

**A STUDY ON THE PREVALENCE OF  
AMPHETAMINE-TYPE-STIMULANTS (ATS) USE  
AMONG PRIMARY AND PRIVATE METHADONE  
MAINTENANCE TREATMENT (MMT) CLIENTS IN  
KUANTAN, PAHANG**

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**UNIVERSITI SAINS MALAYSIA**

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by

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## LIST OF ABBREVIATIONS

MMT	Methadone Maintenance Treatment Program.
Primary	Patients registered in government MMT programs.
Secondary	Patients registered in private MMT programs.
ATS	Amphetamine-types stimulant including methamphetamine and amphetamine
BUP	Buprenorphine
BZD	Benzodiazepine
PWID	People who inject drugs
FSW	Female sex worker
MSM	Men who have sex with men
OST	Opiate substitution therapy
HIV	Human Immunodeficiency Virus
Hep B	Hepatitis B
HCV	Hepatitis C
HAART	Highly active antiretroviral therapy
SUD	Substance use disorder
IDU	Injecting drug users
UNODC	United Nations of Office and Crime
DDA	Dangerous Drug Act
NADA	National Anti-Drug Agency
SDG	Sustainable Development Goals
QoL	Quality of Life
CDDC	Compulsory Drug Detention Centers
WHO	World Health Organization

HRWG	Harm Reduction Working Group
FGD	Focus Group Discussion
MOH	Ministry of Health
LLPK	Langkah-langkah Pencegahan Khas
GP	General Practitioners

**SATU KAJIAN TERHADAP PREVALENS PENGGUNAAN AMPHETAMINE-  
TYPE-STIMULANTS (ATS) DIKALANGAN KLIEN KERAJAAN DAN  
SWASTA DALAM RAWATAN TERAPI METADON (MMT) DI KUANTAN,  
PAHANG**

**ABSTRAK**

Preskripsi dos metadon yang optimum adalah berkaitan dengan peningkatan dalam pematuhan rawatan. Penggunaan “amphetamine-type-stimulants” (ATS) (contohnya metamfetamin dan amfetamin) semasa program rawatan terapi metadon (MMT) adalah berkaitan dengan pematuhan rawatan yang rendah dan tingkahlaku berisiko HIV. Kajian ini bertujuan untuk mengkaji hubungan antara dos metadon dan prevalen penggunaan ATS dalam klien yang berdaftar dalam program MMT kerajaan dan swasta di Kuantan, Pahang. Sejumlah dua ratus tiga puluh tujuh (n=129 kerajaan dan n=108 swasta) pengguna metadon direkrut dari dua program MMT melalui pensampelan mudah untuk kajian keratan rentas ini. Tinjauan dijalankan melalui temubual bersemuka menggunakan borang soal selidik semi-berstruktur. Semua responden telah disaring untuk penggunaan dadah terlarang. Majoriti lelaki (97%, n= 230/237), hanya 7 adalah wanita, di mana kebanyakan adalah Melayu (96%, n=228/237). Separuh (50%, n=119/237) adalah berumur antara 18 hingga 37 tahun, 47% bujang (n=112/237) dan 83% (n=198/237) bekerja. Dua puluh sembilan peratus (n=70/237) mempunyai hepatitis C. Purata umur sampel yang menggunakan metadon kali pertama adalah 32.8 tahun, purata tempoh rawatan metadon adalah 48.86 bulan dan purata dos metadon adalah 52.78mg/harian. Dua pertiga (68%, n=161/237) mempunyai  $\leq 4$  tahun sejarah penggunaan metadon, manakala 32% (n=76/237) telah menggunakan metadon  $>4$  tahun. Lima puluh lima peratus

(n=130/237) menerima  $\leq 50$ mg dos metadon harian dan 45% (n=107/237) menerima  $> 50$ mg/harian dos metadon. Satu pertiga (36%, n=86/237) menggunakan ATS antara 1-3 hari dan 26% (n=61/237) menggunakan ATS  $> 4$  hari dalam 7 hari yang lepas. Kebanyakan melaporkan telah menggunakan amfetamin (58%, n=138/237), metamfetamin (44%, n=104/237), dan opiat (37%, n=87/237) dalam 30 hari yang lepas. Satu pertiga melaporkan menyuntik amfetamin (35%, n=83/237), diikuti oleh metamfetamin (27%, n=64/237), dan opiat (21%, n=51/237) dalam 30 hari yang lepas. ATS kebiasaannya digunakan untuk a) meningkatkan produktiviti kerja, b) meningkatkan tenaga, c) meningkatkan euforia dan d) mengurangkan kebergantungan kepada metadon. Keputusan daripada analisis Chi-square menunjukkan responden dalam program MMT swasta adalah lebih suka menggunakan opiat (OR: 4.3: 2.47-7.64;  $p < .0001$ ) dan metamfetamin (OR: 1.7: 1.01-2.84;  $p < 0.046$ ) dalam 30 hari yang lepas, berbanding dengan responden di program MMT kerajaan. Begitu juga, dos metadon yang rendah ( $\leq 50$ mg/harian) berkait dengan penggunaan opiat (OR: 0.3: 0.19-0.59;  $p < 0.001$ ) dalam 30 hari yang lepas, manakala dos metadon yang tinggi ( $> 50$ mg/harian) dikaitkan dengan penyuntikan metamfetamin dalam 30 hari yang lepas (OR: 1.97: 1.01-3.82;  $p < 0.044$ ). Berbanding dengan kumpulan pengguna ATS sahaja, pengguna opiate poly-drug mempunyai peningkatan risiko untuk mempunyai  $> 2$  pasangan seks tidak tetap dalam 30 hari yang lepas (OR: 12.86: 1.31-125.78;  $p < 0.018$ ), dan menggunakan ATS sebelum terlibat dengan hubungan seks (OR: 2.12: 1.18-3.79;  $p < 0.011$ ). Terutamanya, responden dalam program MMT swasta tidak berpuas hati dengan program MMT mereka (OR: 2.83: 1.49-5.39;  $p < 0.002$ ) dan dos metadon (OR: 2.89: 1.61-5.21;  $p < 0.001$ ), daripada responden di program MMT kerajaan. Responden di program MMT swasta mempunyai



kebarangkalian yang tinggi untuk menerima dos metadon yang rendah (OR: 1.84: 1.09-3.09;  $p < 0.022$ ). Memandangkan preskripsi dos metadon yang rendah ( $\leq 50$ mg/harian) dikaitkan dengan penggunaan dadah terlarang dan penyuntikan metamfetamin, intervensi pencegahan yang sesuai diperlukan dengan segera untuk menangani penggunaan ATS dalam kalangan peserta MMT di Kuantan, Pahang.

**A STUDY ON THE PREVALENCE OF AMPHETAMINE-TYPE-STIMULANTS (ATS)  
USE AMONG PRIMARY AND PRIVATE METHADONE MAINTENANCE  
TREATMENT (MMT) CLIENTS IN KUANTAN, PAHANG**

**ABSTRACT**

Optimum prescription of methadone dose is associated with improved treatment compliance. The use of amphetamine-type-stimulants (ATS) (e.g. methamphetamine and amphetamine) during Methadone Maintenance Treatment (MMT) is associated with poor treatment compliance and risky HIV behaviours. This study aims to investigate the relationship between methadone dose and prevalence of ATS use among clients enrolled in primary and private MMT program in Kuantan, Pahang. A total of two hundred and thirty-seven (n=129 primary and n=108 private) methadone users were recruited from two MMT programs through convenience sampling for this cross-sectional study. The surveys were conducted through face-to-face interviews with a semi-structured questionnaire. All the respondents were screened for illicit drug use. Majority males (97%, n=230/237), only 7 were females, while most were Malays (96%, n= 228/237). Half (50%, n=119/237) were between the age of 18 to 37 years, 47% single (n=112/237), and 83% (n=198/237) employed. Twenty-nine percent (n=70/237) had hepatitis C. The samples mean age of first methadone use was 32.8 years, mean duration of methadone treatment was 48.86 months and average methadone dose was 52.78mg/daily. Two-thirds (68%, n=161/237) had  $\leq 4$  years methadone treatment history, while 32% (n=76/237) have used methadone  $>4$  years. Fifty-five percent (n=130/237) received  $\leq 50$ mg of methadone dose daily and 45% (n=107/237) received  $>51$ mg/daily of methadone dose. One-third (36%, n=86/237) used ATS between 1-3 days and 26% (n=61/237) used ATS  $>4$  days in the last 7 days.

Most self-reported to have used amphetamine (58%, n=138/237), methamphetamine (44%, n=104/237), and opiates (37%, n=87/237) in the last 30 days. One-third reported injecting amphetamine (35%, n=83/237), followed by methamphetamine (27%, n=64/237), and opiates (21%, n=51/237) in the last 30 days. ATS was commonly used to a) increase work productivity, b) enhance energy, c) intensify euphoria and d) reduce dependence on methadone. Results from Chi-square analysis showed respondents in private MMT program are more likely to use opiates (OR: 4.3: 2.47-7.64;  $p<.0001$ ) and methamphetamine (OR: 1.7: 1.01-2.84;  $p<0.046$ ) in the last 30 days, compared to respondents in primary MMT program. Similarly, low methadone dose ( $\leq 50\text{mg/daily}$ ) was associated with opiate use in the last 30 days, while high methadone dose ( $>50\text{mg/daily}$ ) was associated with methamphetamine injection in the last 30 days (OR: 1.97; 1.01-3.82;  $p<0.044$ ). Compared to ATS only user group, opiate poly-drug users have elevated risk of having  $>2$  irregular sex partners in the last 30 days (OR: 12.86: 1.31-125.78;  $p<0.018$ ), and use ATS before engaging in sexual intercourse (OR: 2.12: 1.18-3.79;  $p<0.011$ ). Notably, respondents in private MMT program were dissatisfied with their MMT program (OR: 2.83: 1.49-5.39;  $p<0.001$ ) and methadone dose (OR: 2.89: 1.61-5.21;  $p<0.001$ ) than respondents in primary MMT program. Respondents in private MMT program have higher odds of receiving low methadone dose (OR: 1.84: 1.09-3.09;  $p<0.022$ ). Since low methadone prescription ( $\leq 50\text{mg/daily}$ ) was associated with illicit drug use and methamphetamine injecting, proper preventive interventions are urgently needed to curb ATS use among MMT attendees in Kuantan, Pahang.

# CHAPTER 1

## INTRODUCTION

### 1.0 Introduction

This chapter introduces the first topic of the thesis. The world drug abuse problem (e.g. problem drug use, production and trafficking of illicit substances) and Malaysian drug abuse problem (e.g. number of illicit drug users and types of drug use), as well as findings from published articles on Methadone Maintenance Treatment (MMT) program in Malaysia are succinctly discussed in this chapter. Moreover, the research problem, study hypothesis, research questions and study objectives, scope of study and research significance are clearly described in this chapter.

### 1.1 World Drug Abuse Problem

Figures from 2017 World Drug Report by United Nations Office on Drugs and Crime (UNODC) found despite the significant increase in the number of people who use drugs and prevalence of people who use drugs, the number of people with drug use disorders and prevalence of people with drug use disorders remains unchanged from 2006 to 2016, See Figure 1 and Figure 2, (World Drug Report, 2017). It is estimated that a quarter of a billion people (aged 15-64 years) used drugs at least once in 2015 (range: 158-351 million) (World Drug Report, 2017).

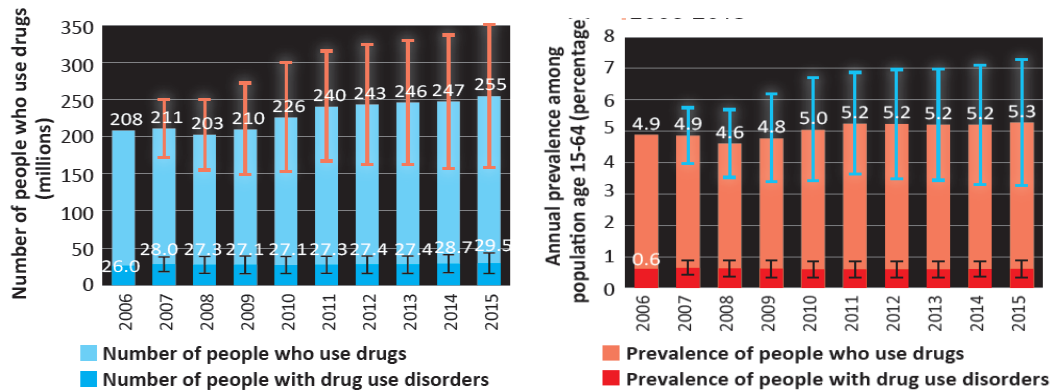


Figure 1.0 Global trends in estimated number of drug users (2006-2015).

Figure 2.0 Global trends in the estimated prevalence of people with drug use problem (2006-2015).  
(Source: UNODC, 2017).

Findings from the Global Burden of Disease Study 2015, estimated that around 17 million “healthy” years of life lost (disability adjusted life years or DALYs) were attributable to drug use disorders in that year (World Drug Report, 2017). Opioid use is associated with the highest negative health impact, followed by amphetamine as the second most commonly abuse drug worldwide (with an estimated 35 million past-year users; range between 13 to 58 million), while methamphetamine is perceived to be widely used in most parts of Asia (World Drug Report, 2017). Globally, it was found that men are three times more predisposed than women to use amphetamine. Compared to men, women typically begin to use illicit substances later in life, but once they have initiated it, they tend to increase their rate of consumption more rapidly than men and may progress more quickly than men to the development of drug use disorder (World Drug Report, 2017). In fact, many individuals with substance use disorders (SUDs) are not enrolled in treatment programs. According to UNODC, the number of people in treatment for disorders resulting from amphetamine use or ATS has been increasing in Asia, although

half of them are in treatment receiving treatment for opioid use disorders. In fact, about 40%-80% of people enrolled in treatment for drug use disorders are diagnosed with poly-drug use, this reflects the complexity of the current drug use phenomenon and challenges of treating people with drug use disorders effectively. Opioids (opiates, heroin and morphine) and amphetamine remains as the most widely consumed illicit substances globally, and its use is associated with a broad range of health consequences ranging from fatal to non-fatal overdose deaths, risk of acquiring infectious diseases (such as HIV or hepatitis C) through unsafe injecting practices, medical and psychiatric co-morbidities. According to UNODC, there are approximately 1 million injecting drug users in the world (UNODC, 2017). Findings from a meta-analysis by Mathers et al. (2010) showed IDUs particularly in Southeast Asia are prone to HIV and other blood-borne diseases such as hepatitis C, tuberculosis and sexually-transmitted diseases (STDs) due to the poor coverage of HIV prevention, treatment and care services for IDU population.

Besides the health burden that is associated with illicit drug consumption, the seizure and production of illicit substances continued to increase globally. UNODC observed a double increased in the seizure of amphetamine and methamphetamine between 2010 and 2015. The increase in ATS seizures can be attributed to the improved access to alternative precursor chemicals and/or pre-precursors used in manufacturing ATS. In view of the established and expanding market for methamphetamine in East and South-East Asia, ATS markets continue to expand globally to North America, South-West Asia and in parts of Europe (World Drug Report, 2017). Methamphetamine dominates the global ATS market, while amphetamine is the main substance that has been reported to be widely used in Middle East, West and Central Europe. Seizure for ATS have increased

markedly from 93 tons in 2010, to 191 tons in 2015 (World Drug Report, 2017). Of which methamphetamine accounted for 61-80% of the total seizure. Similarly, as for opium poppy cultivation, UNODC estimated that the total global area under poppy cultivation in 2016 was at 305,000 hectares, representing a 60% increase in cultivation size over the period of between 2010 and 2016. The increased in opium cultivation can be attributed to the rise in opium poppy cultivation in Afghanistan (World Drug Report, 2017). World Drug Report 2017 showed, methamphetamine use is spreading, while the number of individuals seeking treatment for methamphetamine use have increased. On the other hand, the emergence of New Psychoactive Substances (NPS) is also reported to be associated with various health problems. Unlike opioids, demand for NPS is growing since most NPS are currently not regulated and can be easily purchase from the *dark net* with limited legal consequences. Since NPS can mimic traditional drug effects, users are motivated to use NPS for various reasons including to search for an experience involving the paradigm of ‘modifying perceptions’, curiosity, sociability, search for energy or other functional expectations, boredom and peer-socialization (World Drug Report, 2017). Compared to traditional drugs, NPS can be easily acquired through the *dark net* (e.g. anonymous market place), it is often cheaper and sometimes better in potency. In fact, prisoners commonly use NPS, since most NPS cannot be detected through routine drug screen (World Drug Report, 2017).

## **1.2 Malaysian Drug Abuse Problem**

Malaysia begin to experience problems with illicit drug use prior to pre-independence when Chinese and Indian migrant workers were brought by the British to work in agricultural sectors in Malaya (Zurani et al., 2008). Indian laborer’s smoked

cannabis, while Chinese worker's recreationally smoke opium to enhance work productivity and combat fatigue. Since opium and cannabis consumption was associated with drug dependence and dire health consequences, the use of narcotics was finally criminalized in Malaysia (Kamarudin, 2007). The drug abuse problem turned more serious when local Malay youths started using heroin in the late 70s. The emergence of heroin smoking or the "hippy culture" become popular during the Vietnam war when American soldiers introduced their heroin smoking norm during their visit to Malaysia. The drug abuse problem become more intractable due to the country's close proximity with the porous borders of the 'golden-triangle' which prompted international drug syndicates to expand their drug trafficking routes. The use of psychotropic substances such as opiates (morphine/heroin) and amphetamine-type-stimulants (ATS) (meth/amphetamine) are currently regulated in Malaysia under the Dangerous Drugs Act (DDA) 1952. Those convicted for illicit drug trafficking and possession offences can be sent to the gallows. Latest figures from National Drug Report 2017 showed, the number of people arrested for drug related offences under DDA 1952, and the number of problem drug users (newly and repeat drug users) has increased in the country. For drug related arrests under DDA 1952, a marked increase was also recorded from 128,412 cases in 2013 to 158,386 cases in 2017 (See Table 1.0). Similarly, the number of individuals arrested under LLPK 1985 (special preventive measures) have surged from 838 cases in 2013 to 1,237 cases in 2017 (See Table 1.0). In addition, a significant increase was also recorded in the number of drug users detected in the country between 2013 and 2017 (See Table 2.0). In addition, the number of newly detected cases of drug users continued to increase compared to repeat drug users in the country (See Table 2.0). While under Section 15(1)(a) of DDA 1952, the number of people arrested for illicit drug use particularly ATS have remained stable for



the last five years from 85,140 people in 2013 to 85,004 people in 2017 (See Table 3.0). Data from National Anti-drug Agency (NADA) also indicated that although opiate popularity remains high, ATS use especially methamphetamine is becoming more prevalent in the country (Annual Drug Report, 2017). Thus, it can be implied that methamphetamine use popularity is slowly surpassing opiate use prevalence among the newly detected drug users in the country (See Table 4.0).

Table 1.0 Total arrests under DDA 1952 between 2013 to 2017.

<b>Years</b>	<b>Sec 39B Distribution</b>	<b>Sec 39A Possession</b>	<b>Others</b>	<b>Total</b>	<b>LLPK 1985</b>
2013	4,301	9,533	114,578	128,412	838
2014	4,923	11,282	115,607	131,812	949
2015	5,354	13,080	122,504	140,938	854
2016	5,771	15,427	132,006	153,204	1,019
2017	6,759	17,723	133,904	158,386	1,237

*Source: Annual Drug Report, 2017.*

Table 2.0 Total number of drug users detected from 2013 to 2017.

<b>Years</b>	<b>New drug users</b>	<b>Repeat drug users</b>	<b>Total</b>
2013	13,481	7,406	20,887
2014	13,605	8,172	21,777
2015	20,289	6,379	26,688
2016	22,923	7,921	30,844
2017	18,440	7,482	25,922

*Source: Annual Drug Report, 2017.*

Table 3.0 Total number of people arrested under Section 15 (1)(a) of the DDA 1952 from 2013 to 2017.

<b>2013</b>	<b>2014</b>	<b>2015</b>	<b>2016</b>	<b>2017</b>
85,140	81,435	84,205	85,004	80,925

*Source: Annual Drug Report, 2017.*

Table 4.0 Comparison in opiate and ATS use from 2013 to 2017.

<b>Years</b>	<b>Opiate</b>	<b>Methamphetamine (Crystalline)</b>	<b>Methamphetamine (Tablets)</b>	<b>ATS</b>
2013	75.09%	13.58%	0.50%	1.73%
2014	64.87%	18.42%	5.54%	2.39%
2015	60.47%	29.60%	2.45%	2.31%
2016	53.48%	31.82%	8.28%	2.41%
2017	37.91%	38.89%	16.30%	2.85%

*Source: Annual Drug Report, 2017.*

### **1.3 Methadone Maintenance Treatment (MMT) Program in Malaysia**

In order to fulfil the Millennium Development Goal (MDG) pledge in halting HIV transmission in Malaysia, a Harm Reduction Working Group (HRWG) was established in January 2004 for the purpose of advocating the importance of implementing harm reduction initiatives, consisting of Needle Syringe Exchange Program (NSEP), provision of condom and methadone maintenance treatment (MMT) targeting People Who Use Drugs (PWUDs) (Devi et al., 2012). In October 2005, methadone maintenance treatment (MMT) program was finally launched. The MMT program was introduced in three-phases; in phase one, MMT program was made available in hospitals, government health clinics and private clinics in four zones in peninsular Malaysia involving 1,240 clients. Findings from a pilot-study which was conducted in phase-one of MMT program implementation showed that there were no adverse events, in fact significant improvements in relationships with carers and work performances were noted with marked reduction in crime and high-risk behaviours (e.g. injecting and unprotected sex) during methadone use (Gill et al., 2007). As a result of the overwhelming treatment compliance rate or “retention rate” reaching almost 84% among MMT enrollees, the MMT program was eventually up-scale and made available in many government and private

health care facilities throughout Malaysia in the second-phase (Kaur et al., 2009). Since most opiate users were incarcerated and living with HIV, MMT was also made available in prison settings in the third-phase of MMT program implementation in 2008 (Wickersham et al., 2013). During the initial pilot study, HIV infected prisoners in Pengkalan Chepa and Kajang prison were provided with methadone (Bachireddy et al., 2011; Vijay et al., 2015).

MMT is an Opiate Substitution Treatment (OST) program that is primarily designed to provide pharmacotherapy to opiate dependence (Faggiano et al., 2003). Methadone treatment is scientifically shown to have numerous benefits, especially in reducing opiate use, risky injecting behaviours, HIV and hepatitis C transmissions, opiate overdose deaths, recidivism, and etc. (Fei et al., 2016). In order to minimize HIV spread, MMT was finally implemented as an evidence-based harm reduction intervention in Malaysia (Ali et al., 2017). MMT program was solely introduced in Malaysia from a harm reduction standpoint and not as a security measure. Those seeking to abstain from illicit opiate use can enrol in both primary and private MMT programs in the country. After methadone was found to be helpful, the MMT program was eventually implemented in government and private health care clinics, as well as in Cure and Care (C&C) centres throughout the country (Ministry of Health, 2017). By December 2013, there was approximately 811 MMT centres (446 government facilities and 365 private settings) that provides treatment to about 65,259 opioid users (33,444 clients in government facilities and 31,805 in private settings) in the country. However, only 18,600 clients were found to be active patients (Ali et al., 2017).

In Malaysia, opiate users have a choice to enrol in primary and private MMT programs. In private MMT program clients have to pay for their methadone treatment cost. In fact, those who have favourable treatment compliance history are also allow to buy '*take-away*' methadone doses. While in primary or government clinics, clients can receive free methadone dose. However, not every patient is allowed to receive '*take-away*' methadone dose. The program is only applicable to those who have good treatment compliance. Treatment compliance procedures could be a bit rigid in government MMT clinics compared to private MMT clinics. In government clinics, clients who are tested positive for illicit drug use can be automatically excluded from treatment. Nevertheless, compare to private MMT clients, clients in government MMT clinics have proper access to counselling, psychosocial interventions and medical services for their health problems such as HIV, Hepatitis C, tuberculosis, and mental health problems.

Despite the availability of methadone treatment in private and primary settings, it is reported that clients in private MMT setting are more likely to have poor treatment compliance and predisposed to abuse illicit substances than clients in primary MMT setting (Vicknasingam et al., 2015).

#### **1.4 ATS Use Trends in Malaysia**

Based on the latest figures from National Anti-drug Agency (NADA), the number of people arrested for illicit drug consumption in the country has increased markedly from 260,224 cases (between 2013 and 2014) to 452,528 cases (2015 to 2017) (Annual Drug Report, 2017). Though opiate use still remains as the main choice of drug widely abused in the country from 2010 to 2016, ATS use has surpassed opiate use in 2017 (Annual Drug Report, 2017). Findings from one of the earliest studies on ATS use was reported by

Chawarski et al. (2012). Chawarski and associates (2012) found a high number of out-of-treatment opiate IDUs in Malaysia has significant risk of contracting HIV. Two factors were found to be associated with HIV infections; lifetime history of ATS use and lifetime history of sharing of injecting equipment. Out of the 732 respondents, 75% (n=551/732) had lifetime history of ATS use, and 23% (n=167) reported lifetime ATS injection drug use (Chawarski et al., 2012). This clearly indicates that opiate users in Malaysia are prone to abuse ATS or co-administer opiates with ATS. Similarly, Sulaiman et al. (2014) found co-morbid depressive disorder, bipolar disorder, antisocial personality disorder and heavy methamphetamine use were significantly associated with lifetime methamphetamine-induced psychosis in methamphetamine users in Malaysia. Thus, it can be implied that chronic use of methamphetamine could adversely affect mental health. Moreover, besides the association of ATS use and mental health, a study by Chooi et al. (2017) found opiate users who reported initiating ATS use at a younger age are more likely to experience profound impairments in cognitive functioning. Desrosiers et al. (2016) conducted a focus group discussion among active drug users in rural areas of Kelantan and found drug users preferred using opiates concurrently with ATS at a younger age mainly due to peer influence, relieve boredom and cope with problems. Most of the respondents in the study claimed that they have limited knowledge about treatment options and perceived that there is no available treatment for ATS use. At present, those seeking treatment for ATS use problem can easily enrol in psychosocial programs under the care of National Antidrug Agency. Recently, Lim et al. (2018) found ATS use is also becoming more widespread among men having sex with men (MSM) in Malaysia. MSM in Malaysia used ATS to increase sexual capacity, heighten sexual pleasure and enhance sexual exploration and

adventurism. Despite engaging in risky behaviours, Lim et al. (2018) found MSM in Malaysia have limited access to sexual health and substance use treatment services.

In summary, it can be deduced that ATS users in Malaysia are vulnerable to health problems and HIV risk behaviours.

### **1.5 Published Articles on Opiate Substitution Treatment (OST) in Malaysia**

To fulfil the United Nations Sustainable Development Goals (SDGs) in halting HIV spread among opiate IDUs, Opiate Substitution (OST) Treatment or Methadone Maintenance Treatment (MMT) was eventually implemented in 2005 in Malaysia. OST or MMT was chiefly introduced to provide treatment access to people who use drugs (PWUDs) particularly illicit opiate users. Since the inception of MMT program, various studies have been conducted to determine the effectiveness of MMT program in the country. To date, there are about 13 published articles on MMT program in the country. Some of the earlier studies primarily looked at the quality of life (QoL) of MMT clients (Baharom et al., 2012; Devi et al., 2012). A study by Baharom et al. (2012) found clients enrolled in government MMT program have significant improvement in all domains (e.g. physical, psychological, social relationship and environment) of QoL after being on MMT program for at least six months. Similarly, a study by Devi et al. (2012) found opiate users enrolled in MMT program for a minimum of twelve-months have significant improvements in QoL, as most had refrain from heroin use, less likely to engage in HIV risk-taking behaviour and have better health outcomes. Recently, Ali et al. (2017) conducted a large cross-sectional study among clients enrolled in government MMT program in the country and found there were significant decrease in opiate use, HIV risk-taking behaviour, involvement in criminal activity and improvement in QoL domains (e.g.

physical, psychological, social and environmental). In addition, Fei et al. (2016) found MMT program was effective in reducing heroin use, injecting practices and engagement in criminal activities, however methadone treatment did not seem to reduce client's sex-related HIV risk-taking behaviours over time.

Nevertheless, a study by Vijay et al. (2015) found there are still sub-optimal levels of MMT experiences among people who injected drugs (PWIDs) in the country. Findings from the survey showed though treatment readiness for methadone treatment was moderately low, clients had more preference for methadone over buprenorphine treatment. Similarly, those who had moderately low treatment readiness scores have previous formal drug rehabilitation history. While those with higher treatment readiness scores was found to have past methadone treatment history, were older, have higher stress symptoms and engaged in needle/syringe sharing behaviours. It is not clearly known whether clients enrolled in primary MMT program are satisfied with their methadone program. Aziz and Chong, (2015) found a high percentage of clients enrolled in government MMT program was satisfied with their methadone treatment. However, majority of the respondents in the study highlighted that there is an urgent need for change particularly in dosing hours, waiting area and more manpower. Besides methadone treatment, opiate users in Malaysia can also access and seek buprenorphine treatment from private general practitioners. Buprenorphine treatment that comes in the form of tablet was eventually discontinued in Malaysia in 2006 when opiate IDUs started injecting buprenorphine. Due to the diversion issue, buprenorphine/naloxone combination was introduced in 2007. Despite the availability of buprenorphine/naloxone combination, Vicknasingam et al. (2010) found that there were no significant differences in the diversion and abuse occurrences of both

buprenorphine and buprenorphine/naloxone use among opiate IDUs in the country. After determining problems with buprenorphine diversion, findings from a large survey in Malaysia found low dispensing of buprenorphine/naloxone doses, lack of behavioural monitoring and counselling, high rates of continued drug use including injection of drugs with buprenorphine/naloxone were among some of the common problems related to OST program in the country (Vicknasingam et al., 2015). A study by Wickersham et al. (2013) found HIV positive prisoners who are given adequate methadone doses ( $\geq 80\text{mg}/\text{daily}$ ) at the time of release had better retention on MMT program. Similarly, Bazazi et al. (2017) found providing methadone treatment to HIV positive opiate prisoners during incarceration has significant impact on their health. To gauge HIV infected prisoners' attitude towards OST program, Bachireddy et al. (2011) found most incarcerated HIV positive opiate users expressed their interests to learn more about OST and believed OST is mainly needed to prevent relapse after their release from prison.

Apart from these findings, findings related to ATS use among clients in MMT program remains scant and warrants further research.

## **1.6 Research Problem**

Based on the current available findings, it is clearly shown that clients enrolled in methadone maintenance treatment (MMT) program in Malaysia are prone to use amphetamine-type-stimulants (ATS) (Vicknasingam et al., 2015). Despite the proven effectiveness of MMT program, treatment providers in primary MMT program continue to encounter various challenges ranging from illicit drug consumption problems to treatment compliance issues among treatment attendees (Ali et al., 2017). It is shown that low methadone dose or sub-therapeutic prescription of methadone dose is strongly



associated with illicit drug consumption among clients in MMT program (Faggiano et al., 2003). Despite the incremental surge in ATS seizures (1,141.4kg in 2015 to 1,907.24kg in 2017) and drug related arrests under the Dangerous Drugs Act (DDA) 1952 (140,938 in 2015 to 158,386 in 2017) (Annual Drug Report, 2017), the number of people detected for illicit drug use in the country have also substantially increased from 20,887 in 2013 to 30,844 in 2016, though a slight decrease was observed in the number of problem drug users in 2017 (Annual Drug Report, 2017). Lately, National Antidrug Agency (NADA) personnel's, found individuals with opiate use disorder in Compulsory Drug Detention Centres (CDDCs) have co-occurring opiate and ATS use disorders. On the other hand, treatment providers in primary (government) MMT clinics are beginning to see more newly registered methadone clients are being tested for opiate poly-drug use during their routine drug screens. Although, opiates have been widely used as the main choice of illicit drug between 2013 (75.09%) and 2015 (60.47%), however from 2016 onwards, ATS use have surpassed opiate use in the country. In fact, ATS use have outpaced opiate use among the newly detected drug users in the country in 2017 (Annual Drug Report, 2017). Moreover, the number of people arrested for drug consumption under Section 15(1)(a) of the DDA 1952 have remained constantly high since 2013 to 2017 (Annual Drug Report, 2017).

Despite the gradual increase in the number of individuals detected for ATS use in the country (31.82% in 2016 to 38.89% in 2017), at this juncture, there is no reliable evidence or studies to show whether clients in MMT program are vulnerable to ATS misuse during methadone treatment. Previous studies were mainly designed to investigate the quality of life (QoL) and prevalence of opiate use among MMT clients in Malaysia

(Ali et al., 2017). Findings from a recent large-scale study found although methadone users in Malaysia have significant improvements in various domains of QoL, unfortunately the samples average daily methadone dose was found to be low (54.8mg/daily) (Ali et al., 2018). Thus, perhaps the low dispensing of methadone doses could have propelled clients in MMT program to engage in ATS misuse. so far, no one have investigated the relationship between methadone dose and the prevalence of ATS use among treatment attendees in MMT program in the country.

Preliminary findings from field work observations, as well as urine drug reports gathered from MMT clinics in the District of Kuantan, Pahang, showed clients in MMT programs are prone to misuse amphetamine-type-stimulants (ATS). Data obtained from government MMT clinics in Kuantan, Pahang, also showed that the number of opiate users seeking methadone treatment has increased. As of 2016, a cumulative total of 3,188 opiate users have registered in government-run MMT program in the State. However, out of this number, only 1,682 individuals were found to be active clients (Figure 1.5). While for the District of Kuantan, Pahang, a total of 670 opiate users have registered for methadone program, but only 285 respondents were found to be active methadone users (Figure 1.6). As for the random urine drug screens that was conducted between 2014 and 2015, majority were tested positive for ATS use compared to opiates, cannabis and benzodiazepine (Figure 1.7). The misuse of ATS during methadone treatment can affect treatment compliance and expose clients to HIV risk behaviours (Fei et al., 2016).

Since data on ATS misuse among MMT clients are still limited, this study aims to determine the prevalence of ATS use among MMT attendees in both primary and private MMT programs in the District of Kuantan, Pahang. It is hoped that findings from this

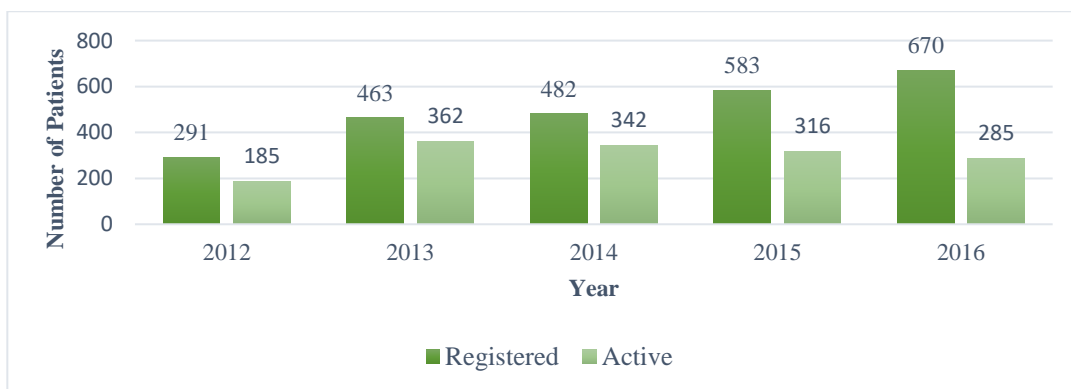
preliminary study can help treatment providers to have a better understanding on the emergence of ATS misuse among clients in methadone treatment program, so that proper interventions can be develop to deter the misuse of ATS among MMT attendees in the country.

Figure 3.0 Number of Registered and Active Patient in Pahang.



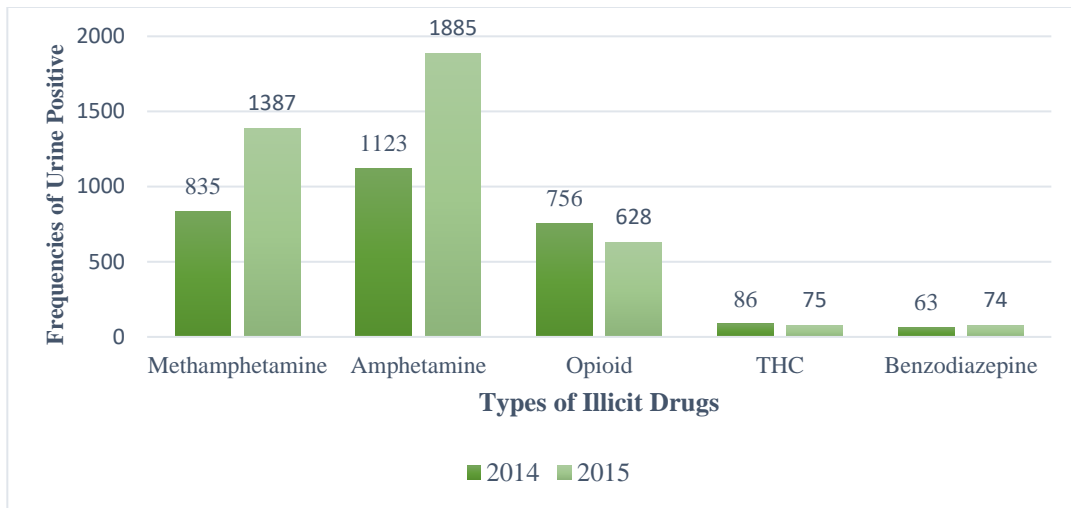
Source: MOH, Pahang.

Figure 4.0 Number of registered and Active Patient in Kuantan.



Source: MOH, Pahang.

Figure 5.0 Random Drug Test in MMT Health Government Clinic from 2014 to 2015.



Source: MOH, Pahang.

### 1.7 Study Hypothesis

The study hypothesis includes;

Low prescription of methadone dose is associated with amphetamine-type-stimulants (ATS) misuse among MMT attendees in primary and private MMT programs in the District of Kuantan, Pahang.

## **1.8 Research Questions**

The research questions were specifically developed based on the study research problem.

1. What is the socio-demographic and behavioural characteristics of ATS users in MMT programs in the District of Kuantan, Pahang?
2. How prevalent is ATS use among MMT attendees in the District of Kuantan, Pahang?
3. Is there a relationship between methadone dose and ATS use among MMT attendees in the District of Kuantan, Pahang?
4. Does MMT attendees who self-reported opiate poly-drug use and ATS use engage in risky (sexual and injecting) HIV behaviours during MMT program in the District of Kuantan, Pahang?
5. Are there any differences in treatment satisfaction, methadone dose and risky HIV behaviours of between primary and private MMT attendees in the District of Kuantan, Pahang?

## **1.9 Research Objectives**

The study objectives are mainly formulated based on the research questions. The following are the study objectives;

1. To identify the socio-demographic and behavioural characteristics of ATS users in MMT programs in the District of Kuantan, Pahang.
2. To investigate the prevalence of ATS use among MMT attendees in the District of Kuantan, Pahang.
3. To determine the relationship between methadone dose and ATS use among MMT attendees in the District of Kuantan, Pahang.

4. To analyse the HIV risk (sexual and injecting) behaviours of MMT attendees who self-reported opiate poly-drug use and ATS use in MMT programs in the District of Kuantan, Pahang.
5. To investigate treatment satisfaction, methadone dose and risky HIV behaviours of between primary and private MMT attendees in the District of Kuantan, Pahang.

### **1.10 Scope of Study**

The scope of study was to determine the prevalence of ATS misuse among treatment attendees in MMT programs in the District of Kuantan, Pahang. Those who self-reported to be currently using ATS were recruited from two different MMT programs (primary vs. private MMT clinics) for the study. Respondents in this study were regular methadone users who were currently receiving methadone treatment for their opiate use disorder.

### **1.11 Significance of Research**

This study is among the first to highlight about the emergence of ATS use among methadone users in primary and private MMT programs in the District of Kuantan, Pahang. The study findings have numerous policy significance. Most importantly, treatment providers (e.g. trained addiction specialists, private general practitioners, pharmacists, counsellors, etc.) can use this study findings to determine the motives and patterns of ATS use among methadone users. This in turn, could help treatment providers understand some of the key factors that is associated with ATS use among treatment attendees in MMT programs. Second, the study findings can be used to alert policy makers on the growing misuse of ATS among MMT clients in the country. Hence, this will enable

policy makers to design proper preventive interventions to curb ATS misuse among methadone users. In fact, certain guidelines can be drawn to exclude clients who are frequently tested for ATS use during routine urine drug screen. Nevertheless, policy makers could also determine some of the common factors that are associated with ATS use among clients in primary and private MMT programs. It will be interesting, with prospective studies can be conducted in other states to determine the severity of ATS use problem among MMT attendees in primary and private MMT programs in the country. In fact, future studies can use this study findings as a basis to develop proper research proposals. This in turn, could help researchers to look at broader issues related to the misuse of ATS use among MMT attendees in the country. Last but not least, our findings can also be used to guide policy makers make informed-decisions pertaining to the occurrences of ATS misuse among methadone users in MMT programs in the country.

### **1.12 Thesis presentation**

This thesis consists of six chapters. The first chapter is the introduction chapter. The world drug abuse problem and Malaysian drug abuse problem, history of methadone maintenance treatment (MMT) program, trends of ATS use in Malaysia are briefly described in this chapter. The importance of conducting the study is clearly delineated in the research problem section of this chapter. The study hypothesis, research questions and study objectives are clearly described in this chapter. In addition, the scope of study and research significance are also described in this chapter.

The second chapter of the thesis is the literature chapter. All the relevant articles related to the scope of study are comprehensively analysed and described in this chapter.

The third chapter will provide detail explanation on the methods used in this study. The study design is discussed in this chapter. The study population, study location, inclusion and exclusion criteria, sampling procedure and data collection techniques is also described in this chapter. Procedures on how the urine toxicology screen was conducted among the study respondents were described in this chapter. Ethical issues, as well as compensation for taking part in the study is all described in this chapter. Finally, how the study data was analysed and interpreted was clearly explained in this chapter.

Chapter four describes the study results. The study results are divided into sub-sections based on the objectives of study. In the first part, the respondent's socio-demographic characteristics, methadone treatment history, illicit drug use history and current ATS use history are described.

Chapter five is the discussion chapter where all the study results are analysed and discuss with various published articles. The format of discussion in this chapter is done sequentially according to the study objectives.

The final chapter is the conclusion chapter. In this chapter, all the key findings of the study are summarized and concluded. The study implications and suggestions for future studies are also described in this chapter.

### **1.13 Conclusion**

The next chapter is the study literature chapter. All the relevant articles related to the scope of study will be comprehensively analyse, compare and discuss in the literature chapter.



## **CHAPTER 2**

### **LITERATURE REVIEW**

#### **2.0 Introduction**

This is the literature chapter. Relevant articles deemed suitable to the scope of study is delineated in this chapter. The literature chapter is divided into several sub-sections. Information pertaining to the global illicit drug use problem, Asian drug use problem, Malaysia drug policy and drug use problem, Methadone Maintenance Treatment (MMT) program in Malaysia, HIV and hepatitis C situation, definition of addiction, drug dependence classification based on DSM-5, risky HIV behaviors, as well as types of illicit drugs and pharmacological treatment for opiate dependence are clearly explained in this chapter.

#### **2.1 Overview of the Global Illicit Drug Use Problem**

Latest figures from World Drug Report (2017) by United Nations Office on Drugs and Crime (UNODC) estimated that there are approximately a quarter of billion people between the age of 15 to 64 years, who have used illicit substances at least once in 2015 (range:158 to 351 million). Opioids were reported to cause the highest negative effects, while cannabis use remains as the most widely used substances (around 125 and 227 million people is estimated to have used cannabis in 2015, equivalent to a prevalence rate of 3.8% of the adult population worldwide) around the globe (World Drug Report, 2017). Amphetamine-types-stimulants (ATS) were the second most widely abuse illicit drug in 2015, where between 35 million people have used ATS, with a prevalence rate ranging from 0.5%-1.8% of the population aged 15-64 (World Drug Report, 2017). As for opiate misuse, about 42 to 58 million people are estimated to have used opiates in 2015, with a

prevalence rate of 0.9%-1.3% of the population aged 15-64 years (World Drug Report, 2017). Recently, the used of New Psychoactive Substances (NPS) have begun the gain wider attention from regulatory, and health providers due to its deleterious effects. At the end of 2016, UNODC found there are about 664 types of NPS, in fact most are still not regulated, and can be easily purchased through the *dark net* (World Drug Report, 2017). NPS is popularly used as a safe substitute for illicit drugs, since most NPS cannot be detected through routine drug screen, and is reported to be non-harmful than traditional substances (World Drug Report, 2017).

## **2.2 Asian Drug Use Problem**

Asia is one of the largest opium production regions in the world. According to United Nations of Office on Drugs and Crime, Afghanistan and Myanmar were among the two largest opium-producing countries in the world (World Drug Report, 2017). The opium cultivation in Afghanistan have increased by 36% in 2013. Afghanistan recorded the highest (89%) opium production in 2013 (UNODC, 2015). While cannabis production remains borderless in most regions of the world (UNODC, 2015). Amphetamine-type-stimulants (ATS) have become the main concern in Asia, when some regions in Asia became the major production and trafficking hub for ATS (64% of ATS seizures occurred in Asian regions) (UNODC, 2015). United Nations Office on Drugs and Crime estimated that more than half of the worlds ATS users resides in Asia (approximately 9.5 million methamphetamine users, and 3.9 million ecstasy users are situated in Asia). Countries like China, Cambodia, Singapore and Philippine recorded a marked increase in the use of methamphetamine (in the form crystalline) in 2015, while the use of methamphetamine tablets saw a significant surged in Thailand, Myanmar and Laos during the same period

(World Drug Report, 2017). At present, there is no data to show that large quantities of ATS are being manufactured in East and South-East Asia (World Drug Report, 2017).

### **2.3 Malaysia Drug Policy and Drug Abuse Problem**

Malaysia have adopted a non-punitive approach in revamping the current drug policy which was deemed archaic and unsuitable with the present context. Previously, people with substance use disorder (SUD) were labelled as criminals, as the government believed that punitive drug laws or legislations can help address or curtail the illicit drug use problem in the country. Despite Malaysia's tough stand against illicit drug use, those found guilty for consuming illicit substances and trafficking can be charged under the Dangerous Drugs Act 1952. At present, individuals with opiate dependence can be detained in Controlled Drug Detention Centres (CDDCs) for at least two-years, followed by another 2 years of community supervision after their post-released from CDDCs. During detention, inmates in CDDCs are required to undergo various recovery components which chiefly emphasized on psychosocial interventions like military type physical exercise, and spiritualism (Vicknasingam and Narayanan, 2008). Due to the exponential surged in HIV spread, non-government organizations such as IKHLAS begin to play a proactive role by urging the government to introduce harm-reduction interventions such as needle-syringe exchange program, and methadone treatment to cater to the treatment needs of out-of-treatment drug users in Malaysia (Malaysian AIDS Council, 2017). As a result of the constant request, a special working group was established in 2014, and named as the National Harm Reduction Working Group (HRWG). The group was tasked to reduce HIV spread, and drug use harms among drug users in the country. Harm reduction interventions were primarily introduced in Malaysia