論文の内容の要旨

論文題目 **The role of methadone-assisted treatment program on improving drug use and preventing HIV infection among people who inject drugs in Dar es Salaam, Tanzania**

(タンザニアのダルエスサラームにおける注射薬物使用者の薬物使用およびエイズ感染予防に対するメサドン補助療法の役割)

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Background

People who inject drugs experience various social and medical problems owing to their altered behavior and bodily functions. Social problems include interpersonal violence and employment instability. These issues affect their employment opportunities and further push them into criminal activities to obtain money for drugs. They also encounter various medical problems including risk of HIV and other blood-borne infections. They can transmit HIV amongst themselves through their high-risk injecting practices such as needle sharing and 'flashblood'—the sharing of a syringe full of blood from another person who injects drugs. HIV can also be transmitted amongst people who inject drugs or to the general population through high-risk sexual practices such as unprotected sex, multiple sexual partnerships, and transactional sex. As a result of such elevated risks, HIV prevalence was 1.7 million out of 12.2 million people who inject drugs globally in 2013. Even while faced with such an exceptional HIV burden, they must content with poor access to health services.

Effective interventions are available to address HIV and drug use problems in people who inject drugs. Such initiatives include needle and syringe provision programs, opioid substitution therapy, HIV testing and counseling, and antiretroviral therapy for those living with HIV. These harm reduction interventions effectively cut short the circle of HIV transmission. For example, needle and syringe provision programs reduce illicit drug use and needle sharing. Similarly, opioid substitution therapy reduces illicit drug use, sharing of injecting equipment, and criminal activities. HIV testing and counseling, meanwhile, reduces high-risk injecting and sexual behaviors. However, these interventions are mostly provided in isolation as single interventions. Combination of such interventions may be more effective for HIV prevention amongst people who inject drugs and in the general population. In addition, a more holistic strategy in this vein may improve other aspects of people who inject drugs' lives including through health care seeking behavior and reduced criminal activities. However, evidence is limited on the effectiveness of combined interventions in Africa, where HIV is still prevalent and drug use is escalating--and Tanzania is no exception.

Tanzania is experiencing a growing problem of drug trafficking and use. It is estimated to harbor about 30,000 people who inject drugs. Like in other countries, people who inject drugs in Tanzania are also at high risk of HIV infection due to their high-risk injecting and sexual behaviors. As a result, HIV prevalence among them is about 35.0%. Such a significant burden far exceeds the 5.1% HIV prevalence rate found in the general population. People who inject drugs may have poor health care seeking behavior and higher rates of criminal activities in Tanzania, as in other countries. In response, HIV prevention and other health interventions for them are available in a few centers in the country. Examples include needle and syringe provision programs and opioid substitution therapy.

Opioid substitution therapy using methadone was first introduced in a public health facility in Tanzania in 2011. Tanzania is among the few countries in Africa to start a public health facility-based, methadone-assisted treatment program. The program is integrated with various health services such as methadone treatment, psychosocial counseling, medical care, and training on income-generating activities. Since its inception, no study has examined the effect of this program in reducing high-risk behaviors among people who inject drugs. Therefore, this study was designed to address five objectives. The first one was to examine the role of an integrated methadone-assisted treatment program—the intervention in reducing drug use behavior among people who inject drugs. The second one was to examine the role of the intervention in reducing their sharing of injecting needles. The third one was to examine the role of the intervention in reducing their criminal activities. The fourth one was to examine the role of the intervention in improving their condom use. The last one was to examine the role of the intervention in improving their health care seeking behavior in Dar es Salaam, Tanzania

We hypothesized that the positive changes in risk behaviors would be higher among people who inject drugs enrolled in the integrated methadone-assisted treatment program compared with those not enrolled in the program after 6 months of treatment. Specifically, enrolled people who inject drugs would improve their health care seeking behaviors and reduce their illicit drug use more frequently than those not in the program. In addition, enrolled people who inject drugs would reduce their sharing of injecting needles, reduce their criminal activities and improve their use of condoms more so than those not enrolled in the program.

Methods

I conducted a prospective cohort study among people who inject drugs in Dar es Salaam, Tanzania. Dar es Salaam region has three municipalities: Kinondoni, Ilala, and Temeke. I included two groups of participants. People who inject drugs newly enrolled into the integrated methadone-assisted treatment program as the intervention group and community-recruited people who inject drugs as the control group. For the intervention group, I included any male or female person who injects drugs aged 18 years and above, and resided in Dar es Salaam. For the control group, I included any male or female person who injects drugs and not enrolled in the program, aged 18 years and above, and resided in Dar es Salaam.

The exclusion criterion was having a severe mental illness. I conducted a brief interview prior to data collection to assess severe mental illness of participants. The items of this assessment included observing if a participant was grossly disorganized in behavior and speech and if he/she was cognizant in time, place, and person. In this study, a participant was considered to have a severe mental illness if he/she had gross disorganization in behavior and speech and was not cognizant of time, place, and person. Among the participants I approached, none had gross disorganization in behavior and speech. Furthermore, all the participants who were approached were cognizant of time, place, and person. Thus none was excluded from the study.

The intervention comprised the integrated methadone-assisted treatment program. The program's clinics are located in the Muhimbili National Hospital in Ilala municipality and Mwananyama Hospital in Kinondoni municipality of the Dar es Salaam region. The program is integrated with various health services such as methadone treatment; HIV testing an counseling; screening for hepatitis B and C virus and STIs; psychosocial counseling; medical care; antiretroviral therapy (ART); tuberculosis treatment; and training on income generating activities.

I recruited both the intervention and control groups participants using convenience sampling. For the intervention group, I selected any new enrollee from the program's clinics at the two hospitals. For the control group, I selected community-recruited people who inject drugs from the sites where they usually meet to use drugs, known as 'vijiwe' or 'maskani' in all three municipalities of Dar es Salaam.

I collected baseline data from January to April 2014 and follow-up data 6 month later from July to October 2014. I used a Swahili language, pre-tested questionnaire for the face-to-face interviews. I measured various participants' characteristics and behaviors. They included their age; sex; marital status; education level; employment status; use of personal health services; drug use behaviors including sharing of injecting needles and practicing flashblood--a practice of sharing a syringe full of blood from another person who has just injected drugs; and sexual behaviors such as the use of condom.

I used both descriptive and regression methods to analyze the data. I analyzed data of 578 participants for a baseline survey. For a follow-up survey, I analyzed data of 466 participants due to loss of follow-up and removing questionnaires with missing data. For the descriptive analyses, I compared the characteristics of the intervention and control groups using chi-squared tests and independent sample t-tests. I assessed the changes in the participants' behaviors from baseline to six months follow-up using differences-in-difference analysis technique.

I used three different types of analyses to examine the role of the integrated methadone-assisted treatment program on the outcome variables of interest. I assessed the health care seeking behavior outcome using the chi-squared test. I used this method because participants who fell ill at baseline were different from those who fell ill at 6-month follow-up. In addition, all participants in the intervention group who fell ill at 6-month follow-up, sought care at a health facility. For drug use outcome, meanwhile, I used logistic regression analysis because all the participants were using drugs at baseline and variability would only have occurred at follow-up.

Finally, I examined the role of the integrated methadone-assisted treatment program on the remaining outcomes using generalized estimating equations (GEE). The outcomes included sharing of injecting needle at the last injection, condom use at the last sexual encounter, and criminal activities. I assessed condom use among sexually active participants only. I used GEE because it provides population average effects for correlated data and the data for the outcome variables had variability at

baseline and at follow-up. I set the statistical significance at $p<0.05$ and used STATA version 12 for all analyses.

The study was approved by the Research Ethics Committee of The University of Tokyo and by the Senate Research and Publications Committee of Muhimbili University of Health and Allied Sciences. Participants provided verbal consent and signed the consent forms. Privacy and confidentiality were maintained.

Results

Participants in the intervention group improved most of their behaviors following the 6 months of treatment in the integrated methadone assisted therapy clinic. They were less likely to use drugs (AOR: 0.0006, 95% CI: 0.00006 – 0.006), share injecting needles (AOR: 0.02, 95% CI: 0.004 – 0.16), and engage in criminal activities (AOR: 0.05, 95% CI: 0.03 – 0.10) compared with those in the control group. In addition, they all sought medical care when they needed it, but only 63.3% (74/117) did so in the control group. However, condom use was not different between two groups (OR: 0.52, 95% CI: 0.27 – 1.01).

Conclusions

The integrated methadone-assisted treatment program improved most of the high-risk behaviors of people who inject drugs in the intervention group at six-month follow-up. They were less likely to use drugs, less likely to share injecting needles at the last injection, and less likely to engage in criminal activities compared to their control group counterparts. In addition, the intervention improved participants' health care seeking behaviors. All people who inject drugs in the intervention group had sought medical care when they needed it in the past 30 days, compared to only 63.3% of those not exposed to the intervention. However, the use of condom was not different between two groups.

Recommendations

The results of this study highlight the need for a scaling up of the integrated methadone-assisted treatment programs in Tanzania and their establishment in countries with a similar problem and context. This program provided an opportunity for people who inject drugs in Dar es Salaam, Tanzania to receive treatment for drug dependence, psychosocial counseling, counseling and screening for infectious diseases, and access to medical care when in need. As a result, its participants reduced their drug use behaviors, reduced sharing of injecting needles, and reduced criminal activities appreciably. The reduction in criminal activities may bring about societal benefits such as environmental safety and reduce the costs incurred from handling people who committed crimes.

On the other hand, the intervention did not improve the use of condom. The level of condom use was not different between those who received the intervention and those who did not. Routine counseling on safer behaviors might help to improve condom use. Furthermore, further explanatory qualitative research is needed to better understand motivations for use and non-use of condoms in this population. To further improve this integrated intervention, it is important to beef it up with more counseling sessions on safer sexual behaviors. Moreover, this challenge must be taken into account when scaling up the integrated methadone-assisted treatment programs across Tanzania and elsewhere.