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# Factors Associated With Interest In Receiving Methadone Treatment Among Opioid Dependent Prisoners In Malaysia

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# Factors Associated with Interest in Receiving Methadone Treatment Among Opioid Dependent Prisoners in Malaysia

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## **ABSTRACT**

Background: Criminalization of drug use in Malaysia has led to a concentrated epidemic of HIV and substance use disorders within prisons. In response, Malaysia introduced prison-based methadone maintenance therapy (MMT) programs to treat opioid dependence and reduce risky behaviors. Despite the introduction of this program, MMT uptake has been suboptimal in prison settings. Therefore identifying individual-level factors associated with MMT initiation is key to improving uptake.

Methods: 200 incarcerated individuals with a history of opioid use in the 12 months prior to incarceration were enrolled in a study to determine factors associated with interest in receiving MMT. All participants were 18 years of age or older, had been detained for at least 30 days, and were able to speak English or Bahasa Malaysia. Additionally, HIV-positive inmates were selectively recruited up to 50%. Logistic regression analysis was used to identify the factors associated with MMT interest.

Findings: Only 85 (43%) participants expressed an interest in receiving MMT, 18 (21%) of whom were currently enrolled in the MMT program. Age, ethnicity, religion, education, and income were unrelated to interest in MMT ( $p > 0.05$ ). Conversely, those that were previously married (OR=4.15), had a history of incarceration (OR=5.68), depression (OR=3.66), reported daily pre-incarceration heroin use (OR=5.53), and had the most favorable attitudes towards MMT (OR=19.82) had a greater odds of being interested in receiving MMT ( $p < 0.05$ ).

Conclusions: Results show that interest in MMT initiation is largely driven by social, legal and psychological problems related to drug use. Incarceration provides a unique window of opportunity to initiate MMT, and successful uptake of MMT will not be possible without first addressing the barriers towards receiving MMT in prison, and how attitudes towards methadone impairs MMT interest.

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**Table 1: Participant Characteristics**

<b>Characteristic</b>	<b>Overall mean (SD) or N (%)*</b>	<b>MMT interest Yes N=85 (43%)</b>	<b>MMT interest No N=115 (57%)</b>	<b>p-value<sup>a</sup></b>
<b>Age (years)</b>	40.9 ± 9.0	40.6 ± 8.9	41.1 ± 9.1	0.703
<b>Ethnicity</b>				0.341
Malay	142 (71.0)	65 (45.8)	77 (54.2)	
Indian	35 (17.5)	12 (34.3)	23 (65.7)	
Other	23 (11.5)	8 (34.8)	15 (65.2)	
<b>Religion</b>				0.822
Islam	155 (77.5)	66 (42.6)	89 (57.4)	
Hindu	26 (13.0)	12 (46.2)	14 (53.9)	
Other	19 (9.5)	7 (36.8)	12 (63.2)	
<b>Marital status</b>				0.074
Currently married	47 (23.5)	14 (29.8)	33 (70.2)	
Never married	130 (65.0)	58 (44.6)	72 (55.4)	
Previously married	23 (11.5)	13 (56.5)	10 (43.5)	
<b>Highest level of education completed</b>				0.679
Primary	38 (19.0)	17 (44.7)	21 (55.3)	
Form 3	66 (33.0)	28 (42.4)	38 (57.6)	
Form 5	76 (38.0)	34 (44.7)	42 (55.3)	
University	20 (10.0)	6 (30.0)	14 (70.0)	
<b>Income (monthly)</b>				0.483
≤1000MYR	58 (29.1)	27 (46.6)	31 (53.4)	
≥1001MYR	141 (70.9)	58 (41.1)	83 (58.9)	
<b>Prior history of incarceration</b>				0.003
Yes	173 (86.9)	81 (46.8)	92 (53.2)	
No	26 (13.1)	4 (15.4)	22 (84.6)	
<b>Prior compulsory drug treatment</b>				0.071
Yes	119 (59.8)	57 (47.9)	62 (52.1)	
No	80 (40.2)	28 (35.0)	52 (65.0)	
<b>HIV status</b>				0.360
HIV +	96 (48.0)	44 (45.8)	52 (54.2)	
HIV -	104 (52.0)	41 (39.4)	63 (60.6)	
<b>Depression</b>				0.061
Yes	88 (44.7)	44 (50.0)	44 (50.0)	
No	109 (55.3)	40 (36.7)	69 (63.3)	
<b>Prior MMT use</b>				0.041
Yes	93 (48.2)	48 (51.6)	45 (48.4)	
No	100 (51.8)	37 (37.0)	63 (63.0)	
<b>Polysubstance use in the 30 days prior to incarceration</b>				0.027
Yes	72 (36.0)	38 (52.8)	34 (47.2)	
No	128 (64.0)	47 (36.7)	81 (63.3)	
<b>Lifetime injection drug use (IDU)</b>				0.002
Yes	136 (69.7)	68 (50.0)	60 (50.0)	
No	59 (30.3)	17 (28.8)	42 (71.2)	

<b>Frequency of heroin use in 30 days prior to incarceration</b>				0.003
None	31 (15.5)	5 (16.1)	26 (83.9)	
Intermittent	36 (18.0)	14 (38.9)	22 (61.1)	
Daily	133 (66.5)	66 (49.6)	67 (50.4)	
<b>Addiction severity</b>				0.144
Low	80 (40.0)	29 (36.3)	51 (63.8)	
High	120 (60.0)	56 (46.7)	64 (53.3)	
<b>Treatment readiness</b>				
Recognition	27.1 ± 3.2	27.6 ± 2.7	26.8 ± 3.5	0.099
Ambivalence	14.6 ± 2.0	14.7 ± 1.9	14.5 ± 2.1	0.530
Taking Steps	31.0 ± 4.0	31.3 ± 3.6	30.8 ± 4.2	0.458
<b>Opioid use stigma</b>				
Disclosure Concerns	14.7 ± 2.0	14.9 ± 2.0	14.6 ± 2.0	0.193
Negative Self-Image	14.1 ± 2.1	14.2 ± 2.3	14.0 ± 2.0	0.476
Public Attitudes	14.7 ± 2.1	15.0 ± 2.3	14.4 ± 2.0	0.054
Personalized Stigma	22.0 ± 3.6	22.6 ± 3.9	21.6 ± 3.3	0.057
<b>MMT attitudes</b>				<0.001
Low	50 (25.4)	8 (16.0)	42 (84.0)	
Moderate	103 (52.3)	47 (45.6)	56 (54.4)	
High	44 (22.3)	28 (63.6)	16 (36.4)	

Note: Percentages may not sum to 100%

\*Numbers may not sum to 200 due to missing data.

<sup>a</sup> P-value for  $\chi^2$  test for categorical variables or t-test for continuous variables.

**Table 2: Predictors of interest in MMT**

Characteristic	Unadjusted OR*	95% CI	p-value	Adjusted OR**	95% CI	p-value
<b>Marital status</b>						
Currently Married	1.00			1.00		
Never Married	2.15	(1.03, 4.50)	0.043	1.72	(0.70, 4.23)	0.241
Previously Married	3.20	(1.12, 9.11)	0.029	4.15	(1.15, 15.02)	0.030
<b>Prior history of incarceration</b>	4.53	(1.48, 13.84)	0.008	5.68	(1.54, 21.02)	0.009
<b>Depression</b>	1.75	(0.97, 3.15)	0.062	3.66	(1.68, 7.98)	0.001
<b>Frequency of heroin use in 30 days prior to incarceration</b>						
None	1.00			1.00		
Intermittent	4.06	(1.15, 14.39)	0.030	2.91	(0.72, 11.86)	0.135
Daily	6.66	(2.19, 20.27)	<0.001	5.53	(1.65, 18.58)	0.006
<b>MMT attitudes</b>						
Low	1.00			1.00		
Moderate	4.34	(1.84, 10.21)	<0.001	7.82	(2.87, 21.29)	<0.001
High	11.25	(4.06, 31.17)	<0.001	19.82	(6.07, 64.74)	<0.001

\*Unadjusted OR for variables significant at p <0.10

\*\*Final model includes all variables significant at p <0.05 (N=186)

**Table 3: Attitudes towards MMT**

Characteristic	Overall mean (SD) or N (%) <sup>*</sup>	MMT interest Yes N=85 (43%)	MMT interest No N=115 (57%)	p-value <sup>^</sup>
<b>Methadone therapy is the best way to treat opiate addiction</b>				<0.001
Agree	151 (75.5)	77 (51.0)	74 (49.0)	
Disagree	49 (24.5)	8 (16.3)	41 (83.7)	
<b>Being on methadone therapy would improve the quality of my life</b>				<0.001
Agree	146 (73.0)	77 (52.7)	69 (47.3)	
Disagree	54 (27.0)	8 (14.8)	46 (85.2)	
<b>Methadone therapy is only replacing one addiction for another</b>				0.228
Agree	146 (73.0)	77 (52.7)	69 (47.3)	
Disagree	54 (27.0)	8 (14.8)	46 (85.2)	
<b>Methadone therapy is bad for a person's health</b>				<0.001
Agree	100 (50.3)	25 (25.0)	75 (75.0)	
Disagree	99 (49.7)	59 (59.6)	40 (40.4)	
<b>Being on methadone therapy would help me stay out of prison or Pusat Serenti</b>				<0.001
Agree	140 (70.0)	71 (50.7)	69 (29.3)	
Disagree	60 (30.0)	14 (23.3)	46 (76.7)	
<b>People should try to get off of methadone therapy as soon as they can</b>				0.698
Agree	143 (71.5)	62 (43.4)	81 (56.6)	
Disagree	57 (28.5)	23 (40.4)	34 (59.6)	
<b>Being on methadone therapy would keep me from injecting</b>				0.003
Agree	156 (78.0)	75 (48.1)	81 (51.9)	
Disagree	44 (22.0)	10 (22.7)	34 (77.3)	
<b>Methadone therapy encourages people to use more of other drugs</b>				0.164
Agree	92 (46.2)	34 (37.0)	58 (63.0)	
Disagree	107 (53.8)	50 (46.7)	57 (5.3)	
<b>People look down on those in methadone therapy</b>				0.123
Agree	64 (32.2)	22 (34.4)	42 (65.6)	
Disagree	135 (67.8)	62 (45.9)	73 (54.1)	
<b>Doctors who prescribe methadone treat addicts poorly</b>				0.463
Agree	35 (17.6)	13 (37.1)	22 (62.9)	
Disagree	164 (82.4)	72 (43.9)	92 (56.1)	
<b>My religious beliefs do not permit me to use methadone as a treatment for my drug addiction</b>				0.034
Agree	53 (26.5)	16 (30.2)	37 (69.8)	
Disagree	147 (73.5)	69 (46.9)	78 (53.1)	

<sup>\*</sup>Numbers may not sum to 200 due to missing data.

<sup>^</sup> P-value for  $\chi^2$  test for categorical variables.

## INTRODUCTION

Malaysia is currently facing an epidemic of drug use, with over 300,000 drug users in the country, 170,000 of whom are people who inject drugs (PWID) (Vicknasingam and Mazlan, 2008; WHO, 2011). In 2013 alone, Malaysia accounted for an additional 20,887 drug users, 75.1% of whom reported opioid use (ADK, 2013). Following a period of consistent decline, the number of new opioid users in Malaysia has nearly doubled from 8,472 in 2012 to 16,035 in 2013, while the use of other drugs have either remained the same, or continued to decline (ADK, 2013). Additionally, Malaysia reports the highest prevalence of opioid use at 0.94%, when compared to the rest of Southeast Asia (UNODC, 2014). Similarly, Malaysia also reports the highest cumulative incidence of HIV due to drug use (76.3%) in all of Southeast Asia, with an average of six new infections reported to the Ministry of Health everyday (Chawarski et al., 2006; MoH, 2011; Suleiman, 2012).

In response, the Malaysian government introduced several harm reduction programs in 2006, including methadone maintenance therapy (MMT) (MoH, 2013). The long history of punitive and abstinence only drug policies, however, continue to exist and suspected drug users are routinely sent to compulsory drug detention and rehabilitation centers (Pusat Serenti), or prison, thereby preventing access to evidence-based treatment, and limiting the success of prevention efforts (Kamarulzaman, 2009a). Approximately 45% of all prison inmates in Malaysia are convicted on drug charges, and the harsh criminalization of drug use has led to a tremendous increase in the number of people who are HIV-positive and opioid dependent in prison (MoH, 2011; UNODC, 2010).

In 2008, MMT was extended to 12 prisons, and serves approximately 200 patients in total, leaving much room for improvement (Kamarulzaman, 2009b). Evidence from the United States,

Australia and Malaysia have demonstrated numerous benefits of initiating MMT within prison, including increased adherence to antiretroviral therapy (ART) and viral load suppression for those that are HIV-positive (Springer and Bruce, 2008) (Farrell et al., 2005; Kamarulzaman, 2009a; Wolfe et al., 2010). MMT initiated prior to release also has the potential to reduce needle sharing within prison, and prevent relapse to drug use and death from overdose after release. Additionally, MMT has proven successful in reducing the rates of criminal behavior and recidivism, and ensuring continuity of care and retention in treatment post-release (Binswanger et al., 2007; Bruce et al., 2007; Dolan et al., 2003; Dolan et al., 2005; Gordon et al., 2012; Gordon et al., 2008; Keen et al., 2000; Kinlock et al., 2009; Kinlock et al., 2007; Stallwitz and Stover, 2007).

Outside of the prison, people who use drugs continue to face a number of structural barriers that may inhibit treatment seeking. In Malaysia, MMT users must register with the government, which impedes their ability to obtain a driver's license, gain employment, seek child custody, and reinforces the 'drug user' label for the duration of treatment (Needle and Zhao, 2010). Additionally, police frequently wait outside MMT clinics and target patients for stop and frisk searches, subjecting registered users to additional stigma, discrimination, and harassment that may impede their desire to initiate treatment (Wickersham et al., 2013). In contrast, initiation of MMT within prison may overcome some of these initial barriers to beginning treatment in the community.

Therefore, initiating MMT prior to release from prison is critical in treating opioid dependence and halting the spread of HIV. Uptake of MMT in Malaysia has been suboptimal, and an enormous gap still exists between those who need treatment and those who actually receive treatment. Furthermore, little is known about MMT usage within prisons in Malaysia. Thus, the

objective of this study was to identify individual-level factors associated with interest in receiving MMT, in order to identify the barriers and facilitators of engaging incarcerated persons in treatment.

## **MATERIALS & METHODS**

### ***Study Design***

This cross-sectional study was conducted between June and August 2014 in the male correctional facility of Kajang State Prison in Selangor, Malaysia located 30 km outside of the federal territory of Kuala Lumpur. Kajang State Prison was chosen for this study because it has a separate Drug Treatment and Rehabilitation division, and is one of Malaysia's largest prisons.

### ***Data Collection***

Participants were identified through convenience sampling, in which prison officials assessed initial eligibility and interest in each cellblock. Interested participants were brought to a member of the study team, who further assessed eligibility, described the nature of the study, any risks and benefits, and obtained verbal consent in a private area. Participants met eligibility criteria if they were over the age of 18 years, had used some form of opioids, specified as heroin, morphine or opium, in the twelve months prior to incarceration, had been detained for at least 30 days in their current incarceration period, were able to speak and understand English or Bahasa Malaysia, and were able to provide consent. HIV-positive participants were selectively enrolled up to 50% of the study population, and were recruited from a separate cellblock reserved for HIV-positive inmates. Foreign residents and those on death row were excluded, as they are not eligible to enroll in a prison-based MMT program under Malaysian law. All data was collected through the use of structured interviews lasting approximately 45 minutes, and were conducted

in either English or Bahasa Malaysia by trained research assistants. Additionally, this study was approved by ethical review boards at both Yale University and University of Malaya, and was conducted in accordance to standards at Kajang State Prison.

### ***Study Measures***

The outcome variable used in all analyses was interest in receiving MMT treatment. This was defined as either currently receiving MMT within the prison, or interest in receiving MMT if they were not currently enrolled in treatment. A broad range of correlates related to interest in MMT were examined, including sociodemographic characteristics, incarceration history, co-morbid conditions, drug use history and psychosocial factors.

Sociodemographic characteristics included age, ethnicity, religion, marital status, and highest level of education completed. Monthly income prior to incarceration was dichotomized as  $\leq 1000$ MYR or  $\geq 1001$ MYR, roughly corresponding to Malaysia's poverty line income (Hatta and Ali, 2013). Prior history of incarceration in prison or in a compulsory drug treatment detention center (Pusat Serenti) was also dichotomized as having been previously incarcerated, or not having been previously incarcerated.

All incarcerated individuals are tested for HIV upon arrival to the detention facility, and HIV status was pre-determined as HIV-positive or HIV-negative by prison officials. The presence of depression was determined through the use of the CES-D questionnaire, in which scores greater than ten correspond to depression (Andresen et al., 1994).

Prior MMT usage, and drug use history and behavior were also assessed. Those that used more than three drugs in a day, in the 30 days prior to incarceration were defined as polysubstance drug users. Frequency of heroin use in the 30 days prior to incarceration was also determined.

Frequency of heroin use was defined as none, if participants did not use heroin in the 30 days prior to incarceration, or daily if they reported everyday use of heroin. All others were defined as intermittent users. Opioid dependence was determined using the RODS screening tool, where participants were defined as opioid dependent if they responded to having three or more characteristics related opioid dependence (Wickersham et al., 2015).

Psychosocial predictors of interest in MMT included addiction severity, treatment readiness, opioid use stigma and attitudes towards methadone. Addiction severity was assessed using the DAST-10, and was further dichotomized as low or high, in which scores greater than five characterized high levels of addiction severity (Skinner, 1982). Treatment readiness was measured using SOCRATES-8D, which consists of three subscales measuring recognition of problems related to drug use, ambivalence of a drug use problem, and taking steps towards making positive changes related to drug use behaviors (Miller and Tonigan, 1996). Opioid use stigma was assessed by adapting an abridged version of the Berger HIV Stigma Scale, in which the term 'I have HIV' was replaced with 'I use heroin or opioid drugs' (Berger et al., 2001; Jeyaseelan et al., 2013). Subscale measures of opioid use stigma included disclosure concerns, negative self-image, public attitudes, and personalized stigma related to opioid drug use. Finally, questions assessing attitudes towards MMT were adapted from the Attitudes towards Methadone scale developed by Schwartz et al. (2008), and have been previously used in Malaysia by Vijay et al. (2015). A summary score measuring MMT attitudes was created, in which scores ranging from 0 to 5, 6 to 8 and 9 to 11 were characterized as low, moderate or high levels of favorable attitudes towards treatment, respectively.

### ***Data Analysis***

The analysis for this study proceeded in four steps. First, descriptive statistics were generated through frequencies of categorical predictor variables, or the mean and standard deviation for continuous variables. Second, bivariate associations between predictor variables and interest in MMT were calculated using the Pearson's chi-square test, or a two-sided Student's t-test for independent samples. A multivariate analysis was then performed using logistic regression, in which the reported odds ratios (OR) and 95% confidence intervals are estimates of the likelihood of being interested in receiving MMT. A p-value of 0.10 was used as the criterion for selection into the multivariate logistic regression model. Backwards elimination was used to obtain the final model, in which all predictor variables significant at a p-value of 0.05 were retained. Finally, a Pearson's chi-square test was used to determine which specific attitudes towards methadone were significant in predicting interest in MMT. All data analysis was completed using IBM SPSS Statistics (SPSS Inc., Chicago, IL, USA) and SAS, version 9.3 (SAS Institute Inc, Cary, NC, USA).

### **RESULTS**

Table 1 describes the baseline characteristics of study participants, and differences between those interested and not interested in receiving MMT. With regards to baseline characteristics, the mean age was 40.9 years old (range= 21 - 61 years), with the majority of participants being ethnically Malay (71.0%), Muslim (77.5%), and having never married (65.0%). Approximately one-third of the sample reported earning equal to or less than 1000 MYR/month (\$303/month), and reported polysubstance use. The majority of participants had previously been incarcerated

(86.9%; mean = 5.4 years, range= 1 month – 35 years) or detained in a compulsory drug rehabilitation center (59.8%; mean = 2.7 years, range = 2 weeks – 8 years). Approximately half the sample had previous experience using MMT as prescribed by a doctor. Although 95% of the sample was opioid-dependent, 60% were characterized as having high addiction severity, and 66.5% reported daily heroin use in the 30 days prior to incarceration.

Treatment readiness is further divided into three subscales measuring recognition, ambivalence and taking steps. Recognition subscale scores ranged from 19 to 35 (mean =  $27.1 \pm 3.2$ ), Ambivalence subscales ranged from 8 to 20 (mean =  $14.6 \pm 2.0$ ) and the taking steps subscale ranged from 16 to 40 (mean =  $31.0 \pm 4.0$ ). Total stigma scores ranged from 45 to 92 (mean =  $65.2 \pm 8.2$ ), disclosure concerns related to heroin and other opioid use ranged from 9 to 20 (mean =  $14.7 \pm 2.0$ ), negative self-image ranged from 8 to 20 (mean =  $14.1 \pm 2.1$ ), public attitudes ranged from 10 to 20 (mean =  $22.0 \pm 3.6$ ), and personalized stigma ranged from 13 to 32 (mean =  $22.0 \pm 3.6$ ). MMT attitudes scores were divided into quartiles, approximately 25% had low or high levels of positive MMT attitudes, and approximately 50% had moderate levels of positive MMT attitudes.

Eighty-five (42.5%) of the participants surveyed expressed an interest in receiving MMT, of which 18 (21.2%) were currently receiving MMT within the prison. There were no significant differences between those interested in MMT and those uninterested in MMT, by age, ethnicity, religion, marital status, educational attainment, monthly income, compulsory drug treatment history, HIV status, depression, addiction severity, treatment readiness, or opioid use stigma ( $p > 0.05$ ). Differences in MMT interest were observed by incarceration history, previous experience with MMT use, pre-incarceration polysubstance drug use, lifetime injection drug use, frequency of pre-incarceration heroin use, and attitudes towards MMT ( $p < 0.05$ ).

Table 2 represents the results of bivariate and multivariate logistic regression analysis. In the bivariate analysis, those that were not currently married, had prior history of incarceration, had prior experiences with MMT usage, reported polysubstance use in the 30 days prior to incarceration, reported injection drug use ever in their lifetime, reported any use of heroin in the 30 days prior to incarceration, and had moderate or high levels of positive attitudes towards MMT were significantly more likely to be interested in receiving MMT ( $p < 0.05$ ). Additionally, those with greater recognition of their drug dependence as a problem, and those that faced greater stigma related to public attitudes and personalized stigma were significantly more likely to be interested in receiving MMT ( $p < 0.05$ ). Upon adjusting for all bivariate predictors significant at the  $p = 0.10$  level, marital status, prior history of incarceration, depression, frequency of drug use, and MMT attitudes remained significant. Those that were previously married were 4.15 (95% CI: 1.15, 15.02) times more likely to be interested in MMT treatment than those that are currently married. Those that are depressed are 3.66 (95% CI: 1.68, 7.98) times more likely to be interested in treatment. Compared to those that reported no heroin use, those that used heroin daily in the 30 days prior to prison were 5.53 (95% CI: 1.65, 18.58) times more likely to be interested in MMT. And finally, those with the highest levels of positive attitudes toward MMT treatment were 19.82 (95% CI: 6.07, 64.74) times more likely to be interested in receiving MMT as treatment.

Table 3 describes the proportion of participants who agreed or disagreed with each statement addressing individual attitudes towards MMT. P-values signify whether each statement was independently associated with interest in receiving MMT. The majority of participants agreed with affirmative statements regarding MMT treatment for opioid dependence. These included statements indicating that being on methadone therapy would keep them from injecting, stay out

of prison or Pusat Serenti, improve the quality of their life, and is the best way to treat opioid addiction. All these statements were significantly predictive of interest in receiving MMT ( $p < 0.05$ ). On the other hand, many disagreed with negative statements regarding MMT treatment. The majority of participants did not believe that their religion would not permit them to use methadone, that doctors treat addicts poorly, and that people look down on those who use methadone. Approximately half of all participants believed that methadone is bad for a person's health, and that methadone only encourages people to use more of other drugs. Finally, approximately 75% of all participants believed that methadone only replaces one addiction for another, and that people should try to get off methadone therapy as soon as possible. Only statements related to religious beliefs, and health beliefs were significantly predictive of interest in MMT ( $p < 0.05$ ).

## **DISCUSSION**

This is the first study to examine factors related to interest in receiving methadone treatment for opioid dependence amongst those incarcerated in Malaysia. Identifying factors related to seeking MMT may make it easier to identify potential candidates who may have more successful treatment outcomes, and greater retention to care. The numerous benefits of implementing MMT prior to release indicates that ensuring uptake of treatment has important implications for continuity of care, and secondary HIV prevention. This study reveals that less than half of those incarcerated with a history of opioid use will want to enroll in methadone treatment in prison, despite the fact that 95% met the criteria for opioid dependence. We found that those wishing to enroll in treatment are more likely to have prior convictions and report daily heroin use prior to incarceration, possibly indicating greater addiction severity. Similar to our findings, Rounsaville

and Kleber (1985) found that treatment seeking opiate users were more likely to suffer from major depression, and have poorer social outcomes due to drug use, which may be explicative of the finding that those that displayed clinically depressive symptoms, and those that were previously married are more likely to be interested in MMT.

This study also found that attitudes toward methadone had the greatest effect on interest in receiving methadone as treatment for opioid dependence. Those with the most favorable attitudes were almost twenty times as likely to be interested in methadone when compared to those with the least favorable attitudes. Even a moderate increase in favorable attitudes towards methadone can have a profound effect, making individuals almost eight times more likely to be interested in MMT. Although it is generally known that those with better attitudes toward medication-assisted treatment will have better treatment outcomes, this study helps identify exactly which factors need to be addressed through education and awareness campaigns. (Bachireddy et al., 2011; Rich et al., 2005; Vijay et al., 2015). This finding has important implications for future public health interventions that aim to increase treatment motivation and uptake of MMT.

Surprisingly, only 43% of the participants surveyed indicated interest in MMT, despite the fact that few participants expressed negative attitudes, and that the majority expressed favorable attitudes towards MMT. This discordance between attitudes and interest in treatment uptake may indicate that an additional, unmeasured factor mediates the relationship between attitudes and treatment seeking. A lack of treatment knowledge may pose an additional barrier for those eligible for methadone treatment, and may partially explain the lack of treatment interest in the 57% that did not wish to receive methadone. Previous studies from Australia and the U.S. have examined the attitudes of correctional staff towards medication-assisted treatment, and found that staff members are largely unaware of the risks and benefits of MMT, and favor abstinence-

related treatment over pharmacological interventions, suggesting an opportunity for education amongst treatment providers and the drug using population (Bruce et al., 2007; Gjersing et al., 2007; Rich et al., 2005). This study also revealed that stigma continues to exist in this population, and the compounded stigma of HIV and drug use, especially in healthcare settings, may impose a significant barrier to seeking treatment (Bruce et al., 2007; Choi et al., 2010; Earnshaw et al., 2013; Jin et al., 2014).

The results from this study identify the factors associated with interest in receiving MMT within prison. Marital status, incarceration history, depression, and frequency of heroin use may serve as identifiers for those motivated to seek treatment, who may have more successful uptake, and have greater retention in care. Among those uninterested in receiving treatment, awareness and education regarding MMT as a harm reduction approach is imperative in dispelling the negative myths and stigma surrounding methadone usage. The findings from this study demonstrate that having favorable beliefs regarding methadone may have the greatest impact on interest in receiving MMT. Therefore, changing the attitudes and beliefs about methadone may serve as a target for future public health interventions, in order to increase treatment motivation and increase treatment uptake.

### ***Limitations***

Although several predictors of interest in enrolling in MMT emerged from this study, the findings may be limited by the sampling method used to recruit participants. All participants were recruited from a single correctional institution, potentially limiting the generalizability to Kajang Prison or Malaysia as a whole. Additionally, the cross-sectional nature of this study does

not infer causality, but rather significant associations. Finally, although the structured interview was extensive, it is impossible to cover all individual-level factors related to methadone seeking. Nonetheless, this study provides important insight into factors associated with interest in receiving MMT among prisoners in Malaysia with a history of opioid use, which may be critical in identifying those most motivated to seek treatment and those that may have the greatest retention to care.

## **CONCLUSION**

Incarceration provides a unique window of opportunity to initiate MMT, and is a critical harm reduction strategy. Overall, interest in MMT initiation is largely driven by social, legal and psychological problems related to drug use and incarceration. More specifically, the findings from this study demonstrate that marital status, incarceration history, depression, frequency of heroin use prior to incarceration and favorable attitudes toward MMT are significantly associated with interest in methadone treatment. Further investigation into how treatment motivation affects MMT interest is warranted, especially in the context of prisons. Despite continuous efforts to introduce MMT into the prison system, successful uptake of MMT will not be possible without first addressing treatment attitudes, and systematic barriers preventing the expansion of MMT programs within prison.

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