

Low rates of hepatitis C testing among people who inject drugs in Thailand: implications for peer-based interventions

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ABSTRACT

Background Regular testing for hepatitis C virus (HCV) provides an opportunity for HCV prevention and treatment efforts. In Thailand, the barriers and facilitators of HCV testing among people who inject drugs (IDU) are not known.

Methods Using data derived from the Mitsampan Community Research Project between July and October 2011, we assessed the prevalence and factors associated with ever having been tested for HCV antibodies using bivariate statistics and multivariate logistic regression.

Results Among 427 participants, 141 (33.0%) reported a history of HCV antibody testing. In multivariate analyses, factors positively associated with receiving an HCV antibody test included higher than secondary education [adjusted odds ratio (AOR) = 2.20; 95% confidence interval (CI): 1.35–3.64], binge drug use (AOR = 1.81; 95% CI: 1.12–2.93), methadone treatment enrollment (AOR = 3.47; 95% CI: 1.85–6.95) and having received peer-based education on HCV (AOR = 4.22; 95% CI: 2.66–6.77).

Conclusions We found one-third of Thai IDU in our sample reporting a history of HCV testing. The finding that IDU who received peer-based HCV education were more likely to access HCV testing provides evidence for the value of peer-based interventions for this population.

Keywords hepatitis C testing, peer-education intervention, people who inject drugs, Thailand

Introduction

Hepatitis C virus (HCV) infection continues to be a global public health concern, affecting ~170 million individuals worldwide.^{1,2} People who inject drugs (IDU) constitute a large proportion of prevalent and incident HCV cases via their sharing of drug-injecting paraphernalia, and seroprevalence among this population have been documented to be as high as 90% in countries such as China, Russia, Thailand and Vietnam.^{1–3} Once chronically infected, these individuals are at a heightened risk for developing a wide array of health problems, including chronic liver disease, liver cirrhosis and liver cancer.^{4–6}

Early diagnosis of HCV infection through regular HCV testing can lead to effective treatment and care when clinically indicated, and can overall minimize morbidity and mortality associated with HCV.⁷ However, in Thailand, HCV

testing and treatment services are not widely available, and recent reviews suggest inadequate access to HCV testing in this setting.⁸ Thailand's healthcare system operates through three main public health financing schemes: the Civil Servants' Medical Benefit Scheme (CSMBS), Social Security Scheme and Universal Healthcare Coverage (UC) Scheme. Individuals under the CSMBS are eligible for full reimbursement of HCV testing and treatment; however, this scheme

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only includes government employees and their dependents. In fact, the majority of IDU are covered under the UC Scheme, and despite what the term 'UC Scheme' implies, expenses related to HCV are paid out of pocket for these individuals. Currently, HCV antibody tests in Thailand cost ~200–300 Thai Baht (~\$6–9 USD) and the cost of a 48-week course of HCV treatment, a combination of two drugs pegylated interferon and ribavirin, is ~1 million Thai Baht (~\$32 000 USD).⁹

In addition to financial barriers, other barriers that may prevent IDU from accessing HCV testing and treatment include the high levels of stigma and discrimination that may exist within conventional healthcare settings, which may in turn affect patient–provider relationships and the willingness on the part of physicians to treat these individuals.^{10,11} While potential barriers to HCV testing and treatment among IDU have been widely documented in developed settings,^{11,12} little is known about access to HCV services (i.e. HCV testing and treatment), in particular among Thai IDU. Therefore, we sought to investigate the prevalence and correlates of HCV testing among a community-recruited sample of IDU in Bangkok, Thailand. Additionally, we explored access to HCV treatment among HCV-positive IDU.

Methods

The Mitsampan Community Research Project is a collaborative research project involving the Mitsampan Harm Reduction Center (MSHRC) (Bangkok, Thailand), the Thai AIDS Treatment Action Group (Bangkok, Thailand), Chulalongkorn University (Bangkok, Thailand) and the British Columbia Centre for Excellence in HIV/AIDS (BC-CfE)/University of British Columbia (Vancouver, Canada). During July and October 2011, the research partners undertook a cross-sectional study involving 440 community-recruited IDU. To overcome some of the barriers to conducting research with this highly marginalized population, we employed a community-based research design that involved local IDU in all stages of the project. Specifically, former and active IDU were trained as peer researchers by frontline staff from the BC-CfE on how to correctly administer surveys. Potential participants were recruited through peer-based outreach and word of mouth and were invited to attend the Mitsampan Harm Reduction Center or O-Zone House (local drop-in centers for IDU) to be part of the study. Former and active IDU trained to conduct outreach were sent offsite in pairs to areas with a high density of IDU to recruit participants. Potential participants were given information cards with directions to the MSHRC and further contact instructions. Adults residing in

Bangkok or adjacent provinces who had injected drug(s) in the previous 6 months were eligible for participation in the study. All participants provided oral informed consent and completed an interviewer-administered questionnaire eliciting demographic data as well as information about drug use patterns, HIV risk behavior and experiences with healthcare services. Participants received a stipend of 350 Thai Baht (~\$11 USD) upon completion of the questionnaire. The study was approved by the research ethics boards at Chulalongkorn University and the University of British Columbia.

The primary outcome of interest in this analysis was having ever received an HCV test. We compared IDU who did and did not report receiving an HCV test using the bivariate statistics and multivariate logistic regression. In the present study, an HCV test refers to an HCV antibody test. This study only included participants who provided complete data. Explanatory variables of interest were chosen based on a previous study conducted on HCV testing among HIV-positive IDU in Thailand¹³ and based on a review of relevant literature on the topic. Variables considered included median age (≥ 38 years vs. < 38 years), gender (male vs. female), education level (\geq secondary education vs. $<$ secondary education), HIV serostatus (positive vs. negative or unknown), frequent heroin injection ($>$ weekly vs. \leq weekly), frequent midazolam injection ($>$ weekly vs. \leq weekly), frequent methamphetamine injection ($>$ weekly vs. \leq weekly), years since first injection (per year older), binge drug use (yes vs. no), syringe sharing (yes vs. no), ever accessed voluntary drug treatment (excluding methadone treatment) (yes vs. no), ever accessed methadone treatment (yes vs. no), barriers to accessing healthcare services (any vs. none), ever incarcerated (yes vs. no), unprotected sex (yes vs. no) and ever received peer-based education on HCV (yes vs. no). All variables refer to the previous 6 months unless otherwise indicated. Binge drug use was defined as 'having injected drugs more than usual in the last 6 months'. Barriers to accessing health care were defined as in a previous study,¹⁴ including long wait lists/times, stigma and discrimination by healthcare professionals, among others. Participants were coded as having received peer-based education on HCV if they received education about HCV by a trained former or active drug user at the MSHRC or any other harm reduction center. In this setting, harm reduction centers provide a range of health and harm reduction services to IDU, including needle and syringe distribution, education about HIV and HCV and various support programs.

Bivariate statistics and multivariate logistic regression were applied to determine factors associated with ever having

received an HCV test. Categorical variables were analyzed using Pearson's χ^2 test and Fisher's exact test (when one or more cells contained values less than or equal to five), and continuous variables were analyzed using a simple logistic regression. We then applied an *a priori*-defined statistical protocol based on the examination of the Akaike Information Criterion (AIC) and *P*-values to construct an explanatory multivariate logistic regression model. First, we constructed a full model including all variables analyzed in bivariate analyses. After noting the AIC of the model, we removed the variable with the largest *P*-value and built a reduced model. We continued this iterative process until no variables remained for inclusion. We selected the multivariate model with the lowest AIC score. All *P*-values were two sided. As a sub-analysis, among participants who were HCV positive, we identified the proportion of individuals who received a viral load test and those who were referred to an HCV-specialist doctor. Among those who were referred to a specialist, we identified the proportion of IDU who were offered HCV treatment at a cost.

Results

A total of 427 individuals with complete data were included in this study: 83 (19.4%) were female and the median age was 38 years (interquartile range: 34–48 years). Thirteen (3.0%) participants failed to provide complete data and thus were excluded from further analyses. In total, 141 (33.0%) participants reported that they had been tested for HCV in the past. As indicated in Tables 1 and 2, factors significantly and positively associated with HCV testing in bivariate analyses included higher than secondary education [odds ratio (OR) = 2.70; 95% confidence interval (CI): 1.72–4.23], HIV-positive serostatus (OR = 1.96; 95% CI: 1.19–3.21), years since first injection (OR = 1.02; 95% CI: 1.00–1.05), binge drug use (OR = 2.26; 95% CI: 1.47–3.48), having ever accessed methadone treatment (OR = 4.59; 95% CI: 2.47–8.56) and having received peer-based education on HCV (OR = 4.94; 95% CI: 3.18–7.69). Having unprotected sex (OR = 0.62; 95% CI: 0.39–0.97) was negatively associated with having been tested for HCV.

Table 3 presents the results of multivariate analyses of factors associated with having been tested for HCV. As indicated here, higher than secondary education [adjusted odds ratio (AOR) = 2.20; 95% CI: 1.35–3.64], binge drug use (AOR = 1.81; 95% CI: 1.12–2.93), having ever accessed methadone treatment (AOR = 3.47; 95% CI: 1.85–6.95) and received peer-based education on HCV (AOR = 4.22; 95% CI: 2.66–6.77) remained significantly associated with having been tested for HCV. Among the participants who

were tested for HCV, 33 (23.4%) reported an HCV-positive serostatus. Among those who were HCV positive, 54.5% were offered a viral load test and 27.3% were referred to an HCV-specialist doctor. Among those who were referred to a specialist doctor, 33.3% were offered HCV treatment by their doctor at a cost.

Discussion

Main findings of this study

Our study found a low prevalence of HCV testing among a sample of Thai IDU, with only one-third of the participants reporting a history of HCV testing. Of importance, Thai IDU who received peer-based HCV education were more likely to report HCV testing. Various factors, including higher education, binge drug use and having been previously enrolled in methadone treatment, were also independently associated with having been tested for HCV. Among the 33 Thai IDU who reported a prior positive antibody test for HCV, 54.5% were offered a viral load test and 27.3% received a referral to see an HCV-specialist doctor. 33.3% of those who were referred were offered HCV treatment at a cost.

What is already known on this topic

Elements of prevention, treatment and care for HCV infection among IDU have been previously described in the literature and include HCV testing and counseling, social support, prevention education and interferon-based treatment.¹¹ However, prior research has documented a number of barriers to HCV testing and treatment among IDU in developed settings, including fear of a positive result and poor patient–physician relationships.^{15,16} To overcome some of these barriers, peer-based interventions have shown to be effective in improving the uptake of HCV testing among IDU in developed countries such as Australia.^{17,18} Though many international health organizations have recommended the implementation of peer-based interventions for prevention, testing and treatment efforts of infectious diseases, the Thai government has been reluctant to support these evidence-based initiatives^{19,20} and thus, there are limited peer-based harm reduction programs available in Thailand mainly funded through external sources.²¹

What this study adds

Consistent with prior research,¹³ our study found a low uptake of HCV testing among a sample of Thai IDU in a setting where testing is not routinely offered. However, past work in this area was focused on HIV-positive IDU, and

Table 1 Bivariate analyses of socio-demographic factors and drug-using behaviors associated with ever having been tested for HCV among IDU in Bangkok, Thailand ($n = 427$)

Characteristic	Ever tested for HCV		Odds ratio (95% CI)	P-value
	Yes [141 (33.0%)]	No [286 (67.0%)]		
Age				
≥ 38 years	72 (51.1)	153 (53.5)	0.91 (0.61–1.36)	0.64
< 38 years	69 (48.9)	133 (46.5)		
Gender				
Male	110 (78.0)	234 (81.8)	0.79 (0.48–1.30)	0.35
Female	31 (22.0)	52 (18.2)		
Education level				
\geq Secondary education	107 (75.9)	154 (53.8)	2.70 (1.72–4.23)	< 0.01
$<$ Secondary education	34 (24.1)	132 (46.2)		
HIV serostatus				
Positive	37 (26.2)	44 (15.4)	1.96 (1.19–3.21)	< 0.01
Negative or unknown	104 (73.8)	242 (84.6)		
Heroin injection ^a				
$>$ Weekly	36 (25.5)	56 (19.6)	1.41 (0.87–2.27)	0.16
\leq Weekly	105 (74.5)	230 (80.4)		
Midazolam injection ^a				
$>$ Weekly	82 (58.2)	153 (53.5)	1.21 (0.80–1.82)	0.36
\leq Weekly	59 (41.8)	133 (46.5)		
Methamphetamine injection ^a				
$>$ Weekly	27 (19.1)	59 (20.6)	0.91 (0.55–1.51)	0.72
\leq Weekly	114 (80.9)	227 (79.4)		
Years since first injection				
Mean	21	19	1.02 (1.00–1.05)	0.02
IQR	16–28	12–24		
Binge drug use ^a				
Yes	59 (41.8)	69 (24.1)	2.26 (1.47–3.48)	< 0.01
No	82 (58.2)	217 (75.9)		
Syringe sharing ^a				
Yes	25 (17.7)	51 (17.7)	0.99 (0.59–1.68)	0.98
No	116 (82.3)	235 (82.3)		

^aRefers to activities in the previous 6 months.

our study is, to our knowledge, the first to characterize HCV testing prevalence among a community-recruited sample of HIV negative and positive IDU in Thailand. Our findings revealed that among those who were tested for HCV, almost one-quarter tested positive for HCV. The inconsistency between HCV prevalence among IDU in our study and in the previous literature³ may be due to the fact that only a small proportion of our sample of Thai IDU were previously tested for HCV, thereby underestimating HCV positivity among this population in the present study. Further, our findings suggest suboptimal levels of patient–physician interaction among IDU who received an HCV

test, as 54.5% of IDU who tested positive for HCV were offered a viral load test, and 27.3% were referred to an HCV-specialist doctor. These findings are of particular concern, and may be in part due to the structural barriers associated with access to HCV services in Thailand, since HCV testing and treatment are not covered through two of the three healthcare schemes. Also, the decision to treat a patient with HCV is often complicated and is based upon various factors (e.g. age, stage of fibrosis, contraindications to therapy, adverse effects related to therapy), and may not be suitable for all individuals with chronic HCV.²² Regardless, knowledge of HCV serostatus at an earlier stage

Table 2 Bivariate analyses of social/structural factors and sexual risk behavior associated with ever having been tested for HCV among IDU in Bangkok, Thailand ($n = 427$)

Characteristic	Ever tested for HCV		Odds ratio (95% CI)	P-value
	Yes [141 (33.0%)]	No [286 (67.0%)]		
Ever accessed voluntary drug treatment (excluding methadone treatment)				
Yes	42 (29.8)	63 (22.0)	1.50 (0.95–2.37)	0.08
No	99 (70.2)	223 (78.0)		
Ever accessed methadone treatment				
Yes	128 (90.8)	195 (68.2)	4.59 (2.47–8.56)	<0.01
No	13 (9.2)	91 (31.8)		
Barriers accessing healthcare services				
Any	102 (72.3)	212 (74.1)	0.91 (0.58–1.44)	0.69
None	39 (27.7)	74 (25.9)		
Ever incarcerated				
Yes	109 (77.3)	210 (73.4)	1.23 (0.77–1.98)	0.39
No	32 (22.7)	76 (26.6)		
Unprotected sex ^a				
Yes	36 (25.5)	102 (35.7)	0.62 (0.39–0.97)	0.04
No	105 (74.5)	184 (64.3)		
Ever received peer-based education on HCV				
Yes	77 (54.6)	56 (19.6)	4.94 (3.18–7.69)	<0.01
No	64 (45.4)	230 (80.4)		

HCV, hepatitis C virus; IDU, people who inject drugs; CI, confidence interval.

^aRefers to activities in the previous 6 months.

Table 3 Multiple logistic regression of factors associated with ever having been tested for HCV among IDU in Bangkok, Thailand ($n = 427$)

Variable	AOR	95% CI	P-value
Education level			
≥Secondary education vs. <secondary education	2.20	1.35–3.64	<0.01
Binge drug use ^a			
Yes vs. no	1.81	1.12–2.93	0.02
Ever accessed methadone treatment			
Yes vs. no	3.47	1.85–6.95	<0.01
Received peer-based education on HCV			
Yes vs. no	4.22	2.66–6.77	<0.01

^aRefers to activities in the previous 6 months.

of infection provides an opportunity for prevention of further HCV transmission by increasing knowledge of HCV serostatus and risks associated with HCV transmission.

Therefore, access to comprehensive harm reduction services and better linkages to IDU-friendly healthcare services are necessary for controlling HCV transmission in this setting.²³ Policy changes that include the incorporation of HCV services within the Thai universal healthcare system are also needed. In particular, efforts to harmonize the three healthcare schemes to provide coverage of HCV testing and treatment to all individuals, as well as efforts to produce generic versions of pegylated interferon and ribavirin may assist in providing access to low cost or free HCV treatment for this population.

We found that IDU who received peer-based education were more likely to have been tested for HCV. Consistent with previous studies focused on peer-based interventions, this finding suggests that peer-education interventions are effective in reaching and educating IDU who may not be reached by other means.^{24–26} Though several non-governmental organizations in Thailand are increasingly utilizing peer-based models as a way of conveying and distributing harm reduction information and blood-borne virus prevention tools (i.e. clean injecting equipment, voluntary counselling and testing, access to healthcare) to IDU,^{27,28} these initiatives are not widespread and are mainly funded through international sources. Nonetheless, given the high risks associated with contracting HCV especially among this population, and the added risk of HIV and HCV co-infection, it is encouraging to note that peer-education interventions appear to be promoting access to HCV testing. Future efforts to expand on these peer-based initiatives by increasing the coverage of such programs are warranted in this setting.

Our study revealed that IDU who accessed methadone treatment were more likely to have been tested for HCV than those who had never accessed methadone treatment. This finding is consistent with previous studies demonstrating the benefits of drug treatment programs in terms of providing linkages to healthcare services for IDU,^{29,30} and is consistent with past work showing a positive impact of engagement in methadone treatment on HIV treatment.³¹ Of concern, however, is the lack of association between having accessed voluntary drug treatment and having been tested for HCV when methadone treatment was excluded from the variable definition. We postulate that this relationship exists because non-methadone treatment service providers may not be well educated regarding the risks and transmission routes of HCV and thus, may not refer IDU to HCV testing services. Given that a recent study conducted in Thailand demonstrated a positive association between voluntary drug treatment services and HIV testing,¹⁴ future research may want to explore the inconsistency between HIV

and HCV testing referrals further from a providers' perspective. Regardless, training programs that improve drug treatment service providers' knowledge of HCV may help increase the uptake of HCV services among the IDU population.^{32–34}

The national guidelines on HIV/AIDS in Thailand states that individuals who test positive for HIV should be screened for HCV co-infection prior to starting antiretroviral therapy (ART).³⁵ However, the fact that HIV-positive serostatus did not remain significantly associated with a history of HCV testing in our multivariate model suggests that these guidelines have not been appropriately met, and may be an indication that HCV testing among HIV-positive IDU are not being initiated early enough. Providing HCV testing subsequently after a HIV-positive test result, regardless of whether the individual meets the CD4 requirement to initiate ART (i.e. CD4 levels ≤ 350), may prove effective in improving the uptake of testing among this population. As well, early testing will help to inform the choice of first-line regimen for individuals who are eligible for HCV treatment.

Binge drug use, a measure of intensity of injection drug use, was found to be positively associated with having been tested for HCV. That these individuals were more likely to have been tested is a positive finding given that IDU who are binge users are at a high risk of acquiring HCV infection.^{36,37}

Limitations of this study

This study has several limitations. First, due to the cross-sectional design of the study, we were unable to determine a temporal relationship between the explanatory variables and the outcome. Secondly, the data collected was self-reported and may be subject to reporting biases, such as socially desirable reporting and recall bias. Thirdly, given that the study sample was not randomly selected, the study findings may not be generalizable to Thai IDU or IDU in other settings.

In sum, only one-third of our study sample reported a history HCV testing. Various factors, including higher education, binge drug use and a history of accessing methadone treatment, were positively associated with having been tested for HCV. Importantly, IDU who received HCV education through peer-based efforts were also more likely to have been tested for HCV. Our findings also highlight the sub-optimal levels of HCV services within conventional health-care settings. Collectively, these findings provide evidence for continued investments in peer-education interventions as well as health policy changes that incorporate HCV testing, treatment and care for all individuals within Thailand's universal healthcare system.

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