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ORIGINAL ARTICLE

Unfavorable attitudes toward receiving methadone maintenance therapy and associated factors among the inmates using intravenous heroin

靜脈注射海洛因的監所收容人對於接受美沙冬維持療法的排斥態度和相關因子

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Abstract The aims of this study were to examine unfavorable attitudes toward receiving methadone maintenance therapy (MMT) and associated factors among inmates using intravenous heroin in Taiwan. A total of 315 inmates using intravenous heroin were recruited. Their unfavorable attitudes toward receiving MMT after discharge from prison were evaluated using the Client Attitudes Toward Methadone Programs Scale. The associations of unfavorable attitudes toward receiving MMT with sociodemographic and drug-using characteristics, human immunodeficiency virus serostatus, perceived family support, and depression were examined using multiple regression analysis. The results of this study showed that the mean score of unfavorable attitudes toward receiving MMT, determined on the Client Attitudes Toward Methadone Programs Scale, was 9.918 (standard deviation = 2.277, range = 5–20). Heroin-using inmates who were young, started using heroin earlier, perceived many advantages and few

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disadvantages of heroin use, had never received MMT, and had severe depression, had unfavorable attitudes toward receiving MMT. Based on the results of this study, we suggest that inmates who have the factors associated with unfavorable attitudes toward receiving MMT should receive intervention and motivational interviewing to improve their attitudes toward MMT and to increase their opportunity to receive MMT after discharge from prison.

摘要 本研究的目的是在於調查靜脈注射海洛因的監所收容人對於接受美沙冬維持療法的排斥態度，以及和排斥態度相關的因子。共有315位靜脈注射海洛因的監所收容人完成個別問卷訪談，以Client Attitudes Toward Methadone Programs Scale (CAMP) 調查收容人對於自己未來出監後接受美沙冬維持療法的排斥態度高低，並以邏輯迴歸檢驗排斥態度高低與社會人口學變項、非法成癮物質使用特徵、愛滋病毒感染狀況、感受的家庭支持、憂鬱程度的關連性。結果顯示：研究中的收容人對於接受美沙冬維持療法的CAMP問卷排斥態度平均得分為9.918 (標準差：2.277；範圍：5–20)。若收容人為年紀較輕、較早開始使用海洛因、對於使用海洛因感受較高程度好處和較低程度壞處、過去從未接受過美沙冬療法、憂鬱嚴重程度較高，則對於接受美沙冬維持療法的排斥程度越強烈。依據本研究結果，研究者建議：具有以上對於接受美沙冬維持療法採排斥態度的因子之海洛因使用監所收容人，宜利用在監所期間進行衛教和動機式晤談介入，以改善對於接受美沙冬維持療法的排斥態度，增加未來出監後接受美沙冬維持療法的機會。

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Introduction

Since 2003, intravenous heroin use has become one of the major causes of human immunodeficiency virus (HIV) infection in Taiwan [1]. A general survey of inmates admitted to jails and detention centers in Taiwan from 2003 to 2005 found that the rate of HIV-positive serostatus increased from 13.6 per 100,000 in 2002 to 178.3 per 100,000 in 2005, and HIV-positive inmates using intravenous heroin accounted for 72.6% of subjects newly diagnosed with HIV in Taiwan [1]. The results of these surveys indicate that it is important to evaluate the attitudes toward changing heroin-using behaviors and to develop strategies to prevent the spread of HIV infection among inmates using intravenous heroin.

To prevent the spread of HIV infection in intravenous heroin users, methadone maintenance therapy (MMT) was introduced into Taiwan in 2005. Although MMT has proved effective in Western studies in reducing heroin use [2–5] and the risk of HIV infection [6,7], and has improved HIV therapy outcomes [8,9], heroin users may have ambivalent attitudes toward receiving MMT [10,11] and may even reject it. Previous studies found that heroin users who were older [12], were females [12–14], had HIV-positive serostatus [12], and had not been detained for illegal activity in the previous 6 months [12] had more favorable attitudes toward receiving MMT.

The associations of several factors need to be evaluated with regard to favorable attitudes toward receiving MMT. First, one might expect that heroin users who have a greater degree of heroin dependence would have a more favorable attitude toward receiving MMT, because they may experience more adverse consequences from heroin use. However, further study is needed to examine whether the severity of heroin dependence or the perceived advantages and disadvantages of heroin use are associated with attitudes toward receiving MMT. Second, psychopathology and perceived family support may influence subjects' motivation to receive therapy for physical problems. For example, one study found

that depression may compromise adherence with anti-retroviral therapy in subjects with HIV [15]. Substance abusers who perceive greater social support spend a longer period in MMT [16]. Examining the associations of depression and perceived social support with unfavorable attitudes toward receiving MMT in heroin users is worthwhile. Third, although one study found that combined use of stimulants, for example, cocaine, can increase the risk of discontinuing MMT [17], another study had a different finding [12]. Methamphetamine is the most prevalent stimulant combined with heroin in Taiwan. It would be interesting to examine the association between methamphetamine use and attitudes toward receiving MMT in heroin users.

One of the challenges for health professionals is the lack of opportunity to contact heroin users with unfavorable attitudes toward MMT and to introduce the advantages of MMT to them. Detention in jail or a detention center is a good opportunity for health professionals to contact inmates with unfavorable attitudes toward receiving MMT. Inmates who have factors associated with these unfavorable attitudes after release from jail should be the targets of intervention to improve their knowledge and attitudes toward MMT. Thus, the aims of this study were to examine unfavorable attitudes toward receiving MMT and associated factors among inmates using intravenous heroin in Taiwan.

Materials and methods

Participants

We consecutively recruited heroin users (detained in four jails because of heroin use) into this study from May 2008 to April 2009. Those who claimed that they used heroin only through the smoking route ($n = 20$) were excluded. A total of 328 intravenous heroin users were detained during this period. Those who refused interviews ($n = 10$) or could not cooperate (e.g. intellectual disability; $n = 3$) were

excluded from the study. A total of 315 intravenous heroin users were recruited into this study. The protocol was approved by the Institutional Review Board of Kaohsiung Medical University.

Instruments

Client attitudes toward methadone programs scale

We used the five-item Client Attitudes Toward Methadone Programs Scale (CAMP) to evaluate participants' unfavorable attitudes toward receiving MMT [18]. Participants were asked to rate their level of agreement with the description of the MMT on a four-point scale, with 1 indicating "disagree strongly" and 4 indicating "agree strongly." Two items were reverse scored. A higher total score on the CAMP indicates that the participant has unfavorable attitudes toward receiving MMT. The Cronbach's α of the CAMP in this study was 0.70.

The Chinese version of the Severity of Dependence Scale

The five-item Chinese version of the Severity of Dependence Scale (SDS^[Ch]) was used to evaluate participants' severities of heroin use before detention [19,20]. Each item was scored on a four-point scale (scored 0–3). The total SDS scores range from 0 to 15, with higher scores indicating a greater degree of dependence. The Cronbach's α of the SDS in this study was 0.74.

Decision Balance Questionnaire

We used the 12-item Decision Balance Questionnaire (DBQ) to evaluate the participants' levels of perceived advantages (six items) and disadvantages (six items) of heroin use [21]. Each item was scored on a five-point scale, with 1 indicating "not important at all" and 5 indicating "very important." Higher total scores in the subscales of advantages and disadvantages indicate more perceived advantages and disadvantages from heroin use, respectively. The Cronbach's α values of the subscales of advantages and disadvantages on the DBQ in this study were 0.70 and 0.84, respectively.

Family APGAR Index

The five-item Chinese version of the Family APGAR Index was used to measure participants' perceived family support [22,23]. A higher total score indicates perceived greater family support. The Cronbach's α in this study was 0.86.

The Center for Epidemiological Studies Depression Scale

The 20-item Chinese version of the Center for Epidemiological Studies Depression Scale (CES-D) was used to assess the frequency of depressive symptoms in the preceding week [24,25]. A higher total CES-D score indicates greater severity of depression. The Cronbach's α in this study was 0.90.

The Questionnaire for Experience in Substance Use

We used the items of the Questionnaire for Experience in Substance Use to determine participants' ages at initial use of heroin, history of receiving MMT before detention, history of methamphetamine use, and criminal record of more than two arrests for heroin use (the median) [26].

We also collected data on participants' sex, age, education level, marriage and job status, criminal record

for crimes other than heroin use, and HIV serostatus based on participants' self-report information.

Procedure and statistical analysis

Research assistants explained the purpose and procedure of this study to the participants. Written informed consents were obtained from all participants. Research assistants read all questions to the participants face to face to maximize comprehension and reliability. Sociodemographic and drug-using characteristics, HIV serostatus, perceived family support, and depression are shown in Table 1. The score for unfavorable attitudes toward receiving MMT was determined. The association of unfavorable attitudes with the characteristics in Table 1 was examined using univariate regression analysis first. Then, the correlations between the variables that were significantly associated with unfavorable attitudes in univariate regression analysis were examined using Pearson's correlation to determine which variables should not be put into the same fully entered multivariate regression analysis model. The collinearity of the variables selected into multivariate regression analysis was also examined. A two-tailed p value of less than 0.05 was considered statistically significant.

Results

The mean score of unfavorable attitudes toward receiving MMT determined on the CAMP was 9.918 (standard deviation = 2.277, range = 5–20). The associations between unfavorable attitudes and participants' characteristics examined by univariate regression analysis are shown in Table 2. The results indicated that heroin users who were young, started heroin use early, perceived many advantages and few disadvantages of heroin use, had never received MMT, perceived low family support, and had severe depression, had unfavorable attitudes toward receiving MMT.

We examined the correlation among these seven variables before selecting them into multivariate regression analysis models. The correlation matrix shown in Table 3 indicates that age and age at initial use of heroin were significantly correlated to each other at a moderate level (Pearson's $r = 0.649$). Based on the result, we selected age and age at initial use of heroin into separated models of multivariate regression analysis.

The results of multivariate regression analysis for the associated factors of the unfavorable attitude toward receiving MMT are shown in Table 4. In Model I, younger age, perceiving more advantages and less disadvantages of heroin use, having never received MMT, and more severe depression, were significantly associated with a more unfavorable attitude toward receiving MMT (adjusted R square = 0.121, $F = 8.190$, $p < 0.001$). In Model II, starting using heroin earlier, perceiving more advantages and less disadvantages of heroin use, and having never received MMT were significantly associated with a more unfavorable attitude toward receiving MMT (adjusted R square = 0.114, $F = 7.722$, $p < 0.001$). Both multiple regression analysis models passed the collinearity examination, because all condition indexes were lesser than 25.

Table 1 Sociodemographic and drug-using characteristics, HIV infection status, perceived social support, and depression of the subjects (*N* = 315)

Variables	<i>n</i> (%)	Mean (SD)
Sociodemographic characteristics		
Sex: male	219 (69.524)	
Age, yr		35.261 (6.669)
Duration of education, yr		9.172 (2.196)
Marriage status: single or broken marriage	264 (83.810)	
Have a fixed job	181 (57.460)	
Drug-using characteristics		
Age at initial use of heroin, yr		25.373 (6.795)
Previous criminal record of heroin use >2 times	88 (27.937)	
Have any criminal record other than heroin use	198 (62.857)	
Severity of heroin use on SDS ^[Ch]		8.248 (3.496)
Perceived advantages of heroin use on the DBQ		9.013 (3.186)
Perceived disadvantages of heroin use on the DBQ		18.552 (6.262)
Have ever used methamphetamine	247 (78.413)	
Have ever received MMT before committal	63 (20)	
Positive HIV serostatus	197 (62.540)	
Family support on the APGAR		15.267 (3.480)
Severity of depression on the CES-D		14.556 (8.636)

CES-D = The Center for Epidemiological Studies Depression Scale; DBQ = Decision Balance Questionnaire; HIV = human immunodeficiency virus; MMT = methadone maintenance therapy; SD = standard deviation; SDS^[Ch] = The Chinese version of the Severity of Dependence Scale.

Discussion

A history of receiving MMT before detention is one of the significant factors associated with attitude toward receiving MMT in this study. Those who had favorable attitudes toward receiving MMT may have motivation to receive MMT, and the advantages they received from MMT may have further improved their attitude toward MMT.

After adjusting for the history of receiving MMT before detention, there were multidimensional factors associated with attitude toward receiving MMT, including age, age at initial use of heroin, perceived advantages and disadvantages of heroin use, and depression. The present study found that younger heroin users had more unfavorable attitudes toward receiving MMT. Research has also found that older injection drug users (IDUs) are more likely to

Table 2 The associated factors of the unfavorable attitude toward receiving MMT: univariate regression analysis

Variables	Beta	<i>t</i>	<i>p</i>
Sociodemographic characteristics			
Sex, male	0.085	1.512	0.131
Age	-0.154	-2.765	0.006
Duration of education	-0.007	-0.119	0.906
Marriage status: single or broken marriage	0.048	0.859	0.391
Have a fixed job	-0.037	-0.653	0.514
Drug-using characteristics			
Age at initial use of heroin	-0.139	-2.480	0.014
Previous criminal record of heroin use >2 times	0.032	0.565	0.572
Have criminal record other than heroin use	-0.039	-0.699	0.485
Severity of heroin use on SDS ^[Ch]	-0.051	-0.911	0.363
Perceived advantages of heroin use on the DBQ	0.143	2.553	0.011
Perceived disadvantages of heroin use on the DBQ	-0.160	-2.861	0.005
Have ever used methamphetamine	-0.012	-0.217	0.828
Have ever received MMT before committal	-0.184	-3.318	0.001
Positive HIV serostatus	0.004	0.064	0.949
Family support on the APGAR	-0.163	-2.927	0.004
Severity of depression on the CES-D	0.152	2.712	0.007

CES-D = The Center for Epidemiological Studies Depression Scale; DBQ = Decision Balance Questionnaire; HIV = human immunodeficiency virus; MMT = methadone maintenance therapy; SDS^[Ch] = The Chinese version of the Severity of Dependence Scale.

Table 3 Correlation matrix for the variables selected into multiple regression analysis

Variables	1	2	3	4	5	6	7
1: Age	1						
2: Age at initial use of heroin	0.699	1					
3: Perceived advantages of heroin use on the DBQ	−0.056	−0.025	1				
4: Perceived disadvantages of heroin use on the DBQ	−0.108	−0.035	0.239	1			
5: Have ever received MMT before committal	0.034	−0.012	−0.054	0.029	1		
6: Family support on the APGAR	0.042	0.031	−0.117	−0.065	0.083	1	
7: Severity of depression on the CES-D	−0.080	−0.153	0.089	0.028	0.032	−0.328	1

CES-D = The Center for Epidemiological Studies Depression Scale; DBQ = Decision Balance Questionnaire; MMT = methadone maintenance therapy.

initiate drug therapy than younger IDUs [12]. Further investigation is needed to direct efforts aimed at improving the attitude toward receiving MMT among young IDUs and attracting them into therapy.

This study also found that starting using heroin earlier was significantly associated with a more unfavorable attitude toward receiving MMT. Research found that individuals who have early onset of symptoms of substance-use disorders have low rates of seeking treatment for their substance-using problems [27], although early onset of symptoms is a powerful predictor of adverse social and mental consequences of substance use, such as low educational attainment, teen childbearing, marital problems, economic adversity, and psychopathology [28,29]. One possible explanation for the low rates of treatment seeking among early-onset users is that the lifestyles they have developed allow them to continue using drugs without disrupting established roles, thereby reducing their chances of seeking treatment [27].

The results of this study indicated that depression was significantly associated with unfavorable attitudes toward receiving MMT in inmates with heroin use. Depression may compromise the cognitive function needed for being aware of the necessity to change and compromise psychomotor ability to adopt practical strategies to stop substance-using behaviors. For example, individuals who had an alcohol use disorder with co-occurring depression had a lower level of motivation to change their alcohol problem than those without co-occurring depression [30]. Research on the neural correlates of cognitive control also found that negative

affect might attenuate the engagement of mental processes associated with both proactive and reactive cognitive control [31]. Depressed IDUs may also use heroin to self-medicate depression symptoms, such as insomnia and disturbed mood regulation. Thus, treating depression is an essential step to improve the attitude of IDUs toward receiving MMT.

This study found that more perceived advantages and fewer perceived disadvantages of heroin use, but not the severity of heroin use or previous criminal record of heroin use, were significantly associated with unfavorable attitudes toward receiving MMT. The results indicated that IDUs may hesitate to change substance-using behaviors if they focus on the advantages and choose to ignore the disadvantages of heroin use, even if they have a high level of dependence. One of the major principles in enhancing IDUs' motivation to change addictive behaviors is to help them perceive the discrepancy between present behavior and important personal goals or values [32].

Research has found that, to pair MMT with provision of HIV medications can improve patients' adherence to HIV therapy [33]. Given that MMT is provided free for IDUs with positive HIV serostatus in Taiwan to prevent the spread of HIV infection among IDUs, one might expect that inmates with positive HIV serostatus have more favorable attitudes toward receiving MMT than those with negative serostatus. However, the results of this study did not support this hypothesis. To improve the attitudes toward receiving MMT among inmates with positive HIV serostatus, it is necessary to inform them that MMT is cost free and that MMT is

Table 4 Associated factors of the unfavorable attitude toward receiving MMT: multivariate regression analysis

Variables	Model I			Model II		
	Beta	t	p	Beta	t	p
Age	−0.150	−2.815	0.005			
Age at initial use of heroin				−0.125	−2.333	0.020
Perceived advantages of heroin use on the DBQ	0.156	2.831	0.005	0.158	2.861	0.005
Perceived disadvantages of heroin use on the DBQ	−0.207	−3.749	<0.001	−0.194	−3.531	<0.001
Have ever received MMT before committal	−0.162	−3.039	0.003	−0.168	−3.142	0.002
Family support on the APGAR	−0.075	−1.323	0.187	−0.081	−1.414	0.158
Severity of depression on the CES-D	0.112	1.984	0.048	0.103	1.797	0.073

CES-D = The Center for Epidemiological Studies Depression Scale; DBQ = Decision Balance Questionnaire; MMT = methadone maintenance therapy.

effective in the prevention of the spread of HIV infection to other inmates.

Previous studies found that individuals who co-used multiple substances experienced more adverse consequences on mental health or somatic complaints than those who used a single substance [34,35]. One might expect that co-use of methamphetamine is significantly associated with favorable attitudes toward receiving MMT because they might have experienced more adverse consequences of illicit drugs. However, the results of this study did not support this hypothesis. Research has found that the abuse of multiple substances potentially produces long-lasting neuropsychological impairment [36]. Further study is needed to examine whether neuropsychological impairment caused by concurrent heroin and methamphetamine use compromises the ability to become aware of necessity of change in the heroin-using behavior.

A previous study found that substance abusers who perceive greater social support spend a longer period in MMT [16]. In this study, heroin users who perceived low family support had unfavorable attitudes toward receiving MMT in univariate regression analysis. However, the significant association disappeared when perceived family support was selected into a multivariate regression analysis model. Because the participants in this study were detained in jails and were separated from their families, whether family support has different influence on their attitudes toward receiving MMT after discharge needs further study. This study also failed to find significant associations of unfavorable attitudes toward receiving MMT with gender, marriage status, occupational status, or previous criminal record. However, this is a pilot study to examine the associated factors of unfavorable attitudes toward receiving MMT in inmates using intravenous heroin. Further study is needed to examine these associations to give more support for the results of this study.

Some limitations of this study should be addressed. First, because MMT is not available for heroin users during detention in Taiwan, we could not examine real MMT-receiving behaviors in inmates with heroin use. Alternatively, we measured unfavorable attitudes toward receiving MMT, which is one of the "proximal indicators" of substance-using behaviors and is assumed to be able to predict "ultimate outcomes" [37], such as receiving MMT after discharge from jail. Further follow-up study is needed to examine the predictive value of inmates' attitudes toward receiving MMT after discharge from jail. Second, this study assessed the severity of depressive symptoms in the preceding week but not the diagnosis of major depressive disorder. Whether the association between attitudes to receive MMT and depression is all the same among individuals with different levels of depression needs further study. Third, the data were provided by the participants, and some factors, such as the characteristics of heroin use and criminal records, were difficult to validate. Fourth, this study examined unfavorable attitudes toward receiving MMT among inmates. As mentioned before, detention in jail is a good opportunity for health professionals to evaluate heroin users' attitudes toward receiving MMT and deliver intervention; however, whether the results of this study can be generalized to heroin users in the community needs further study.

In conclusion, until the predictive value has been determined, inmates who have factors associated with unfavorable attitudes toward receiving MMT should still receive intervention, and health professionals should help them improve their attitudes toward MMT to increase their opportunity to receive MMT after discharge from jail.

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