Clandestine Drug Laboratory: Emergence, Types, Factors and Problems

Ahmad Fahmi Lim A[a*], Chang KH[a], Wan Nur Syuhaila MD[a], Maimonah S[b], Raihanah H[c] and Kunalan V[b]

[a] *Forensic Science Programme, School of Health Sciences, Universiti Sains Malaysia, 16150 Kubang Kerian, Kelantan, Malaysia*
[b] *Narcotics Section, Forensic Division, Department of Chemistry Malaysia, Jalan Sultan, 46661, Petaling Jaya, Selangor, Malaysia*
[c]*Royal Malaysia Police Forensic Laboratory, Jalan Cheras, 43200, Cheras, Selangor, Malaysia*

*Corresponding author: fahmilim@usm.my

ABSTRACT: This article research on clandestine drug laboratory focuses on its emergence, types, factors and problems. Clandestine drug laboratories, *i.e.* settings with a combination of sufficient apparatus and chemicals for the manufacture of a controlled substance, were frequently reported in East and South-East Asia. In Malaysia, a number of large scale laboratories were dismantled since their first emergence in 1998 but “condominium scale” clandestine laboratories became prominent recently. Market demand, availability of precursors, ease of production and suitable setting to avoid detection are among the factors contributing to the emergence of clandestine laboratories. Various types of clandestine laboratories utilising different synthesis pathways were encountered. Many hazardous chemicals were used in a variety of methods used to synthesise drugs. Besides physical and chemical hazards posed by the clandestine laboratories, especially in the hands of unskilled cooks and with makeshift apparatus, the waste products from these clandestine laboratories also lead to heightened health risk and environment contamination. Public awareness is important to reduce the harm caused by clandestine laboratories while effective strategies against the operation of clandestine laboratories should be taken by law enforcement agencies.

Keywords: Clandestine laboratory, drugs, methamphetamine, hazards

Introduction

A clandestine drug laboratory is a place where the preparation and synthesis of illicit drugs takes place (Burgess and Chandler, 2003; Christian, 2004) and is often operated by the criminal, deceiving the legal requirements and supplying the drug substances to the illicit market (Frank, 1983). During the manufacturing process in the laboratories, the precursor chemicals were extracted, converted or synthesized into the controlled substances, followed by the conversion of these controlled substances into suitable usable form, and packaged for distribution (Christian, 2004). Clandestine laboratories are found across all regions of the world with the majority of them involved in the production of methamphetamine (80–90%), but other drugs including amphetamines, methylenedioxymethamphetamine (MDMA) or ecstasy, methcathinone (CAT), lysergic acid diethylamide (LSD) and fentanyl may also be synthesized (Burgess and Chandler, 2003; UNODC, 2013). This article provides an overview on the trends of drugs of abuse and discusses the emergence and types of clandestine laboratories, factors associated with these and the problems posed.

Trends of drug abuse

The United Nations Office on Drugs and Crime (UNODC) shows that the global drug use situation has remained stable over the last decade (UNODC, 2010, 2011, 2012, 2013). Although some increase in the estimated number of illicit drug users (from 180 million to some 300 million people) were previously reported, the prevalence of drug users among the population has remained stable at about 5.0% (UNODC, 2011, UNODC, 2013). Among the drugs, cannabis is the most widely used illicit drug with up to 181 million cannabis users or a prevalence of 3.9% of the world population UNODC (2013),. Although cannabis is produced in practically every country in the world, its cultivation is largely localized and for the local markets. West and Central Africa (12.4%), Oceania (10.9%), North America (10.7%), and Western and Central Europe (7.6%) recorded a prevalence of cannabis use that is higher than the global average (UNODC, 2013).

Uses of amphetamine-type stimulants (ATS) and opioids remain stable across the globe after cannabis, estimating at 33.8 million (0.7%) and 31.9 million (0.7%) users among the world population, respectively. The uses of these drugs have outstripped the use of heroin and cocaine (UNODC, 2011, 2013, 2013a). The market for ATS is expanding as seen from increased seizures and consumption levels especially in the markets of Asia's developed economies, notably in East and South-East Asia (UNODC, 2013). Malaysia is also suffering from methamphetamine epidemic.ATS is attractive to millions of users as they are more affordable, convenient to the users and frequently associated with a modern and dynamic lifestyle (UNODC, 2010). Methamphetamine continues to be the mainstay of the ATS business as it is accounted for 71% of global ATS seizures in 2011 (UNODC, 2013).

The estimate numbers of ecstasy, cocaine and opiates users remain stable over the years (UNODC, 2013). It is worth noting that the use of ecstasy has been declining globally, although slight increase was found in Europe (UNODC, 2013). Oceania, North America and Europe reported higher prevalence of ecstasy uses, and this issue continued to be associated with the recreational and nightlife settings in cities, particularly among the youth (UNODC, 2013; UNODC, 2014) with majority of users aged between 15 and 34 years (UNODC, 2014).

North America and Western and Central Europe are the two major markets for cocaine though a decrease was seen in recent years (UNODC, 2013). Africa and Asia, particularly East and South-East Asia, as well as Central and West Asia have shown an increase in opioid (*i.e.* prescription opioids, heroin and opium) use since 2009 (UNODC, 2013). The global area under coca cultivation almost unchanged from a year earlier but 14% lower compared to 2007 and 30% less compared to 2000 (UNODC, 2013). Afghanistan and Myanmar continued to be the major producers in poppy cultivation worldwide, in addition to Mexico in the Americas (UNODC, 2013).

The continued growth of new psychoactive substances (NPS) market over the previous years has become a major international concern (UNODC, 2013a; UNODC, 2013c). More than 80 countries were reported with the emergence of NPS of various types by June 2013 (UNODC, 2013a). The Department of Chemistry of Malaysia has also encountered several cases of NPS recently (Personal Communication).

Asia is estimated to have one quarter to 40% of all illicit drug users worldwide (UNODC, 2011). The highest estimated numbers of drug users were recorded in groups of cannabis (54.1 million), opiates (10.0 million), ATS (19 million) and ecstasy (10 million), of the total population (UNODC, 2013). According to the most recent report from UNODC (2013), the annual prevalence of users for above groups is considerably lower than the global average (UNODC, 2013), most probably due to the larger Asian population. Note that among the drug users, as high as 57% of ATS users and 55% of ecstasy users were recorded in Asia from the total global users (UNODC, 2013). It is therefore not surprisingly that Asia also gains the attention as much more widespread in clandestine manufacture of ATS. These clandestine methamphetamine laboratories were frequently reported in East and South-East Asia, including Philipines, China, Malaysia and Myammar, as well as the Islamic Republic of Iran which emerged as a popular clandestine location (UNODC, 2011). Ecstasy was also illegally manufactured in Malaysia, China and Indonesia (UNODC, 2011a).

Emergence of clandestine laboratories

The manufacturing of illicit drugs in clandestine laboratories has been reported as early as in 1960s but became widely spread in the United States especially in 1990s (DEA, 2011), and continued as a major problem until recent years (UNODC, 2013). Since synthetic drugs are the products of chemical reactions, producing these drugs are relatively easier as compared to processing cocaine or heroin that originate from herbal materials (Abdullah and Miskelly, 2010a) and therefore their manufacturing is not constrained by specific locations but are frequently located close to the illicit market (UNODC, 2011).

Almost all detected clandestine synthetic drugs laboratories process ATS drugs, including methamphetamine, amphetamine, methcathinone and ecstasy-group substances (UNODC, 2010). The United States of America, the Czech Republic, Australia and China have registered the largest number of detected clandestine laboratories (UNODC, 2010). The number of ATS laboratory incidents rose from years to years and has spread to new regions which previously reported little or no such operations (UNODC, 2010a; UNODC, 2013d). The type and form of ATS manufactured vary across of the regions of the world. For instance, East and South-East Asia often manufacture methamphetamine in tablet form or highly purified crystalline form while in the Near and Middle East Asia, they are sold in tablets form, known as Captogen, which are sourced from South-East Europe and from within the region (UNODC, 2010).

To date, methamphetamine is still the most widely manufactured ATS worldwidewith more than 80% from all the clandestine laboratories reported worldwide (UNODC, 2011; UNODC, 2013). A total number of 385 clandestine laboratories were dismantled in the East and South-East Asia in 2012, and most of them were manufacturing methamphetamine (UNODC, 2013d). The global seizures of precursor chemicals of the methamphetamine (*i.e.* ephedrine and pseudoephedrine) were doubled on a year earlier, and they are frequently trafficked across the regions (UNODC, 2011).

A number of small scale laboratories, as well as large scale mega clandestine laboratories have been reported to UNODC in nearly all regions of the world (UNODC, 2011). The growing popularity of the production of methamphetamine is mainly due to its simpler procedure to manufacture; the detailed instructions and protocol which are readily available in internet and books (Uncle Fester, 1999) , as well as the manufacturing methods with allow the production from the chemicals that can be easily acquired in daily life (UNODC, 2010, Christian, 2004). Figure 1 summarizes possible synthesis pathway for methamphetamine.

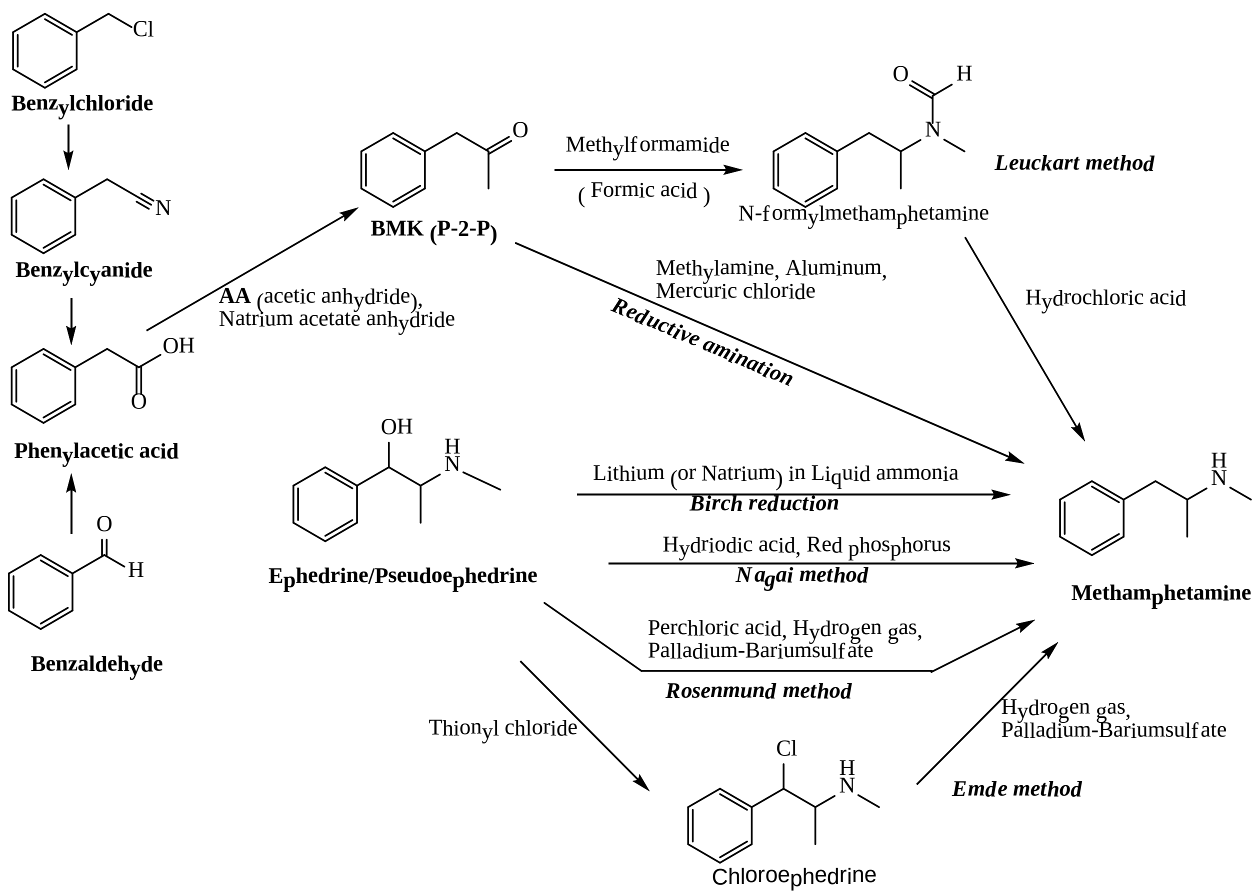

Figure 1: Possible synthesis pathway for methamphetamine

The manufacturing operations of illicit amphetamine and ecstasy tend to be fewer in number but more sophisticated, as they require more specialized equipment, precursor chemicals and greater skill levels (UNODC, 2010; 2011a). The numbers of clandestine laboratories and seizures of these drug substances declined worldwide. Safrole is the main precursor of MDMA (ecstasy) which occur naturally in the tree species in South-East Asia. The control of safrolein 2010 has led to the use of alternatives to MDMA, mimicking the effects of ecstasy group substances. Therefore, the nature of ecstasy has shifted and characterized by pills with low content of MDMA and mixture of other psychoactive substance such as synthetic cathinones and ketamine (UNODC, 2014).

NPS also were reported with increase in their production and misuse at global level. Some of them are the synthetic cannabinoid, synthetic cathinone, ketamine, piperazine and phenetylamines, but also minority of plant-based substances like kratom and khat. Among these drugs, synthetic cannabinoids and synthetic cathinones have increased sharply during the period of 2008 to 2012 (UNODC, 2013). The emergence and spread of NPS could be an issue worldwide, especially in the illicit market if they are not regulated in terms of their production and trafficking. Clandestine laboratories manufacturing these drugs could pose another challenge to law enforcement agencies in the future.

Trends of drug abuses and the clandestine laboratories in Malaysia

Heroin remains the primary drugs of abused in Malaysia from 2008 to 2013, with an approximately 45% of all reported drug users in 2013. An estimated of 8% of the total drug users consumed ATS, particularly methamphetamine. Cannabis herbs, amphetamine and ketamine are also among the commonly used drug substances in Malaysia (Table 1).

In Malaysia, the demands for synthetic drugs in domestic market, in some instances for regional supply, have raised the setting up of clandestine laboratories. Malaysia has become a significant methamphetamine manufacturing locations, demonstrating the shift in the pattern of clandestine manufacturing, trafficking as well as the use. Significant quantities of ecstasy are also manufactured domestically in clandestine laboratories. The precursors and the essential chemicals used in the drug substances manufacturing are smuggled into Malaysia or diverted from licit trade (UNODC, 2013d).

Table 1: Comparison of Various Drugs of Abused Seized from 2008 to 2013 (Source: National Anti Drug Agency Annual Report 2009-2013)

Drug Type	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**
Heroin Base (kg)	21.20	27.42	30.638	275.47	5.23	116.89
Heroin No. 3 (kg)	269.87	218.35	234.27	445.13	364.27	558.72
Heroin No. 4 (kg)	5.99	37.583	34.414	34.86	47.35	87.39
Cannabis (kg)	874.77	2,351.79	1,064.35	1,054.39	861.29	898.09
Raw Opium (kg)	0.002	10	0.01	0.73	9.51	0.00
Prepared Opium (kg)	13.89	0.14	4.422	0.12	2.87	0.32
Cocaine (kg)	7.13	18.61	20.57	3.52	6.99	73.87
Methamphetamine (kg)	356.92	1,159.66	887.29	1,235.58	851.82	1706.49
Ecstasy Powder (kg)	8.6	708.52	106.39	26.53	464.61	654.59
Ecstasy Pil (Tablet)	80.778	75,515	60,713	98,751	772,421	395,984
YabaPil (Tablet)	281,343	107,952	107,963	364,909	521,384	524,964
Psychotropic Pil (Tablet)	306,610.5	268,888	311,123	895,890	1,139,884	816,938
Eramine 5 (Tablet)	1,502.233	2,909,587	2,032,183	1,206,735	9,424,643	243,112
Ketamin (kg)	553.13	1,070.59	334.69	202.48	238.88	402.58
Codeine (liter)	17,704.42	13,131.74	1,925.14	3,463.84	5,571.64	6990.19
Ketum (litre)	20,516.06	5,139.61	22,790.92	89,967.00	34,179.56	36,956.82
Ketum (kg)	1,441.79	1,797.85	2,203.13	3,067.00	5,237.74	9,101.46

The first clandestine laboratory was being reported in 1998 in Sabah, Malaysia. Since then, a number of large scale laboratories were dismantled by Malaysian law enforcement agencies. In recent years, smaller scale laboratories and the so-called “condominium laboratories” were uncovered with most of them involved in methamphetamine manufacturing. The clandestine laboratories reported in Malaysia can be in active, abandoned or immature stages. According to Royal Malaysia Police, the numbers of clandestine laboratories being seized were reported in an increasing trend. A total of 115 cases of seized laboratories were reported within the duration of six years between year 2007 to 2012 (RMP, 2012). The statistics reveals the seizures of 30 and 32 clandestine laboratories in 2011 and 2012, respectively (RMP, 2012). UNODC (2013d) reported that 27 illicit laboratories were dismantled in Malaysia in 2012, slightly lower than the report from RMP (2012).According to UNODC (2013d), 20 out of 27 clandestine laboratories were dealing with crystalline methamphetamine manufacturing, six with ecstasy facilities and one methamphetamine pill laboratory (UNODC, 2013d). The numbers of clandestine methamphetamine laboratories in Malaysia were greatly increased as compared to six and three laboratories dismantled in year 2010 and 2011, respectively (UNODC, 2013d).

Types of clandestine drug laboratories

Clandestine drug laboratories are found almost everywhere including farmhouses, housing apartments, hotels or motels, and even in a highly-mobile vehicle (Servick, 1993, Abdullah, 2008). The size of these drug laboratories may vary, as the large and highly organized laboratories are known as "super-" or "mega-" laboratories whereas smaller scale laboratories are often referred to as "mom and pop-" or "Beavis and Butthead-" laboratories (NDIC, 2001; Scott, 2002; Christian, 2004). The former type of clandestine laboratories has higher production capacity and often run by skilled operators, mainly for financial gain (Christian, 2004). Different operations (extraction, production, tableting, packaging and distribution) may take place at varying locations in an established network to avoid the detection by law enforcement agencies (Christian, 2004). Additionally, the risk of losing the property due to asset forfeiture, and those hazardous materials clean up costs can also be avoided while they are moving from one place to another (Irvine and Chin, 1991). On the other hand, the latter type produces smaller amount of illicit drugs per production cycle, and just enough for their own and close associates' uses (Servick, 1993; NDIC, 2001; Scott, 2002; Christian, 2004) and often are run by less skilled operators with no or less chemical education (Christian, 2004).

The two types of clandestine drug laboratories present different challenges to law enforcement agencies (Scott, 2002). With high production capacity, super-laboratories account for the majority of drug production (80% for all methamphetamine produced), they are of greater concern to control of supply of illicit drugs (DEA, 2000). The successfully trafficking of their production into the society largely affects the security in nearly all regions of the world. However, the smaller clandestine laboratories may actually present greater risks to the general populations due to potential explosions, fires, uncontrollable hazardous and danger waste management as well as child endangerment (UNODC, 2013). The lacking of manufacturing skills and the uses of make shift equipment's could be the causes of these possible incidents (Russo, 1999), higher physicals hazards and environment contamination (Irvine and Chin, 1991). Due to their relatively smaller spaces, the operators can set up and dismantle these kinds of drug laboratories easily (Scott, 2002). Structure contamination during cooking may require extensive remediation and decontamination for re-occupancy (Abdullah, 20080). At a smaller scale, these laboratories can also be set up inside a vehicle. This is the most dangerous laboratories due to the possibility of the vehicle being involved in a traffic accident.

Contributing Factors

The profit through the manufacturing of drugs can be huge but varied, on the basis of the availability of chemicals and precursors, the purity of the produced drugs, the region or the country where is manufactured, distributed and sold, as well as the size and sophistication of the laboratories (Scott, 2002).

Besides profit, market demand, availability of precursors, ease of production and suitable setting to avoid detection are among the factors contributing to clandestine laboratories situation. Clandestine laboratories are set up where there is demand from drug abuser but in many instances, drug traffickers, both domestic and also international are involved. Availability of precursor or substitute chemicals is also a key factor. Where a precursor is under international control, the clandestine laboratory will shift to the use of other available precursors. For instance, phenyl-2-propanone was widely used before it was categorised as a Schedule II controlled substance in 1980 in the US (Allen *et. al.*, 1992, Irvin and Chin, 1991).

Newer and cleaner methods using ephedrine and pseudoephedrine as the main chemical precursor have gained in popularity. The first published article about methamphetamine production through ephedrine/pseudoephedrine reduction (HI Reduction Method) was by Skinner in "*The Methamphetamine synthesis via Hydriodic Acid/Red phosphorus Reduction of Ephedrine*" in 1990 (Skinner, 1990). In fact, there are a few variations of HI Reduction Methods namely the Hydriodic Acid /Red Phosphorus Method, Iodine/Red Phosphorus Method and Iodine/Hypophosphorous Acid Method (Abdullah, 2008). The increasing diversion of precursor chemicals, as well as increased seizures and manufacture of drug substances explain the complexity of clandestine drug laboratory situation (UNODC, 2013).

The seizures of methamphetamine, both pills and crystalline forms, have indicated that the substance is an imminent threat worldwide (UNODC, 2013). In many regions, the primary source of ATS is via the illicit manufacturing in clandestine laboratories (UNODC, 2010). In Malaysia, most clandestine laboratories dismantled were associated with methamphetamine manufacturing.

Problems arising from clandestine labs

The increased number of clandestine drug laboratories, whether they are in operational or non-operational stages, can lead to dangerous and hazardous situations for the public and law enforcement agencies. Substandard drug substance can affect the health of a drug abuser. Toxic contamination and the risk of error during the production are possible. The drug contamination may result in potentially serious adverse health effects and complications for the drug users (Burton, 1991).

Injecting drugs, such as ATS, increase the risk of blood borne diseases, especially HIV/AIDS (UNODC, 2011). Additionally, the larger set of problems related to illegal drug manufacturing, trafficking, abuse, and associated crime could be arisen from these laboratories. The distribution and sale of drugs manufactured from clandestine laboratories raised the issue of rave parties and nightlife culture, especially for young adults (Scott, 2002). Violent offences, such as domestic violence and child abuse, were reported in a family with drug abuser. Property crimes were also frequently committed by the drug users, in order to get the money to buy drugs or chemicals to produce them (Scott, 2002).

Apart from the criminal activities, clandestine drug laboratories contain reactive hazardous and flammable chemicals used in the illicit drug synthesis (Irvine and Chin, 1991; Cameron, 2002; Abdullah, 2008; Abdullah and Miskelly, 2010a). Table 2 lists the chemicals used in a variety of methods to produce methamphetamine.

Table 2: Chemicals used in a variety of methods to produce methamphetamine (Sources: Abdullah, 2008)

Acetaldehyde	Freon	Phenyl acetic acid
Acetic anhydride	Hexane	Phenylacetonitrile
Acetone	Hydriodic acid	1-phenyl-2-propanone
Aluminum chloride	Hydrochloric acid	1-phenyl-2-nitropropene
Aluminum metal	Hydrofluoric acid	Phosgene
Anhydrous Ammonia	Hydrogen	Phosphine
Ammonia	Hydrogen peroxide	Phosphoric acid
Ammonium acetate	Hydrogen sulfide	Phosphorus (red)
Ammonium chloride	Hypophosphorous acid	Phosphorus pentachloride
Barium sulfate	Iodine	Phosphorus oxychloride
Benzaldehyde	Iron fillings	Platinum
Benzene	Isopropyl alcohol	Platinum oxide
Benzyl chloride	Lead acetate	Potassium
Benzyl cyanide	Lithium aluminum hydride	Propane
Benzyl magnesium chloride	Lithium (batteries)	Pseudoephedrine (cold tablets)
Bicarbonate of soda n-butyl amine	Magnesium sulfate	Pyridine
Butyl alcohol	Magnesium	Raney nickel
Carbon dioxide	Mercuric chloride	Sodium acetate
Chloro acetone	Methamphetamine	Sodium bisulfite
Chloroform	Methyl alcohol	Sodium cyanoborohydrate
Chloropseudoephedrine	Methyl amine	Sodium chloride
Cyclohexane	Methyl ether ketone	Sodium cyanide
Dry ice	Nitric acid	Sodium hydroxide (lye)
Ephedrine (Cold tablets)	Nitroethane	Sodium metal
Ethyl acetate	Oxygen	Sodium thiosulfite
Ethyl alcohol	Palladium	Sulfuric acid (drain cleaner)
Ethyl ether (Engine starter)	Palladium black	Thionyl chloride
Ferric chloride	Pentane	Toluene (brake cleaner)
Formaldehyde	Perchloric acid	
Formic acid	Petroleum ether	

Chemicals used in clandestine laboratories are chaotic, unorganized and potentially armed, and include heavy metals, carcinogens and phytotoxic substances (Burgess and Chandler, 2003; Australian Government, 2011). Typically, temporary and improvised equipment and facilities are used to avoid detection and these could pose a high risk of physical injuries, including those arising from explosions, fires, chemical burns and toxic fumes (Scott, 2002;

Burgess and Chandler, 2003; Scott and Dedel, 2006; Abdullah; 2008; Abdullah and Miskelly, 2010a). During manufacturing process, all the chemicals are mixed and allowed for chemical reactions to produce the drug substances. By products of the chemical reactions could be produced, and thus the personal involved in the synthetic process, emergency respondents, hazardous cleanup crews, neighbours and future property occupants could be exposed to these potentially hazardous chemicals (Russo, 1999; Scott, 2002). Although the long term health risks due to these chemical by products remains unknown, but their potential effects could not be ignored. Moreover, most of the offenders did not take any safety precautions during the synthetic process, leading to more unpredicted dangers (Scott, 2002).

In most circumstances, the clandestine laboratories use heat to process the chemicals, which is also known as “cooking” the ingredients to produce the desired drug substances (UNCLE Fester, 1999; Scott, 2002). Therefore, fires and explosions could be arisen if no safety actions were considered. Explosions can potentially cause great damage to the responding personnel in the shortest amount of time, due to the improper handling of chemicals or unintentional chemical reactions (Christian, 2004). Booby traps, ignition of flammable atmospheres and the incompatible chemical mixings can cause fires (Christian, 2004). Apart from that, personal acts such as smoking, failure of electrical switches or even equipment-generated friction can trigger explosions in higher possibility as the place where the manufacturing process takes place could flooding with toxic chemical fumes (Scott, 2002; Minnesota Department of Health, 2004). Majority of these clandestine laboratories have poor ventilation which increase the risks of explosions and inhalation of toxic fume. In contrast, the release of potential toxic fumes to the surrounding could also risk the public, especially those who stay near to that particular laboratory (Scott, 2002; Christian, 2004, Scott and Dedel, 2006). Phosphine is an example of toxic gas resulted from heating the red phosphorus in synthesizing methamphetamine (Russo, 1999; Australian Government, 2011). Deaths of the personal working in clandestine laboratories were frequently reported, due to accidental explosions, fires and inhalation of toxic fumes (DEA, 2000).

Discovery of these clandestine laboratories by law enforcement team, in certain instances, could cause accidental explosions especially during the seizure involving the force entry into the laboratories and involving shooting (Scott, 2002). The operators or the personnel in the clandestine laboratories may pose firearms where dangerous situations could be potentially encountered, especially during seizure operations (Christian, 2004). In certain instances, these people could be irrational due to the delusion and hallucination effects, and exerted danger to the surrounding people (Christian, 2004).

Illegal wastage disposal by clandestine laboratories operators could impose a series of structure contaminations and environmental hazards (Abdullah and Miskelly, 2010a). The laboratories often do not have proper disposal system, and therefore the hazardous wastes from the manufacturing process are usually dumped into the ground, sewerage systems, industrial estates, streams or rivers (Irvine and Chin, 1991; Abdullah and Miskelly, 2010a; Australian Government, 2011). The residual contaminants arisen from the manufacturing process of drug substance can be in the form of solids, liquids or vapours. The operators of clandestine laboratories frequently avoid the usage of industrial handling facilities in order to minimize the detection by the law enforcement agencies (Australian Government, 2011). Moreover, the toxic chemicals could also be drained into the sewers along with the water used to clean up the place. Structure and vehicle can also occur due to the drug manufacturing process, especially methamphetamine (Abdullah and Miskelly, 2010a). Traces of chemicals could permeate into the walls, carpets or furniture of a building that illegally used as the clandestine laboratory site, leaving the danger of such chemical that is not easily dissipated (Irvine and Chin, 1991; Abdullah and Miskelly, 2010b). These residual chemicals that contaminated the ground, water supplying system and also the buildings may last for years into the future, and leading to long term environmental effects to the public, especially those residents nearby (Scott, 2002; Australian Government, 2011). Due to the contamination arisen from a deserted clandestine laboratory, a typical cleanup of that property is necessary to prevent the long-term risks to the health of the public in nearby vicinities (Irvine and Chin, 1991; Abdullah, 2008). Commonly, the cost for the cleaning up process may burden the owner of the property, in certain instances, the responsible government.

Children have dangerous chemical and traces of illicit drugs in their body system, especially those who directly or indirectly exposed to the clandestine drug laboratories. They are exposed to dangers of chemicals or fires which can lead to physical burns or injuries if they are forced to work in those laboratories (Scott, 2002; Scott and Dedel, 2004). Apart from that, some of them are badly neglected or abused by their parents who are suffering from drug additive effect. Such domestic violence can cause negative impact in their growing, and bad output in their personality shaping (Scott, 2002).

Conclusion

Illicit drugs continue to jeopardize the health and welfare of people across the globe. They threaten the stability and security of the entire regions, and also influence the economic and social development. In many instances, the illicit drugs, clandestine laboratories, and crimes are bound together. Illegal manufacturing of drug substances, drugs trafficking and their distribution are transnational organized criminal acts, which undermines the human development. Throughout the years, the demands for drugs have not been substantially declined although the global drug use situation has remained stable, due to increase in world total population. Therefore, the awareness of drug abuse, and also the clandestine drug laboratory problem should be increased among the public.

Investigation of clandestine drug laboratories was a high priority for all the law enforcement agencies throughout the world. Drug control systems for detection of illicit manufacturing, drugs trafficking as well as their sale and distribution were implemented in nearly all regions. Recently, the law enforcement agencies are being challenged by the setting up of clandestine laboratories. Although the precursor chemical controls have aided in limiting the access to the key and essential chemicals for the illicit manufacturing of drug substances, the drug operators and manufacturers have developed the alternative methods of production using the slightly modified chemicals that are not yet controlled under legislation. National and international strategies shall be imposed to control the available of precursor chemicals and illicit drugs production as the elimination of these laboratories could prevent to these drug substances from reaching the illicit drug markets.

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