners transition back to the community.

Maintenance with opioid agonist therapies (OAT) using either methadone (MMT) or buprenorphine (BMT) maintenance therapy is among the most effective treatments for opioid use disorders. It is also one of the most efficacious (12, 13) and cost-effective strategies for primary and secondary HIV prevention (14, 15). OAT within prisons has been documented to have similar efficacy as in community settings, especially if started before release (16) and continued post-release (17, 18). On average, OAT reduces HIV transmission by over 50% among PWID (19) and leads to lower rates of hepatitis transmission, criminal activity, recidivism, and drug use (20, 21).

Despite OAT's many documented benefits, moral biases, stigma, and ideological prejudices are barriers to OAT scale-up globally (22, 23). In Ukraine, OAT expansion has been constrained by negative attitudes of governmental and law enforcement agencies towards PWID in both community (24, 25) and prison (26) settings, where many administrators and clinicians have inadequate knowledge about OAT's beneficial effects on health, and endorse demonizing myths and stereotypes about OAT, PWID, and people living with HIV (PLH) (26). OAT is available free of charge through national and external Global Fund monetary support, but the scale-up of OAT and treatment retention have been disappointingly low, with only 2.7% of Ukraine's estimated 310,000 PWID enrolled, which has constrained HIV prevention efforts (14, 27).

The adoption of OAT has been historically arduous and slow, but has been especially problematic in criminal justice populations (28–30) with both patient- and organizational-level hurdles impeding OAT introduction and expansion. Research shows that such factors as lack of knowledge, misinformation about, and negative attitudes toward OAT limits its uptake and expansion even in the US, where opioid-dependence has been treated with methadone for over 45 years (31–34). Our study is the first to investigate and compare attitudes toward OAT and its correlates among currently and previously incarcerated opioid-

addicted PLWHAs in Ukraine, a 25-year old country where OAT was first introduced in 2004 as a pilot program (35).

Attitudes held by individuals contribute significantly to behaviors in general (36) and to risk-related behaviors in particular (37). Emerging evidence suggests that an individual's attitude towards OAT predicts treatment entry in community settings (38). Within prisons, attitudes toward OAT remain an under-examined topic, but it is known that PWID who might benefit from OAT underestimate their need for post-release treatment and don't prioritize it as part of their transitional plan (39, 40). Because about 85% of PWID interface with the criminal justice system, further study is required to improve OAT expansion within these settings. Moreover, understanding the differences in attitudes toward OAT among incarcerated and post-release prisoners will provide important insights into how to best intervene with PWID who interface with the criminal justice system, especially PLH. In this article, we use data from a survey of PLH conducted in Ukraine to explore attitudes toward methadone treatment and intentions to change drug use behavior before and after release from prison.

Methods

Participants and study design

The study eligibility included PLH (confirmed by rapid testing), age 18 years or older. and had injected drugs in the 30 days before incarceration, which was established by either track marks or accurate facility with injection practices. Two groups of participants were recruited from 2010 to 2011 in Odessa and Kyiv, Ukraine. Group 1 was currently incarcerated and within 6 months of release. Group 2 had been recently released from prison. More details about the recruitment process (41) have been described previously. Briefly, for Group 1, the prison first provided a list of all HIV-infected prisoners, then a random sample generator provided a list that was used to recruit for interviews. Group 2 was recruited from among those who had been released from prison within 12 months at sites providing post-release assistance. Research assistants were not provided any unique identifiers and participants were reassured of their anonymity to avoid reporting biases.

After confirming eligibility status and completing informed consent procedures, all participants provided informed consent, similar to previous research experience in Ukraine (42). Group 1 participants completed the survey in a private room inside the prison without the presence of prison staff and Group 2 participants were interviewed in a private space in local NGO offices. Participants in both groups were paid UAH 50 (approximately $8.25 USD) for their time. The study was approved by the Institutional Review Boards of the Yale School of Medicine and of the Ukrainian Institute on Public Health Policy.

Study measures

Surveys were originally written in English, translated into Russian, and back-translated into English (42–44). They were subsequently reviewed by bilingual researchers, and piloted to ensure clarity, quality, and understanding among prospective participants. Surveys, conducted in Russian, were identical for participants in both groups and only differed in referenced time frames (e.g. incarcerated participants were asked about risk behaviors in the

30 days preceding the current incarceration, while released prisoners in the community were asked about risk behaviors in the last 30 days). In addition to demographic characteristics, opioid dependence was measured using DSM-IV criteria (45) and the Alcohol Use Disorders Identification Test (AUDIT: (46)) screened for alcohol use disorders (scores of ≥8 for men and ≥4 for women); and the 10-item Drug Abuse Severity Test (DAST-10:(47)) measured addiction severity. Social support was measured using Zimet Scale of Perceived Social Support (48, 49), and HIV stigma was measured using the Berger HIV scale (50).

Several composite variables using a five-item Likert-type scale (1=strongly disagree to 5=strongly agree) were created, with increasing scores indicating higher standing on each of the following variables. *Awareness* of addiction (α=0.71, 3 items) measured the extent to which one was aware of their drug addiction (e.g. "My drug use has caused a lot of harm"); *Optimism* (ICC=0.52, 2 items) measured how optimistic one was about being able to change their drug use (e.g., "There is no hope for me staying off of drugs" (reverse coded)); *MMT Endorsement* (α=0.82, 4 items), adapted from Springer and Bruce (2008) (33), measured positive attitudes toward methadone maintenance (e.g., "Methadone treatment is a very good way to treat opioid addiction"); and *Intention* to address their drug addiction, (ICC=0.92, 2 items) measured an individual's intention to change his/her drug use (e.g., "I really want to make positive changes in my use of drugs").

Data analysis

To guide our analysis, we hypothesized that HIV-infected prisoners experience less HIV stigma relative to their recently released peers for two reasons. First, PLH are over-represented in Ukrainian prisons (19.4% vs 1.1%), and because of a high degree of prejudice toward HIV in the general population (8), they form a critical minority within prisons and would be potentially less stigmatized. Second, despite evidence elsewhere that HIV stigma is high in prisons (8, 51), McKee et al. (52) found that PWID are more concerned about HIV/AIDS outside of prison than inside it and more tolerant toward incarcerated PLH. We also hypothesized that prisoners would overstate their intentions to change their drug use behaviors relative to those in the post-release group. This reasoning rests on research showing that prisoners with (39, 40) and without (53) HIV often declare strong intentions about prospective change in their behaviors across important domains ranging from employment to substance use, and that inmates tend to be unrealistically optimistic about positive changes they expect to make once released (54). Last, because of the profoundly negative attitudes toward OAT in Ukraine in community and prison settings, we did not expect the groups to differ in their attitudes toward MMT (referred hereafter as MMT Endorsement), the primary OAT available in Ukraine. Our central research goal is to examine the nature of the understudied relationship between endorsement of MMT and intentions to recover, and to determine whether these constructs are independent or correlated in a positive or negative manner.

SPSS, version 22 was used to compute correlation and multiple regressions to assess multivariate relationships among the variables. Independent sample t-tests were utilized to measure differences between currently incarcerated and recently-released prisoners on each of the described measures, using the Bonferroni correction for multiple comparisons, and the

effect size Cohen's *d* (noted a "*d*" throughout) for each mean comparison that was calculated separately. The structural equation modeling program AMOS.22 was utilized to perform a multi-group path analysis. To calculate indirect effects and investigate potential mediating relationships among the variables in the model, we used AMOS bootstrapping procedure (55), a recommended analytic strategy for avoiding measurement error and underestimation of the mediation significance (56).

Results

Table 1 presents descriptive statistics for the two comparison groups of PLH: currently incarcerated (group 1) and recently released (group 2). All currently incarcerated participants were men, and 11 (11.3%) of the recently released participants were women. The two groups were comparable in terms of history of drug use and of opioid injection.

Group differences

As shown in Figure 1, all four HIV stigma subscales differed significantly between the two groups, supporting our hypothesis about differences in HIV stigma. Compared to group 1, participants in group 2 were more wary of disclosure of their drug addiction (M=27.85, SD=3.03 vs. 24.22, SD=4.55, t=−6.32, $p<0.01$, d=0.94); harbored more negative attitudes about self-image (of drug users) (M=33.19, SD=4.43 vs. 29.78, SD=5.53, t=−4.57, $p<0.01$, d=0.68), perceived higher personal stigma (M=48.63, SD=6.55 vs. 40.43, SD=9.26, t=−6.66, $p<0.01$, d=1.02), as well as unfavorable public attitudes towards drug addiction (M=55.1, SD= 6.86 vs. 46.1, SD=10.55, t=−6.60, p<0.01, d= 1.01).

There were no differences between the currently incarcerated and recently released groups for alcohol use disorders (M=1.98, SD=1.11 vs. 2.03, SD=1.05, t=−0.28, $p=0.78$, d=−0.05) and social support (M=45.61, SD=16.98 vs. 47.07, SD=14.07, t= −0.65, $p=0.51$, d=−0.09), but addiction severity was significantly (one grade on the scale) higher for group 2 than for group 1 (mean 4.05 vs 3.38, p<0.01). Figure 2 shows that the groups did not differ in their awareness of their drug addiction (M=3.48, SD=0.78 vs. 3.52, SD=1.02, t=0.30, $p=0.76$, d= −0.04), but differed in optimism, MMT endorsement, and intention to recover. Specifically, incarcerated participants exhibited higher optimism about changing their drug use (3.87, SD=0.84 vs. M=3.03, SD=0.78, t=−7.02, $p<0.01$, d=1.036), were less likely to endorse methadone (3.00, SD=0.92 vs. M= 3.64, SD=0.82, t=4.78, $p<0.01$, d= −0.73) and reported higher intentions to recover from their addiction compared to post-release participants (4.24, SD=0.79 vs. M=3.94, SD=0.81, t=−2.58, $p=0.01$, d=0.38).

We observed a negative significant correlation between MMT endorsement and intention to recover (r=0.25), a finding that suggests that enrollment in MMT and recovery from drug addiction are viewed by our sample as mutually exclusive processes. To test mediating relationships among the variables and to investigate the indirect effects on the intention to recover from drug addiction, we built a path model, with addiction severity as an endogenous variable; awareness, optimism, social support, HIV stigma, and MMT endorsement as mediating variables, and the intention to recover as an endogenous variable. After removing insignificant paths and omitting "hanging" variables, we obtained our final

structural model that is presented in Figure 3 and is described below. The decomposition of direct and indirect effects among the variables in the model is presented in Table 2.

Path model

We tested our structural model using AMOS 22 while controlling for age, religion, and education, and obtained a close fit to the data, X^2 =1.84, p=0.40. The final model explained 22% of the variance in the outcome variable *Intention to Recover* and produced a goodness-of-fit index (GFI) of 0.99, the comparative fit index (CFI) of 1.00, with the root mean square error of approximation (RMSEA) of 0.00 (PCLOSE = 0.57). These model fit indices suggest our model was a good fit for the data. The basic structure of the model was unchanged in a multi-group analysis (group 1 and group 2), with only one path being significantly different between the two groups (see Figure 3).

Direct Effects

Addiction severity had a positive effect on awareness of drug addiction and a negative effect on optimism about being able to recover from their addiction. Being aware of one's addiction negatively correlated with optimism, indicating that hopefulness to recover from their addiction decreases under the combined influences of higher levels of addiction severity and the awareness of addiction. Awareness about their addiction, however, had a negative influence on MMT endorsement, and a positive effect on intention to recover from drug addiction, again suggesting that MMT is viewed distinctly from addiction recovery. Optimism also had a negative effect on MMT endorsement, and was a positive direct predictor of intention to recover, especially for incarcerated prisoners (group 1). MMT endorsement had a negative effect on intention to recover. The relationship between awareness, optimism, and MMT endorsement demonstrates that MMT is perceived to be an obstacle rather than a path to recovery, as it was negatively predicted by awareness and optimism, which in turn positively influenced intentions to recover. Moreover, the obtained negative effect of MMT endorsement on intention to recover suggests that those who endorse MMT have lower intention to recover from drug addiction, underscoring that MMT is viewed as being opposite (i.e., a continued form of addiction) and not supportive or complimentary to addiction treatment and recovery.

Indirect Effects

We tested for indirect effects among variables by using AMOS bootstrapping procedure with 4000 bootstrap samples and bias-corrected accelerated confidence intervals, and found that addiction severity had a positive indirect effect on intention to recover, mediated by awareness of addiction and optimism about recovery, suggesting two independent routes about intention to recover from addiction. Specifically, higher drug addiction severity may lead to a higher awareness of drug addiction, which in turn increases intention to recover. On the other hand, drug addiction severity may decrease optimism that, in turn, deflates the effect of addiction severity on intention to recover. We ran separate mediation analyses and found that addiction severity effect on intention to recover from addiction is fully mediated by optimism (indirect effect b= −0.13; direct effect b = −.03) and partially mediated by awareness (inconsistent mediation: indirect effect b=0.07; direct effect b= −.22).

Discussion

General

Barriers to be prescribed OAT have been documented in many criminal justice settings (CJS) (33, 57). Previous research in Ukraine revealed the omnipresence of barriers to OAT buoyed by prejudice, stereotypes, and lack of knowledge among criminal justice personnel (26). This study is the first to comparatively investigate attitudes toward OAT among currently and previously incarcerated individuals in Ukraine, and to examine whether HIV-infected PWID consider OAT as an important option for drug treatment and embarking on a path toward recovery.

Backed by prospective clinical trials (17, 58), human rights and health authorities widely recommend (59, 60) treating opioid dependence (including those with pre-incarceration opioid use disorder who are currently not using in prison) during the period of incarceration and continuing it post-release. Though there is guidance on introducing OAT into the CJS (60), OAT coverage remains low in nearly all settings where it is available with only a few notable exceptions (61). This is the first study to provide insights into the relative impact of the setting — community versus within prison — on experiences of HIV stigma and individual perceptions about drug addiction, support for MMT and recovery from addiction. Our study explicitly investigates the interdependent nature of the relationship between attitudes toward methadone and intention to recover, factors that have been previously examined separately. In this section, we first consider group differences (within prison versus post-release) regarding HIV stigma and then examine the effects of these group differences (i.e., setting) on drug addiction, addiction awareness, support for MMT, optimism about recovery, and intention to recover and discuss the interdependence among these constructs for this population as a whole.

HIV Stigma

Stigma, the social devaluation and discrediting of certain groups (62), is one of the foremost barriers to HIV prevention, treatment, care and support. Specifically, stigma undermines HIV prevention efforts by discouraging individuals from seeking HIV information and HIV prevention services because these actions raise suspicion about their HIV status or risk (61). As hypothesized, PLH released from prison into the community (Group 2) perceive more HIV stigma than their incarcerated counterparts (Group 1) on each of the four HIV stigma constructs. This may result from being in distinctly different environments (63). Due to the concentration of PLH in prisons, stigma may be reduced due to potentially larger support networks among people with similar issues. HIV prevalence estimates among prison populations in Ukraine ranges from 20–26% (8–10). After release, PLH return to a setting where they constitute only about 1.1% of the population (2). This degree of isolation and marginalization may contribute to higher levels of HIV-related stigma.

Correlates of intentions to recover

While incarcerated (Group 1) and post-release (Group 2) PLH had similar levels of addiction problems, even though Group 1 was within prison, they differed significantly in how they perceived their addiction, whether they intended to recover, their optimism about

ability to recover from their addiction, and whether they supported MMT. While awareness about their addiction was the same for both groups and there was no significant inter-group differences between their perceived social support or alcohol use severity, incarcerated PLH expressed higher intentions to recover, and expressed more optimism about changing their drug use than those who had already been released. Positive illusions about post-release successes have been documented among sentenced prisoners elsewhere (54). During periods of "forced" sobriety while incarcerated (recognizing that not all prisoners abstain from drug use), prisoners appear to become more optimistic and engage in "wishful thinking" about progress made toward addressing their addiction problems and plans about their future employment (53). In addition, excessive optimism during incarceration (where basic needs are met by the prison environment structure) may stem from the tendency to reframe confinement as a 'time out' to think about self-improvement and redemption (64). After release, however, faced with the daily exigencies like struggling with economic insecurity or securing stable housing, these aspirations are challenged by a "reality check" (65) and may, in part contribute to early relapse to alcohol and drug use (66). This explanation is indirectly supported by the fact that the post-release group of PLH had higher addiction severity. Finally, both groups viewed MMT negatively, although it was more likely to be endorsed by those who were recently released. While our data do not disentangle why such differences about support for MMT existed during two distinct time periods in the lives of PLH, one explanation might include the increased availability of MMT in the community (it is not available in Ukrainian prisons), despite generally negative perceptions of it (67). An alternative explanation, however, might stem from the recruitment strategy in the post-release group, which involved organizations providing services that may have supported addiction recovery without MMT.

Model

There are several important findings that emerge from our SEM analysis. The focal result is that MMT is perceived to be more of an obstacle rather than a path to recovery, as endorsement of MMT is the only negative predictor of intention to recover in the model, and is also inversely related to an individual's awareness of their addiction and optimism about recovery. Importantly, both awareness of one's addiction and optimism about recovery mediated the effect of addiction severity on MMT endorsement in a counter-intuitive manner that further clarifies the overall negative perception about MMT: the indirect effect via awareness about one's addiction shows that the increase in addiction severity is associated with the increase in awareness which, in turn, is associated with more negative rather than positive attitudes toward MMT. While the indirect effect mediated by optimism is positive, which implies that MMT may be endorsed as the last resort for recovery, this likely occurs when one's hope for recovery is at the lowest point, colloquially described in addiction treatment and recovery as "hitting rock bottom" (see figure 3). This finding is supported from qualitative data in Ukrainian PWID who perceive that OAT is a treatment of last resort and should be reserved only for those who have no other options (67). It is important to note that our study was the first to inquire about and compare addiction severity during the time of incarceration with PLH who were currently incarcerated, and thus findings here complement previous research on within-prison drug use as reported by a sample of recently released prisoners (68).

We found that while the effect of increasing addiction severity on intention to recover is negative, this direct negative effect may be reduced by awareness of one's addiction and overcome by optimism about recovery. Optimism about recovery from addiction was the strongest predictor of intention to recover, but the relationship was stronger for the currently incarcerated group, suggesting that the prison environment is an important place to initiate evidence-based addiction treatment. Together, our analyses show that the pathway from addiction towards having the intention to transition into recovery is complex. They also highlight the utility of mediation analyses in public health: cognitive constructs, such as those investigated here, are rarely independent and may interact with one another unexpectedly and in not immediately obvious ways (26, 69).

Previous research noted that for highly marginalized populations like prisoners with HIV, trust in respected figures, like prison medical staff, significantly contributed to both acceptance of and adherence to antiretroviral therapy at a time when its benefits were questioned as effective (70–72). As MMT is unavailable in Ukrainian prisons and the staff's attitudes toward OAT are negative (26), it is not entirely surprising that prisoners share similarly negative attitudes. What is striking, however, is that enrollment in MMT and recovery from drug addiction are viewed by our sample as mutually exclusive processes. Since methadone is a highly regulated and medically controlled treatment requiring name-based registration and daily, supervised administration (73, 74), OAT may be viewed as a stigmatized form of continued substance dependence and invoke fears of surveillance and harassment (41, 75, 76).

While we do not have data to disentangle how these findings might apply to opioid dependent persons without HIV, our findings with PLH support the recent changes in the Diagnostic Statistical Manual (DSM), which was changed from DSM-IV-TR to DSM-V (77). In the most recent version, a modifier explicitly states that when an individual is in a controlled environment where access to opioids is restricted, the patient is still considered to have an opioid use disorder and should be considered for treatment with OAT, irrespective of whether the patient is still physically dependent on opioids. Data from randomized controlled trials supports initiating treatment of opioid use disorders within a controlled setting and continuing it immediately post-release for improving addiction treatment outcomes, including retention in treatment, overdose and criminal behavior (17, 78–81). In the previous DSM version, when a person was in an environment like prison and no longer dependent, there was little to no encouragement to provide OAT. Findings from our study report perceptions by PLH, but also show that there is considerable room to educate prisoners, prison staff and addiction specialists about the importance of treatment in such settings.

Though important findings were gleaned by comparing pre- and post-release HIV-infected prisoners, several limitations remain. First, the cross-sectional design that compared two groups of PLH restricts our ability to infer a causal relationship and limits the findings to correlations. Future studies should employ a longitudinal group design of PLH and assess these constructs within the same group and individual. Second, while this study would have benefited from measuring a clinical outcome, like enrollment in MMT, rather than just support for MMT, this strategy is sub-optimal in this context where multiple individual,

clinical and structural barriers exist to MMT enrollment in Ukraine (67, 74, 76). Future studies in settings where MMT is more readily accessible are needed to extend our findings. Third, our study does not employ a nationally representative sample; however, participants in our study were from the two regions with the highest incidence and prevalence of HIV and opioid addiction, and where OAT was introduced first (35). Fourth, women are under-represented in these samples and pathways to recovery for criminal justice-involved women who inject drugs need to be explored further (82, 83). Last, while restricting our sample to only PLH was purposeful, findings cannot be generalized to all criminal justice-involved PWID.

Implications and future directions

Despite multiple clinical trials that support providing OAT during incarceration and continuing it post-release (17, 58), including for PLH (84, 85), numerous factors deriving from unique structural (78) or personnel (26) impediments within prison (60, 86) have made it challenging. In the presence of negative attitudes toward OAT by the CJS, one alternative worth considering is to provide a non-opioid, like extended-release naltrexone (XR-NTX) that can be injected just prior to their release to protect patients from overdose (87, 88). XR-NTX is effective to prevent overdose for about 3–4 weeks post-release, a tragedy that is common and occurs soon after release (66, 89, 90). During this time when patients are protected from overdose, this could serve as a bridge to community-based OAT as long as it is initiated within this time period. Though XR-NTX is considered an evidence-based pharmacological treatment for opioid dependence, a 2011 meta-analytic review (91) concluded that evidence to support such strategies for addressing opioid use disorders is currently insufficient. Concerns about cost, uncertainty about release dates, and eventual overdose for those not remaining on opioid antagonists (92) or not transitioning to OAT, have limited this strategy until more evidence becomes available (93). Nonetheless, this strategy is worthy of further pursuit wherever OAT is not available within the CJS.

Extending literature on how staff attitudes may undermine successful OAT delivery in prisons (60), findings here suggest that the prisoners themselves are important targets for intervention that should be done in parallel with staff-based interventions. Higher support for MMT in the community sample where MMT is available begs the question: if MMT were made available within prisons, would support for MMT increase as well? Our findings suggest that optimism about recovery while within prison is falsely elevated and may contribute to individual inability to comprehend addiction as a chronic relapsing condition that in the absence of treatment will result in 85% of prisoners relapsing within 12 months post-release (94). Though there are no documented prison-based interventions that target attitude change toward OAT by prisoners or prison personnel, a series of meta-analyses of attitude change and persuasion focused interventions document their effectiveness in other conditions and contexts (95), including HIV (96) and substance abuse (97). The unique culture within prison, however, as suggested by recent findings from Moldova where other prisoners ostracized prisoners on MMT, may influence the effectiveness of such interventions (98). Future interventions should take advantage of an individual's sobriety and cultivate their ability to recognize the cycle of addiction and incarceration and to channel that optimism to focus on one of the few evidence-based interventions (i.e., MMT)

available that have been associated with reduced illicit drug relapse, HIV risk-taking and reincarceration. Although alternatives to incarceration would be favored, for those who are imprisoned, prison setting can be effectively leveraged as an ideal space to provide information, motivation and evidence-based addiction treatment options for HIV-infected PWID, a population that can be difficult to engage in the community.

Even though findings here underscore the importance of introducing MMT in prisons, the pervasively negative attitudes toward MMT in either setting emphasize the need for considerable work to be done in health marketing, which should target negative attitudes and prejudices at both the individual and society level. Names and labels carry meaning (99). Terms like opioid substitution therapy and opioid replacement therapy suggest that methadone is merely substituting or replacing one addiction for another, which undermines treatment acceptability. A rebranding in terminology, especially ones that focus on a medical treatment for a chronic relapsing condition, may eventually overcome some of the negative attitudes toward treatment. Most importantly, unless the groups who would most benefit from MMT support it, no matter how widely available it becomes, scale-up efforts will be thwarted irrespective of the setting in which it is provided.

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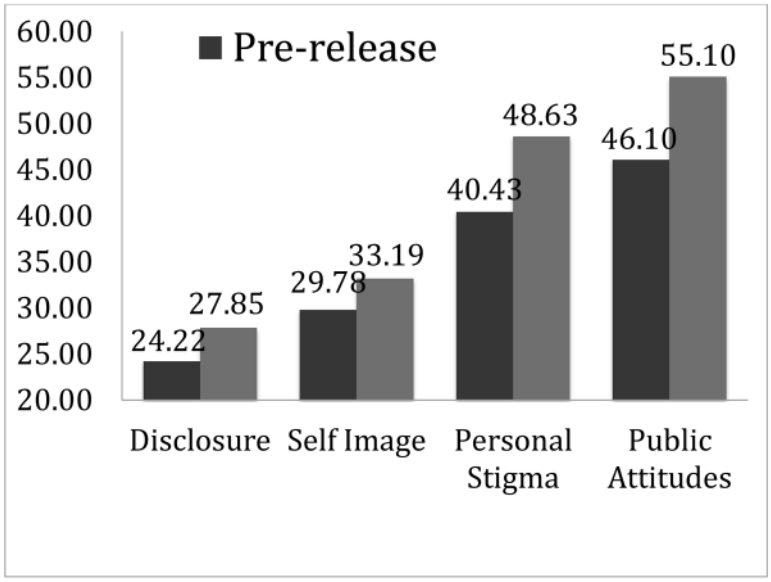

Figure 1.
Group Differences in HIV-Stigma Subscales

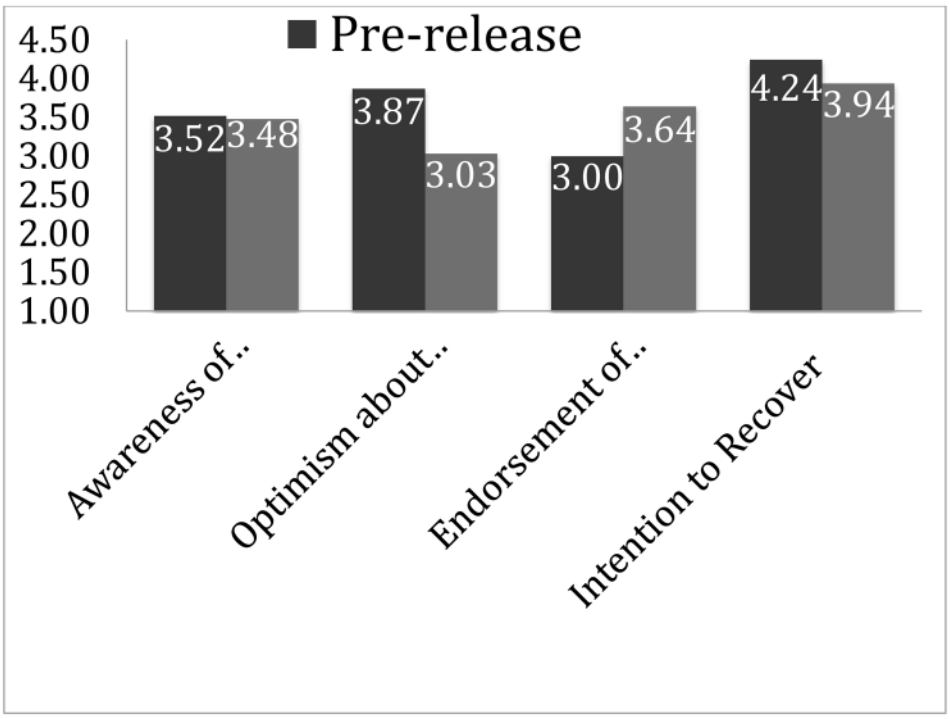

Figure 2.
Group Differences in Attitudes and Intentions

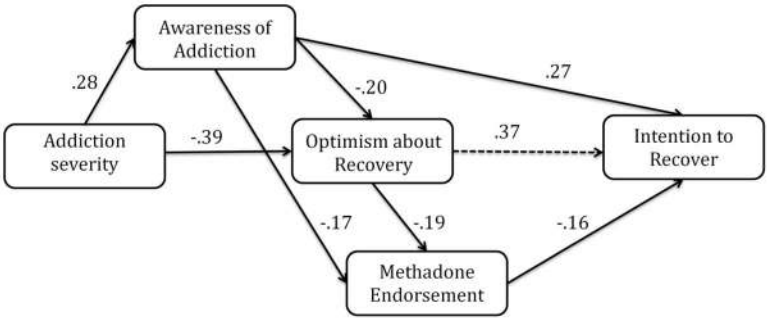

Figure 3.

Path model for Intention to Recover among the full sample of incarcerated and recently released HIV-infected people who inject drugs. All paths are significant at $p < .01$. The model structure and significance levels for paths remains unchanged for a multi-group analysis with the exception of the dashed path from Optimism about Recovery to Intention to Recover, that differed between the two groups: *b*(group 1) = .52, $p < .01$ vs. *b*(group 2) = .20, $p < .01$, $z = -2.38$, $p < .01$. Indirect effects were tested via AMOS bootstrapping procedure with 4000 bootstrap samples and bias-corrected accelerated confidence intervals. Control variables (covariates) are not shown in the figure for ease of presentation. The final model explained 22% of the variance in the outcome variable Intention to Recover. Overall model fit: $X^2 = 1.84$, p=.40; GFI = .99; CFI = 1.00, RMSEA = .00 (PCLOSE = 0.57).

Table 1

Descriptive Statistics for Currently Incarcerated and Recently Released Participant

Personal characteristics	Incarceration Status	
	Group 1 Incarcerated	Group 2 Released
	N=99	N=97
Mean age, years (S.D.)	36.1 (8.14)	35.5 (8.14)
Sex		
Men	99 (100%)	86 (88.7%)
Women	0	11 (11.3%)
Highest educational level attained		
Incomplete secondary	34 (33.3%)	35 (36.1%)
Secondary or higher	66 (64.7%)	62 (64.2%)
Currently has a partner		
No	26 (27.3%)	22 (22.7%)
Yes	72 (72.7%)	71 (73.2%)
Incarceration History		
Re-incarceration	99 (100%)	74 (76.3%)
Mean lifetime incarceration, years (S.D.)	10.3 (6.06)	7.48 (6.5)
Stable housing pre-incarceration		
Yes	76 (76.8%)	67 (69.1%)
No	23 (23.2%)	30 (30.9%)
Median (range) months since HIV diagnosis	50 (0–191)	20 (0–57)
Met criteria for opioid-dependence in past 12 months	60 (64%)	58 (60%)
Ever prescribed MMT	4 (3.9%)	17 (17.5%)

Table 2

Direct, indirect and total effects among the variables in the model

Variables		Direct Effects[a]		Indirect Effects		Total Effects	
Predictor	**Criterion**	**B (SE)**	**Beta**	**B (SE)**	**Beta**	**B (SE)**	**Beta**
Addiction severity	Awareness	.242 (.058)	.275	-	-	.242 (.058)	.275*
	Optimism	−.346 (.056)	−.385	−.049 (.023)	−.054*	−.394 (.053)	−.44*
	MMT Endorsement	-	-	.011 (.017)	.024	.011 (.017)	.024
	Recovery Intention	-	-	−.079 (.039)	−.098*	−.079 (.039)	−.098*
Awareness	Optimism	−.201 (.079)	−.197	-	-	−.201 (.079)	−.197*
	MMT Endorsement	−.086 (.039)	−.174	.016 (.012)	.032*	−.069 (.038)	−.141
	Recovery Intention	.245 (.082)	.268	−.047 (.036)	−.051	.184 (.088)	.201*
Optimism	MMT Endorsement	−.092 (.039)	−.191	-	-	−.079 (.039)	−.164*
	Recovery Intention	.332 (.07)	.371	.023 (.018)	.026*	.357 (.07)	.40*
MMT Endorsement	Recovery Intention	−.272 (.119)	−.158	-	-	−.294	−.158*

[a] All direct effects are significant at $p < .01$

* $p < .01$ for indirect and total effects