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Methadone within prison and linkage to and retention in treatment upon community release for people with opioid use disorder in Kyrgyzstan: Evaluation of a national program

Chethan Bachireddy[a,b], **Roman Shrestha**[c,d], **Daniel J Bromberg**[e,f], **Lyu Azbel**[d], **Ainura Kurmanalieva**[g], **Martin Wegman**[h], **Natalya Shumskaya**[f], **Julia Rozanova**[d], **Jaimie P Meyer**[d], **Frederick L Altice**[d,e,f,*]

[a]Virginia Commonwealth University School of Medicine, Richmond, VA, United States

[b]Leonard Davis Institute of Health Economics, University of Pennsylvania, Philadelphia, PS, United States

[c]epartment of Allied Health Sciences, University of Connecticut, Storrs, CT, United States

[d]Yale University School of Medicine, New Haven, CT, United States

[e]Yale University School of Public Health, New Haven, CT, United States

[f]Center for Interdisciplinary Research on AIDS, Yale University, New Haven, CT, United States

[g]AFEW Kyrgyzstan, Research Department, Bishkek, Kyrgyzstan

[h]University of North Carolina School of Medicine, Chapel Hill, NC, United States

Abstract

Background: HIV incidence in Eastern Europe and Central Asia (EECA) continues to increase, primarily among people who inject drugs (PWID) and people in prisons. In Kyrgyzstan, an estimated 35% of people in prison are PWID, and 10% have been diagnosed with HIV. In 2008, Kyrgyzstan became the first country in EECA to provide free and voluntary methadone in prisons. We examine the impact of this national program on methadone within prison as well as linkage to and retention in treatment upon release to the community.

Methods: Administrative data from a national methadone registry with de-identified information were assessed retrospectively. We examined the delivery of methadone services, including the duration of treatment both within prison and after release, for all prisoners who were prescribed methadone in Kyrgyz prisons from 2008 to 2018. Reasons for discontinuing methadone, HIV status and methadone dose are also analyzed.

*Corresponding author. Frederick.Altice@yale.edu (F.L. Altice).

Declarations of Interest

The authors of this study have no conflicts of interest to declare.

Ethics Approvals

This study is a secondary analysis of de-identified data originally collected for non-research purposes. As this study is not human subjects research, it is exempt from IRB approval.

Results: Between 2008 and 2018, nine of Kyrgyzstan's 16 prisons offered methadone, and 982 incarcerated people initiated methadone within prison. Prisoners prescribed methadone were mostly male (96.2%), in their mid-30s (mean=34.9 years), and had been incarcerated for a relatively long time (mean = 44.1 months); their mean treatment duration in prison was 12.5 months, and 31.6% had HIV. A subsample (N = 645; 65.7%) of these were released to the community. Of these 645 people, 356 (55.2%) were not taking methadone at the time of release, 128 (19.8%) were on methadone and continued it after release, and the remainder (N=161, 25.0%) were on methadone at the time of release, but subsequently discontinued it, most within the first 7 days after release Among those continuing methadone, 14.8% (N=19) remained on treatment ≥ 12 months. Independent correlates of linkage to methadone after release included positive HIV status (adjusted hazard ratio (aHR)=1.55; p = 0.033) receipt of methadone before their incarceration (aHR = 2.01; p = 0.039), and receipt of methadone at the time o release (aHR = 20.81; p < 0.001).

Conclusion: This is the first evaluation of within-prison methadone treatment in EECA. Uptake of methadone within prison and retention in treatment after release were both low. Continuous maintenance of treatment throughout incarceration is an opportunity to optimize HIV prevention and link patients to methadone post-release.

Keywords

Methadone; Opioid agonist therapy; HIV prevention; Kyrgyzstan; HIV/AIDS; People who inject drugs; Prisons

Introduction

Over the past decade, while global HIV incidence and mortality have decreased, they have continued to increase in Eastern Europe and Central Asia (EECA) by 72% and 24%, respectively (Joint United Nations Programme on HIV/AIDS (UNAIDS), 2014). Kyrgyzstan is experiencing one of the most volatile HIV epidemics globally, primarily among opioid dependent people who inject drugs (PWID). In Kyrgyzstan, HIV is concentrated among PWID who have a prevalence at least 70-fold higher than the general population (14.3% vs 0.2%) (UNAIDS, 2021).The intersection between incarceration and the injection of opioids plays a pivotal role in accelerating HIV transmission as individuals with or at high risk of HIV infection are concentrated in prisons, which limits their access to harm reduction modalities, and exacerbates the stigmatization of PWID (Altice et al., 2016).

A 2014 biobehavioral survey of randomly selected incarcerated people in Kyrgyzstan demonstrated a high prevalence of lifetime (35.4%) and within-prison (30.8%) drug injection, primarily of opioids. Of those who had ever injected drugs, a significant proportion (32.1%) injected drugs for the first time within prison (Azbel et al., 2016), and were also more likely to share injecting equipment in prison relative to their pre-incarceration behavior (Azbel et al., 2018). Based on this biobehavioral survey, there were 3,246 PWID among the total census of 9,248 incarcerated people in Kyrgyzstan. This number is likely an underestimate given the prevalence of HCV and HIV in this sample being 49.7% and 10.3%, respectively, with self-reported drug injection and duration in prison being independent correlates of HIV infection (Azbel et al., 2016).

Most PWID in prison are eventually released into the community, at which time they are at especially high risk for relapse to drug use, overdose, and HIV transmission (Adams et al., 2011); in EECA, HIV risk for PWID is two-fold higher for those experiencing incarceration and four-fold higher in the post-release period (Altice et al., 2016). Opioid agonist therapy (OAT), syringe services programs (SSP), effective antiretroviral therapy (ART), and condom distribution are four key evidence-based strategies to reduce HIV transmission risk in prisons (Sugarman et al., 2020; UNODC, 2013). OAT, however, holds particular promise as it not only prevents HIV and HCV, but is also effective at treating opioid use disorder (OUD) (Degenhardt et al., 2019). Both HIV and HCV transmission along with mortality can be reduced further by ensuring access to OAT in prisons and retaining patients on treatment after release (Altice et al., 2016; Degenhardt et al., 2019; Stone et al., 2021; Stone et al., 2018). In the absence of OAT, mortality is especially high after release from incarceration, especially in the first two weeks (Merrall et al., 2010), making linkage to OAT after release especially critical where its use can reduce mortality by as much as 75% (Degenhardt et al., 2014).

Despite this evidence, OAT has been largely underutilized during and after incarceration (Altice et al., 2016; Degenhardt et al., 2014; Larney et al., 2012). To address the HIV epidemic, methadone was introduced in Kyrgyzstan in 2002 in the community and expanded to prisons in 2008. Methadone treatment throughout the country is free and voluntary but was introduced for HIV prevention and not for the treatment of OUD. While methadone treatment within prison and after release has been examined in a few settings (Degenhardt et al., 2014; Dolan et al., 2005; Kinlock et al., 2009; Larney et al., 2012; Malta et al., 2019; Rich et al., 2015), it has never been evaluated in EECA. We therefore sought to examine the impact of Kyrgyzstan's national program on methadone prescribing within prison along with linkage to and retention in treatment after release.

Methods

Ethical Review

This is a retrospective cohort study utilizing de-identified administrative datasets collected for clinical purposes by medical staff of the Prison Department of the Kyrgyz Republic. Because the data used in this analysis were de-identified, this study is not considered human subjects research and was therefore deemed exempt from IRB approval.

Study Setting

Methadone was introduced in Kyrgyzstan, first in the community in 2002, and expanded to prisons in 2008 (Moeller, Karymbaeva, Subata, Kiaer, & Organization, 2009). International donors provided funding for methadone treatment, yet implementers did not view methadone as a treatment for OUD, but rather a strategy for HIV prevention. Methadone is free and delivered by trained medical personnel, in liquid form, to anyone treated for OUD, irrespective of setting. SSPs are also available in both community and prison settings (Wolfe, 2005). During the observation period, methadone dosing was supervised daily, with few exceptions being granted for take-home dosages. From 2008 to 2018, the number of methadone clinics throughout the country increased from 13 to 28, including in nine prisons.

These nine prisons account for over half of the country's 16 prisons. From 2008 to 2018, the incarcerated population in Kyrgyzstan changed from 11,408 to 10,574 (Walmsley, 2018) and the average number of prisoners on methadone increased from 50 to 468 (UNAIDS, 2021).

People who are incarcerated in Kyrgyzstan are not routinely screened for OUD, unless they are on methadone upon entry to prison, if the incarcerated person requests treatment, or if the patient is medically perceived to have complications from drug injection or opioids.

Data Source

Since the inception of the national methadone program, data have been collected on methadone dosage, dates of treatment, transitions between treatment sites, and reasons for discontinuation. The Medical Services of the Prison Service for the Execution of Sentences of the Kyrgyz Republic maintains records on methadone in the prisons; the Republican Narcology Center of the Ministry of Health of the Kyrgyz Republic maintains similar records on methadone in the community; and the AIDS Center maintains records on HIV diagnosis and antiretroviral treatment of individuals through the country.

One author (AK) was granted access to the de-identified versions of the three datasets. Using the national anonymous ID number (every citizen of Kyrgyzstan has such a number), these three data sources were linked together to form a cohort of all individuals who entered prison-based methadone treatment in Kyrgyzstan and were released from prison to the community between January 1, 2008 and January 30, 2018.

Research assistants reviewed records and input these data into an electronic database using SPSS software. Data were cross-checked and verified to ensure accuracy. Data included dates and locations of treatment with methadone or treatment of HIV with ART, methadone dosages, reasons for discontinuing methadone (e.g., administrative discharge, completion of treatment, or death), HIV status (if known), and dates of incarceration. Administrative discharges were uncommon but could be due to being disrespectful to medical staff or diversion of medication. Causes of death were not recorded. Completion of treatment meant voluntary tapering off of methadone, which could have been the decision of either the clinician or patient.

Measures

Time to linkage to community-based methadone after release was determined based on the date of release and the date of the first methadone dose dispensed in the community. Time to linkage to community methadone treatment was stratified at seven-day, 30-day, and 90-day intervals. Optimal linkage is defined as occurring within seven days of release from prison. Retention on methadone treatment in the community was stratified at three-month, six-month, nine-month, and 12-month intervals. Optimal retention in treatment after release was defined as ≥12 months, based on the period of greatest HIV risk (Altice et al., 2016; Stone et al., 2018).

Patients were defined as being on methadone at the time of release if they had taken a dose of methadone one day before their release date. To ensure our ability to establish linkage to community-based treatment, analyses were limited to the observation period from January 1,

2008 through January 30, 2018; however, anyone who was on methadone before this period and who discontinued it before 2008 would not be included to minimize potential treatment access bias. Individuals who initiated methadone soon upon entry to prison, but primarily to treat withdrawal symptoms and not for maintenance, were defined as those who initiated methadone within seven days of prison entry and rapidly tapered their methadone within the first six weeks.

From the data, we were able to define three dosage variables: starting dose, maximum dose, and last dose prescribed within prison. Based on evidence correlating higher methadone dosages with treatment retention, methadone dose was stratified into low (≤40mg), medium (>40–85mg) and high (>85mg) dose categories; with >85mg being recommended (Farnum et all). The dataset does not include information on individuals who have never received methadone in prison.

For the entire dataset, age was calculated at the time of the first methadone dose in prison; for the subset of those who were released from prison, age was calculated based on their age at the time of release. The greater Bishkek region has the greatest number of patients on methadone; therefore, a dichotomous variable was created for individuals who were released to either 1) the Greater Bishkek area or 2) elsewhere in Kyrgyzstan. For all participants, including those with multiple episodes of incarceration, percentage of time on methadone was calculated as the length of time in methadone divided by the duration of total incarceration (the sum of time elapsed in all incarceration episodes, for those with multiple incarceration episodes).

Statistical Analysis

To achieve the objectives of this study, descriptive statistics were used to characterize the 982 individuals who received methadone within prison over the entire observation period (Table 1). More extensive analyses were conducted, however, for the subset of 645 individuals who received methadone within prison and were released to the community (Table 2). Time from prison release to linkage to community methadone was first explored using Kaplan-Meier estimates and is presented as a survival curve (Figure 1). Cox proportional hazards models were then used to estimate the effect of methadone receipt at release, on time to linkage to methadone in the community after release (Table 3). We present results of both univariate and multivariate hazard models. We utilized a backward elimination strategy to build the multivariate model, and variables were retained if they demonstrated statistical significance ($p<0.05$). Follow-up time was censored at the earliest of the following: date of linkage to methadone in the community after release, date of death, or January 30, 2018. Data analyses were conducted using SPSS statistical software, version 25.

Results

Characteristics of the entire sample (N=982)

From 2008–2018, 982 individuals had received methadone while incarcerated (Table 1) and they were overwhelmingly male (96.2%), in their mid-30s and had long incarceration periods; 31.6% were diagnosed with HIV. Mean time from incarceration to methadone

initiation was 7.7 months (SD 14.8) for a mean duration of 12.5 months (SD 17.4) on methadone within prison. Maximum daily methadone dose varied with 27.2% receiving high doses, 46.4% receiving medium doses, and the remainder (26.4%) receiving low doses. While incarcerated, 69.9% discontinued methadone voluntarily or because they violated the methadone contract. Of the 982 who received methadone in prison, 185 (18.8%) experienced a rapid taper.

Characteristics of the subset who were released (N=645)

Of those patients who received methadone within prison, 645 (65.7%) were released to the community during the observation period (Table 2). In general, they were similar to the entire sample as they were mostly male (95.8%) with an average age of 37.1 years and average incarceration length of 31.6 months (SD 23.8). Approximately one-third (28.1%) had HIV infections, and most returned to the Greater Bishkek area (96.4%) post-release.

Mean time from incarceration to methadone initiation was 7.2 months (SD 14.7), and patients remained on treatment for a mean duration of 9.2 months (SD 10.4). A substantial minority of patients (17.4%) tapered off methadone rapidly soon after incarceration. Maximum daily methadone dose varied with 27.9% receiving high doses, 50.1% receiving medium doses, and the remainder (22%) receiving low doses. At the time of release, however, 9.5% were receiving high doses, 20.9% were receiving medium doses, 14.1% were receiving low doses (1–40mg), and 55.5% were no longer receiving methadone.

Of those released, 19.8% (128) linked to methadone in the community – the majority (61.9%) within seven days, 11.7% within 8–30 days, 5.4% within 31–90 days, and 21.1% after 90 days. After release, 7.3% were reincarcerated, and 7.5% died during the study period.

Of those who were linked to methadone in the community, the mean duration on methadone was 9.2 months (SD 10.4), and the maximum daily methadone dose varied with 35.4% receiving high doses, 52.8% receiving medium doses, and 11.8% receiving low doses. Among those linking to community methadone after release, 19 were retained in care ≥12 months, 29 were retained in care ≥9 months, 43 were retained in care ≥6 months, and 63 were retained in care ≥3 months.

Survival analyses

Among the subset of 645 individuals who were released, 638 had data available on methadone linkage and were included in the survival analyses. Kaplan-Meier time-to-event analysis was conducted to assess the impact of methadone receipt at the time of release on linkage to methadone in the community (Figure 1). At the time of release, 44.2% (282/638) were receiving methadone with a mean daily dose of 60.4 mg (SD 34.6). Relative to those not on methadone at the time of release (N=356), those who were taking methadone at the time of release were significantly more likely to be linked to methadone in the community (41.4% linkage vs 2.2% linkage; $X^2 = 152.99$; $p<0.001$). Figure 1 demonstrates an initial steep incline and then a near flattening of the curve after 30 days for those receiving methadone at the time of release – most linkages to community methadone occur early after release, within the first seven (65%) or 30 days (78%).

In a multivariate Cox proportional hazards analysis using the subsample of those who were released (Table 3), receiving methadone at the time of release increased the likelihood of having a shorter time to linkage to community-based methadone by nearly 21-fold [adjusted hazard ratio (aHR) = 20.81; p<0.001)] relative to those not on methadone at the time of release; other independent factors contributing to time to linkage to methadone was having HIV (aHR=1.55; p=0.033) and having received methadone in the community prior to incarceration (aHR=2.01; p=0.039). In adjusted analyses, the percentage of time receiving methadone in prison and rapid tapering of methadone soon upon entry were not significantly associated with time to linkage to methadone in the community.

Although those who were on methadone at the time of release were more likely to be linked to community-based methadone, they were also more likely to be re-incarcerated (14.6% (42/287) versus 1.4% (5/358); p<0.001).

Discussion

To our knowledge, this is the first evaluation of a within-prison methadone program combined with an assessment of linkage to and retention in treatment for individuals with OUD in prison in the EECA region. Findings from this study build on the bold step taken in Kyrgyzstan in 2008 to address the volatile HIV epidemic concentrated among PWID, a population which experiences elevated levels of incarceration.

Despite the introduction of methadone in Kyrgyz prisons, the total number of PWID treated in prisons remains relatively small – the 982 people treated represent only 3.9% of the estimated 25,000 PWID in the country. By 2018 when there were 10,574 prisoners with 35% (N=3,701) estimated to be PWID, the 468 people on methadone that year represented only 12.6% of prisoners who might have benefitted from treatment. Findings from this study identify a number of implementation opportunities for addressing OAT scale-up in prisons and in the community.

Kyrgyzstan is one of only a few in the EECA region to implement with-in prison methadone (in addition to Moldova, Armenia, Latvia, Estonia and recently Ukraine). The experience of the Kyrgyz prison methadone program should guide improved implementation. First, the absolute number of prisoners on OAT who would benefit from it is low. One strategy to improve scale-up might be to implement routine screening upon entry to prison. This strategy, in addition to optimizing dosing, might improve the number of patients who are maintained on methadone throughout incarceration so that they can be on treatment at the time of release – a strategy that increases the likelihood of receiving methadone in the community over 20-fold after release.

Low uptake of methadone in prisons may also be related to inadequate knowledge and negative beliefs about methadone by prisoners, which has been observed in Kyrgyzstan. Despite surveys showing a minimum of 35% of the incarcerated population in Kyrgyzstan injecting drugs, 57% of these people endorsed that methadone should not be available in prisons (Azbel et al., 2018). These attitudes may be partly explained in economic and social terms. In Kyrgyz prisons, incarcerated people are organized into a hierarchy run by

informal prison leaders, who also control the within-prison trade of illicit heroin. Methadone may be seen as a competitive threat to the within-prison trade and distribution of illicit heroin (Azbel, 2020; Azbel & Altice, 2018; Azbel, Bromberg, Dvoryak, & Altice, 2021; Liberman et al., 2021; Rhodes et al., 2019; Azbel, Lancaster, Meyer, & Altice, 2019). Those accessing methadone are ostracized by the informal prison leadership and may be viewed with suspicion as potentially conspiring with the prison authorities who in turn control and administer methadone (Rhodes et al., 2019). Moreover, many Kyrgyz incarcerated people who receive methadone co-inject diphenhydramine to potentially augment the effects of inadequate methadone doses (Meyer et al., 2020). Co-injection of diphenhydramine may in turn lead to harmful health consequences including soft tissue and systemic infection, which have been conflated with the therapeutics effect of methadone. As a result, Kyrgyz incarcerated people who inject drugs may view heroin as a more acceptable alternative to methadone (Meyer et al., 2020; Rhodes et al., 2019).

Second, over half (55%) of patients who at one point accepted methadone, taper off it before release and one-sixth (17.4%) do so immediately upon incarceration. Given the high prevalence of within-prison injection and its elevated contribution to HIV risk (Azbel et al., 2018), it is crucial to develop strategies to maintain PWID with OUD throughout their incarceration and transition them to treatment after release. One strategy to address this issue is to consistently raise methadone dose to optimal levels to promote retention (Farnum et al., 2021; Wickersham, Zahari, Azar, Kamarulzaman, & Altice, 2013), combined with information and training to both prison personnel and patients about the benefits of long-term treatment of a chronic relapsing disease with methadone, especially during the transition from prison that can be exceptionally dangerous in terms of overdose (Merrall et al., 2010) and elevated HIV risk-taking (Altice et al., 2016). Key findings from this study support the need for optimized dosing strategies as 22% never received a dose above 40mg and only 27.9% received a recommended optimal dose. Optimal dosing of methadone has been documented to improve treatment retention both in community (Farnum et al., 2021; Strain, Bigelow, Liebson, & Stitzer, 1999) and during the post-release period from incarceration (Wickersham et al., 2013).

Linkage to and retention on methadone upon release to the community is central to capturing the full public health benefits of within-prison methadone programs (Altice et al., 2016; Degenhardt et al., 2014; Dolan et al., 2005; Larney et al., 2012; Stone et al., 2021; Stone et al., 2018). In multivariate analysis, we found three factors positively associated with linkage to community methadone upon release from prison: HIV positive status; being enrolled in community methadone prior to incarceration; and receipt of methadone at the time of release. It is likely that those with chronic HIV infection were receiving ART during incarceration and were motivated to continue accessing ART upon release from prison. While methadone remains marginalized from mainstream medical care in Kyrgyzstan, increasingly there are efforts to integrate methadone with HIV treatment and prevention efforts (Subata et al., 2016). In other settings, integrating HIV and addiction treatment has yielded improved health outcomes (Bachireddy et al., 2014; Korthuis et al., 2011; Altice et al., 2011). Similarly, those with prior experience may find it easier to return to obtaining methadone in the community following release.

Among those who ever initiated within-prison methadone, only 45% were still receiving methadone when they were released to the community. Those who were receiving methadone upon release were 20 times more likely to connect to methadone in the community compared to those who initiated within-prison methadone but discontinued prior to release. This finding is consistent with prior research suggesting that within-prison methadone increases linkage to and engagement with methadone post-release (Kinlock et al., 2009; McKenzie et al., 2012; Moore et al., 2018; Rich et al., 2015; Wickersham et al., 2013).

There are many potential reasons for a person experiencing incarceration to discontinue methadone prior to release. First, they may only seek methadone for the purposes of withdrawal treatment. Among those treated with any methadone, 17% experienced a rapid taper within prison. Second, they may have received a suboptimal dose and not experienced the therapeutic benefit of methadone. As mentioned above, suboptimal dosing can reduce retention. Emerging data suggest that suboptimal dosing may also lead to co-administration of other substances such as diphenhydramine to enhance the euphoric effects of methadone. Qualitative research suggests that this is a common practice in Kyrgyz prisons and may lead to a host of negative health consequences, thereby undermining the salutary effects of methadone (Meyer et al., 2020). Third, individuals receiving methadone may believe they no longer need methadone upon release. This belief is common and consistent with penal optimism, although it conflicts with the observed high rates of relapse to substance use among people released from incarceration (Rozanova et al., 2018). Finally, individuals may be concerned about the stigma of receiving methadone or feel uncertain about their ability to easily access methadone once released.

PWID in Kyrgyzstan face a formidable array of obstacles in prison and upon release into the community. Chief among them are stigma, poor employment prospects, limited access to care, punitive drug policies, and police harassment. Pre-trial detention and police harassment are common among PWID in Kyrgyzstan and lead to disruptions in HIV care and prevention and unsafe injection practices (Polonsky et al., 2016a). Moreover, in Kyrgyzstan individuals must officially register with the government to access methadone. Official registration may lead to driver’s license restrictions. This and mandatory daily visits to methadone sites may act as barriers to care and decrease opportunities for PWID to fully re-integrate into society.

Among individuals linked to community methadone upon release, a small minority were retained in care at six months (33.6%) and 12 months (14.8%). In a longitudinal cohort study of 375 incarcerated PWID, Larney et al found that methadone receipt upon prison release was not associated with reincarceration but that retention in community-based methadone was associated with a 20% reduction in reincarceration (Larney et al., 2012). Similarly, Dolan et al found that retention in MMT among justice-involved PWID is associated with lower mortality, recidivism, and hepatitis C infection (Dolan et al., 2005). Importantly among the findings of those released on methadone is the high proportion receiving relatively low dosages of methadone, which is amenable to intervention. These findings reinforce the importance of treatment retention, including optimal dosing – and not just initiation – to sustaining the benefits of methadone upon prison release (Altice et al., 2016; Degenhardt et al., 2019).

These findings merit closer examination and attention to not only what treatment is being delivered but in what context. Who is receiving the treatment while incarcerated and why? How does methadone interact within the broader risk environment both in prison and in the community? And how might we encourage uptake of within-prison methadone and retention upon release to the community? Concretely, prison officials can: 1) work to increase access, availability, and desirability of within-prison methadone by expansion of methadone treatment to all correctional facilities; 2) implement universal standardized intake OUD screening, diagnosis, and treatment; 3) provide prisoner and prison staff education about methadone as a safe and effective treatment for OUD; 4) promote patient-centered approaches to achieve higher and more appropriate methadone dosing to increase retention and reduce within-prison co-injection of diphenhydramine and other substances; 5) create partnerships with the informal governance structure; and 6) improve supported transitions to community methadone upon release.

Limitations

There are limitations to the study. First, this is a retrospective cohort study and it is observational in nature. Therefore, it is not possible to establish causality. The dataset was derived from paper records created for clinical purposes which were then migrated to an electronic format. Although this process of data migration underwent rigorous controls, it is possible that human error occurred. While prison-based methadone treatment started in 2008, community-based methadone treatment started in 2002. The dataset was limited to the observation period January 1, 2008 – January 30, 2018 and does not include data on receipt of community methadone prior to January 1, 2008. Given the administrative and clinical purpose of this dataset, there is no readily available data on a control group – incarcerated individuals with OUD who did not initiate methadone and were released to the community. Advanced regression methods were deployed to mitigate bias in assessing factors associated with linkage to methadone in the community after prison release.

Conclusions

Notwithstanding the above limitations, this is the first study to evaluate within-prison methadone and linkage to and retention in community methadone in Eastern Europe and Central Asia, a region that is facing one of the fastest-growing HIV epidemics in the world, with over half of new infections attributable to injection drug use (AIDSinfo). Despite almost ten years of administering methadone in Kyrgyz prisons, uptake and retention in care remain below recommended levels to prevent HIV transmission and drug-related deaths (Altice et al., 2016; Degenhardt et al., 2019). The study's findings suggest that to realize the full potential of methadone treatment, investments must be made in understanding and improving within-prison methadone initiation, linkage to community methadone upon release, and retention in care.

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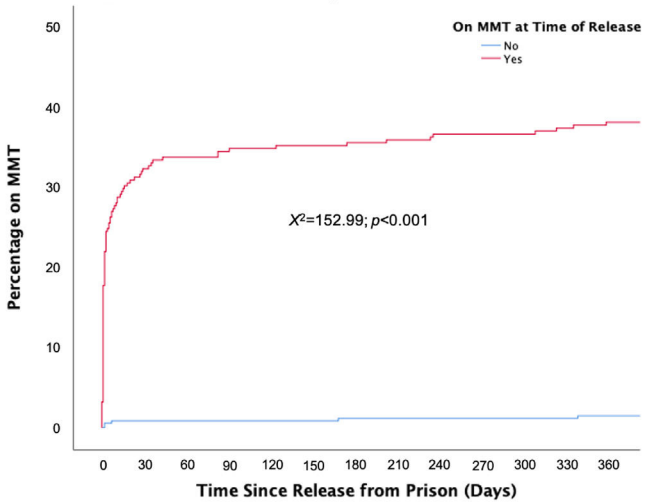

On MMT[a]	Total	Time to MMT Linkage in Community						
		7 Days	30 Days	60 Days	90 Days	180 Days	360 Days	Any
No	356	3 (0.8%)	3 (0.8%)	3 (0.8%)	3 (0.8%)	4 (1.1%)	5 (1.4%)	8 (2.2%)
Yes	282	76 (26.9%)	91 (32.2%)	95 (33.6%)	98 (34.7%)	100 (35.4%)	107 (37.9%)	117 (41.4%)
Total	638	79 (12.3%)	94 (14.7%)	98 (15.3%)	101 (15.8%)	104 (16.3%)	112 (17.5%)	125 (19.5%)

Fig. 1.

Kaplan-Meier curves of linkage to methadone in community after release (n = 638)*

* Excluded individuals with missing dependent variable values; MMT (methadone maintenance treatment); [a] on MMT at the time of release.

Table 1

Characteristics of all people who were prescribed methadone during incarceration ($N = 982$).

Variables	Frequency	%
Age at methadone initiation (years), mean (±SD)	34.9 (±7.6)	
Male	945	96.2
Duration of incarceration (months), mean (±SD)	44.1 (±29.3)	
Methadone start dose in prison		
Low (≤40 mg)	848	86.4
Medium (>40–85 mg)	117	11.9
High (>85 mg)	17	1.7
Maximum methadone dose in prison		
Low (≤40 mg)	259	26.4
Medium (>40–85 mg)	456	46.4
High (>85 mg)	267	27.2
Last methadone dose in prison ($n = 975$)		
Low (≤40 mg)	582	59.7
Medium (>40–85 mg)	290	29.7
High (>85 mg)	103	10.6
Duration on methadone in prison (months), mean (±SD)	12.5 (± 17.4)	

Table 2

Characteristics of those released from prison who were prescribed methadone during incarceration ($n = 645$).

Variables	Frequency	%
Age at release (years), mean (±SD)	37.1 (±7.8)	
Male	618	95.8
Released to Greater Bishkek area	622	96.4
HIV status, positive ($n = 569$)	160	28.1
Duration of current incarceration (months), mean (±SD)	31.6 (±23.8)	
Percentage of time on methadone in prison, mean (±SD)	47.1 (±40.0)	
On methadone in community upon prison entry		
No	620	96.1
Yes	25	3.9
Methadone start dose in prison		
Low (≤40 mg)	542	84.0
Medium (>40–85 mg)	93	14.4
High (>85 mg)	10	1.6
Maximum methadone dose in prison		
Low (≤40 mg)	142	22.0
Medium (>40–85 mg)	323	50.1
High (>85 mg)	180	27.9
Methadone dose at the time of release		
Not on methadone	358	55.5
Low (1–40 mg)	91	14.1
Medium (>40–85 mg)	135	20.9
High (>85 mg)	61	9.5
Rapid taper off methadone upon prison entry	112	17.4
Linked to methadone in community after release	128	19.8
Time to linkage to methadone in community ($n = 128$)		
Within 7 days	79	61.9
Within 30 days	15	11.7
Within 90 days	7	5.4

Variables	Frequency	%
>90 days	27	21.1
Reincarcerated	47	7.3
Died post release	48	7.5
Methadone start dose in community (n = 128)		
Low (≤40 mg)	54	42.5
Medium (>40–85 mg)	52	40.9
High (>85 mg)	21	16.5
Maximum methadone dose in community (n = 128)		
Low (≤40 mg)	15	11.8
Medium (>40–85 mg)	67	52.8
High (>85 mg)	45	35.4
Last post-release methadone dose in community (n = 128)		
Low (≤40 mg)	59	47.2
Medium (>40–85 mg)	43	34.4
High (>85 mg)	23	18.4
Duration on methadone in community (months), mean (±SD)	9.2 (±10.4)	

Table 3

Cox regression hazard ratios for time to linkage to methadone maintenance treatment in community after release ($n = 645$).

Variables	Unadjusted Hazard ratio	95% CI	p	Adjusted Hazard ratio	95% CI	p
Age at the time of release, years	0.99	0.97–1.01	0.731	–	–	–
Male sex	1.86	0.59–5.87	0.285	–	–	–
Released to Greater Bishkek region	1.16	0.43–3.15	0.765	–	–	–
HIV status, positive	1.50	1.01–2.24	0.047	1.55	1.03–2.34	0.033
Duration of current incarceration, months	0.98	0.97–0.99	<0.001	–	–	–
Initiated methadone in community prior to incarceration	3.66	2.06–6.51	<0.001	2.01	1.03–3.90	0.039
Percentage of time on methadone in prison	1.01	1.00–1.02	0.044	0.99	0.98–1.01	0.336
On methadone at the time of release	22.03	10.76–45.12	<0.001	20.81	8.96–48.32	<0.001
Rapid taper off methadone dose in prison	0.34	0.17–0.66	0.002	0.67	0.30–1.49	0.336

Legend: 95% CI: 95% confidence interval; MMT: methadone maintenance treatment.