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**INTEGRATED BIOLOGICAL AND
BEHAVIORAL SURVEILLANCE ON
HIV, HEPATITIS B, HEPATITIS C,
AND SYPHILIS TRANSMISSION
AMONG METH-USERS POPULATION
IN SIX CITIES OF INDONESIA**

Study Report

Integrated Biological and Behavioral Surveillance on HIV, Hepatitis B, Hepatitis C, and Syphilis Transmission among Meth-Users Population in Six Cities of Indonesia

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Executive Summary

In the light of completing the knowledge related to *Sabu* use in Indonesia, this research aims to estimate the serology and behaviors that are at risk of HIV infection and other infectious diseases among population of crystal-meth (*Sabu*) users. By selecting six major cities in Indonesia, namely *West Jakarta, Denpasar, Batam, Makassar, Medan* and *Bandung*, this research was conducted from the beginning of February 2016 until June 2017. This study was consulted with Advisory Board team in which comprised representatives from government sectors and Non-Governmental Organizations. In addition, field data collection process has been supported by local team in six study sites.

The study uses quantitative approach with cross-sectional method. The primary respondents of this study are active crystal-meth users verified by urine test, aged above 18 years old, and resided in the study site for at least 1 year. The data represented in this study analyze from 1,498 respondents were involved in the data gathering using Respondent Driven Sampling in choosing the respondents. Behavioral data were collected using adaptation questionnaire of the Indonesian Integrated Behavioral Surveillance for injecting drug users with some adjustment for crystal-meth uses, sexual networks and social network sections. In addition, The Alcohol, Smoking and Substance Involvement Screening Test (*ASSIST*) was developed for the World Health Organization (WHO) were also utilized to specifically measure severity of drug use problems. The biological data has been compiled to understand the status of HIV, Hepatitis B, Hepatitis C, and Syphilis among respondents. The procedure to retrieve biological data were undertaken by certified medical staff. Small quantity of vein blood was taken to be rapid tested by standardized reagents. The data collection process has been assisted by LIME SURVEY, an online survey questionnaire. This action is taken to ensure the collected data were completed consistently. The procedure of biological data collection supervised by district health laboratory division as part of quality assurance procedure. Data analysis was conducted using statistic tools, such as: RDSAT version 7.1, RDS-A version 0.57 and STATA version 14 to assess the characteristics of social network, estimate population and to identify association between variables.

Since this is a biological and behavioral survey that is conducted for the first time among *Sabu* users in relation to HIV, the data that is shown from the result shall be considered as initial data to assess the trend of this issue in the future. From the biological result, it shows that HIV prevalence is 10.15%. If the data segregated by experienced of injecting drug, the HIV prevalence reached 34.99%, in contrary, the HIV prevalence among people with no injecting experience is 3.39%. The overall HCV prevalence among crystal-meth user found to be reached 14.23%. This number is higher among users with drug injecting experienced (62.04%) and lower among non-

injecting users (3.13%). The majority of HIV and HCV positive *Sabu* users are those who have had experience as injecting drug users (65% and 82%, respectively).

The overall Syphilis prevalence is 1.3% where the prevalence among them who had injecting experienced and non-injecting experienced is 1.27% respectively. While the HBV prevalence is 2.27% with 1.99% among those who had injecting experience and 2.33% among non-injecting experienced. The proportion of positive result mostly found among those who are never had injecting experience (82% for Syphilis and 83% for HIV prevalence). Based on gender, all positive results are found more on male. Female have higher proportion only on HIV and HBV test (29% and 43%). Additionally, HIV and HCV positive are found more among those who are 35-44 years old (56% and 55%). On the other hand, HBV and Syphilis are discovered more among 25-34 years old (52% and 66%).

The characteristics of *Sabu* users are on average aged 27.3 years old, with predominantly senior high school graduates. The majority of occupation is private sector employee and they are mostly unmarried. 92.5% *Sabu* users in six cities reported to have problems in their *Sabu* use at medium level and 7% at high level, according to ASSIST. *Sabu* users are generally poly-drug users, including injected-drugs. In general, one fifth of *Sabu* users have had experience in injecting drugs, but only 2% is discovered to have injected *Sabu*. While for the length of *Sabu* use in six cities is reported on average at 30 months, with a range of 13.7 months to 64 months. Male users are more likely to use *Sabu* for longer period than female users. The frequency of *Sabu* use is on average 6 days per month, with a variation of 2 days to 17 days with a maximum dose per day at approximately 0.4 gram (0.3 – 0.7 gram).

There are various factors surrounding *Sabu* use. It was found that mixing *Sabu* with other drugs, particularly alcohol, marijuana and anti-anxiety pills has been reported by 28% of *Sabu* users. Only about 4.8% have used *Sabu* mixed with sexual enhancement pills. On average, one *Sabu* user knows other 8 *Sabu* users. One out of three *Sabu* users have been arrested by the police, and 2 out of 5 have been detained on other drug-related cases. One of two *Sabu* users have been sentenced to prison and have reported to have used *Sabu* while in prison. About 2% reported to have injected *Sabu* while in prison.

In terms of social network context, male *Sabu* users is likely to have larger network with small number of female members. While for female, although dominated by male, the number of female members are more. Social network members are roughly at the same age, almost half of the members are coming from the same hometown and the majority of them have known each other for over one year. In addition, more than half of *Sabu* user practice share money when buying *Sabu*. Only one third of the network members provide full social support for the *Sabu* user. While a quarter of them do not give support at all. It is also seen that less than one third of the members have initiated

and influenced them to stop using *Sabu*. With control over age and gender of the network members, members who have lent money or share problems tend to have more probability to initiate and influence to stop. On the other hand, types of relationship (sex partner, hometown buddy, new friends, and acquaintance) tend to have less probability to initiate and influence to stop using *Sabu*.

While in the context of sexual network, despite two third of *Sabu* users are unmarried, the majority of them (84%) are sexually active in the last one year. Both male and female *Sabu* users have variety of sexual behaviors, which are heterosexual, homosexual and bisexual. All vaginal, oral and anal sex have been reported by both male and female *Sabu* users. Additionally, the types of sex partner illustrate the level of intimacy and types of different sexual encounters. These types of sex partner are also varied, including long-term, casual or commercial, and having more than one partner at the same time (concurrent). Furthermore, one third of the sex partners are also *Sabu* users, and sexual activities are often done under the influence of *Sabu*. The level of condom use in the last sexual encounter is 34% and its consistency in the last 30 days is only 17%. The lowest proportion is seen when engaging sexual activities with long-term sex partners, while the highest is with commercial partners. Moreover, intimacy, types of sexual interaction, comprehensive knowledge on HIV and HIV status provide significant variation towards condom use in the last sexual encounter and in the last 30 days.

Unfortunately, exposures on services among *Sabu* users is still considerably very low. Only about three quarter of *Sabu* users do not have comprehensive knowledge on HIV. Additionally, only one third of *Sabu* users have been offered Voluntary HIV Test and eventually completed the test with varied results between cities. Furthermore, only 2% of *Sabu* users have accessed drug dependency rehabilitation service in the last one year. While the main reason of not accessing services is that *Sabu* users do not feel that require such services as yet.

Based on the results of the research, recommendations have been outlined to support enhancement and improvement in policy and programming, including recommendation on follow-up researches. The recommendations are as follow:

. Policy and Program

- The program should reach out crystal meth users through existing programs as there are part of key populations in HIV programs (MSM, PWID, Transgender, Sex Workers and Client of Sex Workers).
- Although the practice of injecting crystal meth is still relatively low, this requires early anticipation and prevention through observing and monitoring crystal meth use behavior, also considering that HIV and HCV positive crystal meth users are those who have had experience as PWID.

- One third of crystal meth users are HIV and HCV positive, and the prevalence of HBV and Syphilis is higher among the others, it is very important to include crystal meth users into the current HIV Prevention Programs (harm reduction and sexual transmission prevention program)
- Being offered on getting HIV test has influenced crystal meth users to get tested, therefore HIV prevention needs to be consistently promoted. Scale-up of HIV test among crystal meth users as many of their sexual network are those at risk, this shall be done intensively to increase coverage of HIV testing and eventually will support the goal of 90-90-90.

2. Research

- Adopting crystal meth section component into the National Integrated Biological and Behavioral Survey (IBBS) for all key population groups (PWID, Transgender, FSW, MSM and High-Risk Men) and youth to achieve bigger picture of crystal meth use in the country.
- Inclusion of social and sexual network component into the IBBS would enable to identify contextual factors of HIV transmission among the key populations due to incidence of HIV infection may occur within these groups. This information will allow the development of targeted prevention messages.
- Conducting qualitative research on crystal meth use using life course perspective in order to develop contextual strategies in delivering services for crystal meth users considering different patterns of crystal meth use based on age and gender categories.

ABBREVIATION AND GLOSSARY

Abbreviation

AIDS	: Acquired Immune Deficiency Syndrome
ARC/PPH Atma Jaya	: AIDS Research Center/Pusat Penelitian HIV dan AIDS Unika Atma Jaya
ART	: Antiretroviral Therapy
ASSIST	: Alcohol, Smoking and Substance Involvement Screening Test
ATS	: Amphetamine Types Stimulant
IBSS	: Integrated Behavioural Surveillance Survey
CSO	: Community Service Organization
NNB/BNN`	: National Narcotics Board/Badan Narkotika Nasional
PWID	: People Who Injecting Drugs
FSW	: Female Sex Worker
HIV	: Human Immunodeficiency Virus
HCV	: Hepatitis C Virus
HBV	: Hepatitis B Virus
IEC	: Information, Education and Communication
MoH	: Ministry of Health
MSM	: Men who have Sex with Men
NGO	: Non-Governmental Organization
NPS	: New Psychoactive Substances
OR	: Odds Ratio
PLHIV	: People Living with HIV/AIDS
Puskesmas	: Public Health Center
Labkesda	: District Health Laboratory
RDS	: Respondent Driven Sampling
RDS-A	: Respondent Driven Sampling Analyst
RDSAT	: Respondent Driven Sampling Analysis Tool
STI	: Sexually Transmitted Infection
VCT	: Voluntary Counselling and Testing
UNODC	: United Nations Office on Drugs and Crime
WHO	: World Health Organization

Glossary

Convergence

Point at which the RDS sample proportions for each variable no longer change (or change very minimally) regardless of how many more individuals are recruited. Original term used in RDSAT is equilibrium, while convergence is the term used in RDSA.

Equilibrium

Point at which the RDS sample proportions for each variable no longer change (or change very minimally) regardless of how many more individuals are recruited. Original term used in RDSAT is equilibrium, while convergence is the term used in RDSA.

Homophily

The tendency for respondents to recruit people who have the same traits as themselves. A homophily value of one means no homophily, while values above one show the presence of positive homophily (people are recruiting similar to themselves), and values below 1 mean negative homophily (people are recruiting different from themselves)

Population estimation

The estimate produced by RDS for the variable of interest in the entire population (as opposed to the sample proportion).

Respondent Driven Sampling (RDS)

Methodology used to recruit key populations at higher risk of HIV worldwide. Similar principle as snowball sampling (chain referral), with addition of a mathematical model to weight the sample, to compensate for seed selection.

Respondent Driven Sampling Analysis Tool (RDSAT)

Original software developed to undertake analysis of RDS data, developed by Douglas Heckathorn in 1997

Respondent Driven Sampling Analyst (RDSA)

Newly developed software to undertake analysis of RDS data, written for the R statistical environment. The interface of RDS Analyst is similar to SPSS.

Sample proportion

The results from the dataset, from the sample, as opposed to the population estimates which are generated by an RDS estimator (e.g. such as RDSAT or RDS-A).

Seeds

In RDS, recruitment begins with a set number of 'seeds' who are purposively selected. Selected seeds should be heterogeneous in terms of various characteristics.

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SECTION 1: INTRODUCTION

BACKGROUND

The use of *crystalline methamphetamine* or crystal meth (in Indonesia popularly called as sabu) has become an issue of increasing importance in Indonesia. According to the National Narcotics Agency's (BNN) survey, the estimate number of crystal meth users in Indonesia has reached up to 760,795 individuals or almost 19 percent of the total illicit drug users in the country and. this places crystal meth as the second most widely used illicit drugs in Indonesia after cannabis (BNN *et al.*, 2010). UNODC (2013c) noted that crystal meth users in Indonesia are predominantly male; consume in average 360 grams crystal meth in a year for male users and 25 grams for female users; small proportions of incarceration among crystal meth users; and the drug is still widely trafficked in Indonesia. Therefore, trend in crystal methamphetamine use in Indonesia is estimated to remain unchanged in the coming years (UNODC, 2013b).

Use of *crystal meth* has adverse health consequences. As a stimulant, methamphetamine primarily functions to increase the level of extracellular monoamine neurotransmitter (dopamine, serotonin, and norepinephrine) by stimulating their release from the nerve endings in the brain (Rothman & Bauman, 2003). The effect of *crystal meth* can last up to 12 hours (Buxton, 2008). Common effects of mmethamphetamine include increased alertness and wakefulness, increased energy, feelings of pleasure, euphoria (at high doses) and loss of appetite. Methamphetamine also activates the cardiovascular system, and increases the heart rate, and blood pressure (Kish 2008). Its short-term and long-term impacts include stroke, cardiac arrhythmia, abdominal cramp, tremor, anxiety, insomnia, paranoia, hallucinations, and structural changes to the brain (Anglin *et al.*, 2000). High doses of crystal meth can actually be fatal (Darke *et al.*, 2008), which truly demonstrates its negative impact on an individual's physical as well as psychological health.

Over the years, there have been a number of studies that attempt to gain more insight into the relationship between use of crystal meth and HIV transmission. In 2009 the United Nations Office on Drugs and Crime (UNODC) estimated that as many as 60 out of 110 countries are reporting the use of crystal meth through injection, which creates an opportunity for unsafe injection practices among meth users. In general, crystal meth users have similar characteristics to the HIV key population groups that have a high prevalence and incidence of HIV infection, namely sex workers, men who have sex with men (MSM) and the youth (Benotsch, Lance, Nettles, & Koester, 2012; Couture *et al.*, 2012; Fast, Kerr, Wood, & Small, 2014; Herman-Stahl, Krebs, Kroutil, & Heller, 2007; Uhlmann *et al.*, 2014). Crystal meth is very much relevant with the HIV epidemic since it is frequently used in a sexual context as a way to enhance and prolong sexual

pleasure and reduce sexual inhibitions (Semple, Patterson & Grant, 2004; Zule, 2007). Use of amphetamine can result in risk-taking behaviors such as sex without condom, sex with multiple partners and lengthy sexual encounters (Colfax & Shoptaw, 2005). The latest systematic review and meta-analysis by Thu Vu, Maher, & Zablotska (2015) discovered that use of crystal meth among MSM is closely linked with HIV infection with an average prevalence of 1.86 (95% CI: 1.57 - 2.17). Globally there is a clear association between use of crystal meth and risk for HIV transmission.

To further comprehend the substance abuse situation in Indonesia, The AIDS Research Center (*Pusat Penelitian HIV/AIDS – PPH*) of Atma Jaya, in collaboration with MAINline Netherland, conducted a qualitative study on the use of crystal meth and HIV risk behaviors in late 2015. One finding of the study was that crystal meth users tend to have several sexual partners, either concurrently (more than one partner at any given time) or in a serial monogamous fashion (one partner at any given time, but for a short period of time). Sexual partners of crystal meth users could either be their steady partner, casual partner, or commercial partner (paid sex partner). There was a high degree of overlap between the social network and the sexual network of crystal meth users. Authority relationship was often imbalanced, with female users at a lower bargaining position, potentially contributing to inconsistent condom use and other high risk sexual behaviors. This condition was observed among all types of crystal meth users, frequent users, practical users and casual users. A number of myths and misperceptions regarding health consequences and risky sexual behavior were also quite common among crystal meth users and within their social network, creating barriers toward accessing health services. One reason for this misperception may be due to the lack of program or service that are specifically targeted at crystal meth users.

Findings from the qualitative study demonstrated the need for a follow-up quantitative study to understand the magnitude, distribution and pattern of crystal meth use in areas with a high concentration of users, also to estimate the prevalence of HIV among crystal meth users in Indonesia. The information gained through the study, as well as knowledge about the behavioral, social and environmental factors that are at play, would be critical for designing an effective and targeted HIV intervention program. An epidemiological assessment that can describe the magnitude and scope of the problematic crystal meth use, including its consequence on other infectious diseases, specifically HIV, Hepatitis B, Hepatitis C, and Syphilis, is essential, and this quantitative study is expected to provide a better picture of the serological and behavioral situation that can be used as a guide for developing an HIV prevention program that is targeted at crystal meth users. The study would address the following specific questions:

1. What is the prevalence of HIV, Hepatitis B, Hepatitis C and syphilis infection among crystal meth users in Indonesia?

2. What are the behavioral characteristics of crystal meth users, particularly their drug use behavior, sexual behavior and social network?
3. To what extent has the available risk reduction and drug dependence treatment service been utilized by crystal meth users?

STUDY OBJECTIVES

The primary goal of the study was to estimate the serological prevalence of HIV/AIDS and other infectious diseases among crystal meth users, and the high-risk behavior that can potentially place crystal meth users at increased risk of HIV infection. The specific objectives of the study were:

1. To estimate the prevalence of HIV and other infectious diseases along with the various disease-related risks.
2. To identify and assess the utilization of HIV prevention and care service, and drug dependence treatment service by crystal meth users.
3. To recommend a strategy for an HIV and other infectious diseases prevention and intervention program that suits the situation of crystal meth users.

STUDY SIGNIFICANCE

An integrated bio-behavioral surveillance (IBBS) among crystal meth users is useful to complement the existing IBBS data and provides strategic information that can be used to monitor and evaluate an HIV/AIDS prevention and intervention program. This is the first IBBS on crystal meth users within the context of HIV/AIDS intervention, and provides the baseline data upon which epidemiological and behavioral trend of crystal meth user population are measured. It is expected that through IBBS data, the existing surveillance system will be better able to predict future trends in the HIV/AIDS epidemic, thereby increasing the system's "early detection" capability. Similar to other IBBS that have been performed, this study also enables one to correlate behavior and serological results that will basically provide strategic information for developing interventions related to HIV prevention and care for crystal meth users.

Up until now no HIV interventions are targeted toward crystal meth users. This is a population that is hidden and is relatively hard to reach, partly due to the illegal status of substance use, causing crystal meth users to be reluctant to access social and health services out of fear of being identified. To create access to this population and invite them to participate in the IBBS, a specific method called Respondent-Driven Sampling (RDS) was employed. This is an effective method that is specifically recommended for hard-to-reach populations. This method has been repeatedly used in the past specifically to reach out to People Who Inject Drugs (PWID) and MSM, but has mostly been used as a recruitment method, and not as a method for obtaining various

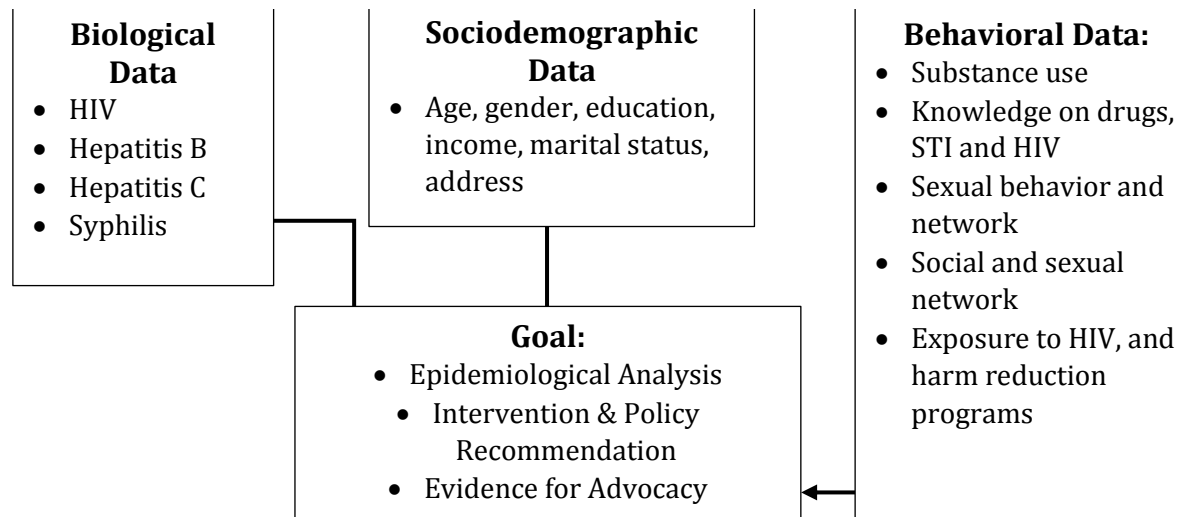
population estimates. The latter approach is hoped to enrich the national HIV/AIDS behavioral surveillance system.

CONCEPTUAL FRAMEWORK

The epidemiological surveillance (biological and behavioral) system has evolved and is continually evolving in response to the dynamics of the HIV epidemic, the progress in knowledge about HIV infection, and the changing needs of a prevention and intervention program (Rehle, *et al.*, 2004). Information generated through the behavioral and biological surveillance on crystal meth users can be utilized by policymakers (AIDS Commission, Ministry of Health or Provincial/District Health Office, International Development Partners, and Civil Society Organizations) as a basis for developing an program addressing to the epidemic profile in each respective area.

Epidemiological data are key for advocacy on policy making, for strengthening program commitment, mobilizing communities, and allocating sufficient resources for HIV prevention and care efforts among crystal meth users. By adapting the Second-Generation Surveillance System (Rehle *et al.*, 2004), our study developed a conceptual framework to achieve the study objectives and simultaneously serve as a data collection guide. This conceptual framework is illustrated in the diagram below:

Figure 1: Conceptual Framework for a Behavioral and HIV Survey among Crystal Meth Users



1. STUDY DESIGN

The study was conducted as a cross-sectional survey using the respondent-driven sampling (RDS) method. RDS is a chain-referral sampling method that has been modified for hard-to-reach populations, in order to generate data that are representative of the population being studied. As part of the drug users' population, crystal meth users are basically a hidden and hard-to-reach population since revealing their status as drug users, which is illegal, may lead to harmful situation for them such as blaming, stigmatization, or arrest. As a result, the standard sampling method (venue or time location based) could not be applied here, and therefore the RDS method was then selected as the method of the IBBS. RDS has been used quite frequently in studies involving such population with an objective to gain information on the population characteristics (Magnani, Sabin, Saidel, & Heckathorn, 2005; Malekinejad *et al.*, 2008; Platt *et al.*, 2006). The RDS method was first introduced by Heckathorn in 1997 as a study on HIV among injecting drug users, using incentives and social network as the basic principle.

This method basically utilizes social networks as a way to recruit study respondents. Initial respondents, called as seeds, consist of three to five individuals who are known to be members of a crystal meth users network in respected locations. They then are requested to invite other people (3 candidates) to participate in the survey. The candidates who agree to participate, and meet the inclusion criteria, upon completion of their participation, will in turn be requested to recruit other people from their social network. This chain recruitment process continues until no additional individuals can be recruited or the required sample size is reached. Through consideration on the size of social network and the degree of homophily (similarity in certain characteristics) among the respondents, adjustment in the statistics analysis can be made to reduce the bias that results from this method. In this way, despite the convenience sampling that is applied at the beginning of the recruitment, the composition of the final sample shows different (independent) variation from the initial sample. Statistical softwares specifically developed for analyzing social network data (RDSAT and RDSA) are used to generate a population estimate for each variable of interest in this study.

2. STUDY SITES

Six cities (*Jakarta, Medan, Makassar, Denpasar, Batam and Bandung*) are selected as the sites of the study. These cities were selected based on results from the recent studies on crystal meth conducted by AIDS Research Center of Atma Jaya Catholic University and *Rumah Cemara*, a civil society organization based in Bandung West Java. In addition, these cities are estimated to be the highest number of crystal meth users in Indonesia (UNODC, 2013a). *Jakarta, Medan, and Makassar* were locations of the

previous qualitative study on crystal meth and HIV-related risks that conducted by ARC Atma Jaya, while *Denpasar*, *Batam* and *Bandung* were sites of *Rumah Cemara's* study. Both studies were completed in 2015.

Table 1: Estimated Number of crystal Meth Users in Six Cities

Location	Estimate*
West Jakarta, DKI Jakarta	1585
Medan, North Sumatera	987
Makassar, South Sulawesi	777
Batam, Riau Islands	2086
Denpasar, Bali	524
Bandung, West Java	590
TOTAL	6549

*Source: (UNODC, 2013a)

3. STUDY RESPONDENTS

Operational definition of crystal meth users in this study is an individual who actively uses crystal methamphetamine (*crystal meth*) within the recent seven days, either through inhalation/snorting, injection or smoking). Considering the recruitment method and ethical aspects of the study, the following inclusion criteria were applied:

- 1) Was at least 18 years old at the time of the interview;
- 2) Had a valid recruitment coupon;
- 3) Had resided in the study site for at least one year;
- 4) Was able to provide consent to participate in the study (was not under excessive influence of drugs or alcohol);
- 5) Actively used crystal meth in recent seven days as verified through a urine screening test.

The exclusion criteria for the study included individuals who: 1) had already participated in this survey; 2) could not understand the objectives of the study or procedures of the study due to under heavy influence of any drugs or alcohol, and 3) could not provide consent to participate in the interview and blood drawing for the study as requirements for voluntary participation in the study

4. SAMPLE CALCULATION

The study targeted 1500 crystal meth users from the six sites. Sample size was calculated based on information and recommendation from previous studies using RDS method (see the formula below). The sample size for RDS method was larger than

simple random sampling method in order to ensure statistical power of the collected data (Salganik, 2006). The design effect (DE) in determining sample size was set at 2.72 as recommended by previous study on the National Surveillance System on HIV Risk Behavior among Injecting Drug Users (Wejnert, Pham, Krishna, Le, & DiNenno, 2012). The probability of crystal meth users engaging in risk behaviors was assumed at 57 percent, which was reported in in a study by Krawczy, *et al.* (2006) that looked at heterosexual crystal meth users and sexual risk behavior through multiple partners. The standard error applied in the sample calculation was 0.04 in line with the recommendation from Wejnert *et al.* (2012) that specifies the SE for RDS samples as ranging from 0.03 to 0.04. The calculation of sample size was 1283 based on the normative calculation for RDS sample.

$$n = DE \cdot \frac{P_a(1 - P_a)}{(SE(P_a))^2}$$

Note:

DE = design effect

Pa = Proportion

SE = standard error

To anticipate any non response that may be encountered during data collection process and learn from IBBS for PWID, the study set 250 crystal meth users to be recruited for each city or 1500 for six cities.. The table below illustrates the estimated size of crystal meth user population in each city, required sample and actual sample recruited for behavioral interviews and biological specimen collection.

Table 2: Estimated population size and actual sample size

Location	Est. Pop. Size	Required # of samples	Actual # of samples
West Jakarta, DKI Jakarta	1585	250	250
Medan, North Sumatera	987	250	250
Makassar, South Sulawesi	777	250	250
Batam, Riau Islands	2086	250	249
Denpasar, Bali	524	250	246
Bandung, West Java	590	250	253
TOTAL	6549	1500	1498

A total of 1541 individuals had valid coupons and came to data collection's sites, but only 1498 were eligible to be participants of the study. Forty three individuals did not meet the inclusion criteria due to negative urine test (29), while the other 14 individuals were below 18 years old.

5. BEHAVIOURAL SURVEY INSTRUMENTS

The instrument used for the behavioral survey was adapted from the IBBS instrument for PWID developed by Ministry of Health. Some modifications were made to adjust with pattern of crystal meth consumption, sexual and social network . The instruments also utilized the Adapted version of WHO Alcohol, Smoking and Substance Involvement Screening Test - ASSIST (WHO, 2010) to assess the extent of the substance abuse problem among respondents.

The study instruments consisted of several variables as detailed in the following table:

Table 3: List of variables in the study

Category	Type of Information
Location and interview details	Number of RDS cluster/sites, name of interviewer, date of interview, language used during interview, consent status, participation completion status, respondent typology, questionnaire review status, data editing and entry.
Sociodemographic characteristics	Age, gender, education, source of income, marital and residential status
Use of drugs and crystal meth	Experience with drug, extent of substance abuse problem (ASSIST), history of crystal meth abuse, current use and consumption behavior of crystal meth, (frequency, number of friends), location of crystal meth use, use of other illicit drugs, frequency of alcohol consumption, legal issues, general and mental health issues
Social and network context	Current and past residence, last place visited, substance abuse by acquaintances (friends, family, colleagues, neighbors, etc) and relationship with the person(s)
Sexual behavior and network	Past sexual behavior based on sexual partner and age at sexual debut, condom use behavior (last condom use, within the last 30 days), use of crystal meth during sex
Knowledge about STI	STI information exposure, ability to detect STI symptoms, history of STI, treatment-seeking behavior
Knowledge about HIV/AIDS	Hearing about HIV, correct information regarding HIV transmission and prevention, undergoing HIV test, knowledge about antiretroviral therapy, risk perception
Exposure to interventions	Health-seeking behavior, access to HIV/STI service, harm reduction service, IEC and outreach

6. BIOLOGICAL DATA

Biological data in the form of blood sample was collected from each respondent to be tested for HIV, Hepatitis B, Hepatitis C, and syphilis serology . Upon completion of the behavioral interview, a supervisor guided the respondent to a *Puskesmas* (Public Health Center) health personnel (nurse/laboratory staff) who is competent and has been trained on venous blood collection. Confirmation of consent was obtained prior to blood drawing, and blood samples were transported to a *Puskesmas* laboratory staff who performed testing using an agreed test reagent. All blood samples were refrigerated for random repeat testing by the District Health Laboratory (*Labkesda*) as part of quality assurance procedure. Additionally, 10% of urine samples also were randomly retested by the lab officers.

7. DATA MANAGEMENT AND ANALYSIS

Questionnaire of the study was set up as an electronic format installed on tablets using the Lime Survey platform.. Each tablet was protected with a password accessible only to the enumerator and the coupon manager. To ensure complete and consistent response of each question, automatic verification was set based on the flow of the questionnaire. Confidentiality was maintained by assigning a specific identification code to each respondent that cannot be linked to the respondent's name, address or other identifying information.

Once an interview was completed, data were automatically uploaded to the study server located at the researcher's office. . Data were monitored daily by a data manager who tracked the incoming data and confirmed the completeness of the data with the field team. A form was also developed to record the distribution of coupons, incentives payment and biological data recording. Data on laboratory testing were sent weekly by the laboratory staff to the field coordinator for incorporation into the electronic database.

Data analysis was performed using RDSAT version 7.1.¹ and RDS-A version 0.57². RDSAT was specifically used to analyze the characteristics of the social network represented by the coupon data, while RDS-A was used to obtain population estimates at 95% confidence interval for all variables measured in the survey. In producing the estimates, the RDS also provided the weight of the survey. Data on the social and sexual network of crystal meth users, which reported by, were regarded as dependent variables and were analyzed using STATA 14.

As a form of surveillance, the main analyses of study are focussed on population estimates for HIV, Hepatitis B, Hepatitis C and Syphilis prevalnces;, the risk behavior characteristics (drug use and sexual behavior), and knowledge as well as access to

¹ <http://www.respondentdrivensampling.org/>

² http://wiki.stat.ucla.edu/hpmrg/index.php/RDS_Analyst_Install

health services. Stratified analysis based on city, gender or certain behavioral variables were performed as needed to identify higher risk sub-populations.

8. ETHICAL APPROVAL

The study received recommendations from the Directorate of Communicable Diseases Control, Ministry of Health, with approvals from various government administration levels starting at the national level (Directorate General of National Unity and Politics, Ministry of Home Affairs) and at the city level (National Unity and Politics Office) of each study site. The study protocol were reviewed by the Ethics Committee of the Institute for Research and Community Service (*Lembaga Penelitian dan Pengebodian kepada Masyarakat* – LPPM), Atma Jaya Catholic University of Indonesia, Jakarta.

The main ethical concern of the study were possibility of revealing respondents who are involved in illegal activities, which may have legal consequences. HIV sero-status, if inadvertently revealed, can also result in stigma and discrimination. Considering this, even though respondents have signed a consent form, several procedural steps were taken to minimize the risk of revealing sensitive information:

- Name or other identifying information was not recorded on the study form, or on the laboratory specimen form.
- All paper-based survey materials were kept in a locked cabinet, in a locked office room. Access to the room was restricted in a similar manner as access to electronic data.
- All staffs who work with respondents were requested to sign an employee confidentiality agreement.
- Drug use practices and HIV test results would not be reported to the authorities.
- Each respondent was offered to receive HIV health services and drug dependence treatment as needed.

SECTION 2: FINDINGS

A. NETWORK CHARACTERISTICS

1. RESPONDENTS RECRUITMENTS PATTERN

The study was conducted in six large cities of Indonesia (*Medan, West Jakarta, Bandung, Denpasar, Makassar and Batam*) that have been known as having the highest number of crystal meth users in the country. In each city, one non-governmental organization (NGO) participated in respondent recruitment using the RDS method. One NGO staff was responsible to assess the respondent, ensure that the inclusion criteria were met, and perform urine test. Two NGO staffs conducted the behavioral interview, while another staff documented the giving of coupon and linked with the coupon bearer for subsequent visit to the drop-in center. The whole process of data collection took place at the office of each NGO, except in the City of Bandung where data collection took place at a *Puskesmas*, a partner of the NGO.

The main role of the NGO in this recruitment process was in determining the seed respondent who would be recruiting more respondents. Each NGO prepared five seed respondents, though in practice only three of them were needed in *Medan, West Jakarta, Denpasar and Makassar*, while in *Bandung and Batam* four seed respondents were assigned. Considering the likelihood of different key population groups having different social network, the first three seeds were sex workers, PWID, and MSM. On the side, there is an assumption that a network would have connections with other network through individual(s) who is the member of both networks. Therefore, it was expected that these seeds could reach different types of crystal meth users in the selected cities through recruitment chains (wave) in their social network. It was also estimated that the convergence of the sample could be reached in 6-7 waves of recruitment.

Seeds were recruited based on the NGO's evaluation on which member of the key population group who has a relatively extensive network of crystal meth users. Field workers would approach the individual, explain the inclusion criteria, and invite him/her to recruit three other individuals for participation in the study. Crystal meth users who agreed to serve as seed respondents would be enrolled into the study, be interviewed and be provided with coupons that they used to recruit other users in their group. A crystal meth user who had been referred through the coupon by the seed respondent would be requested to present to the NGO office and participate in the study, as well as recruit three additional crystal meth users in his/her network. The recruitment process continued until no additional crystal meth users could be recruited or the targeted number of respondents had been achieved. There were two incentives for the respondents in the form of cash. First incentive was IDR 90,000 (USD 8.5) for their time and effort to participate in the survey. Second incentive was IDR 40,000 (USD 3) for

each successful recruitment that made by a respondent. Therefore, a respondent could receive up to IDR 210,000 if he/she could successfully recruit three other respondents.

During implementation, recruitment was not limited to the assigned groups, but quickly spread to individuals who were not members of the target groups. This demonstrates that crystal meth users do not limit themselves with similar behavioral background. The fourth seed respondent was assigned because the recruitment process from one of three seeds stopped. Selection of the fourth seed was determined by the field team based on site mapping and characteristics of the recruited respondents.

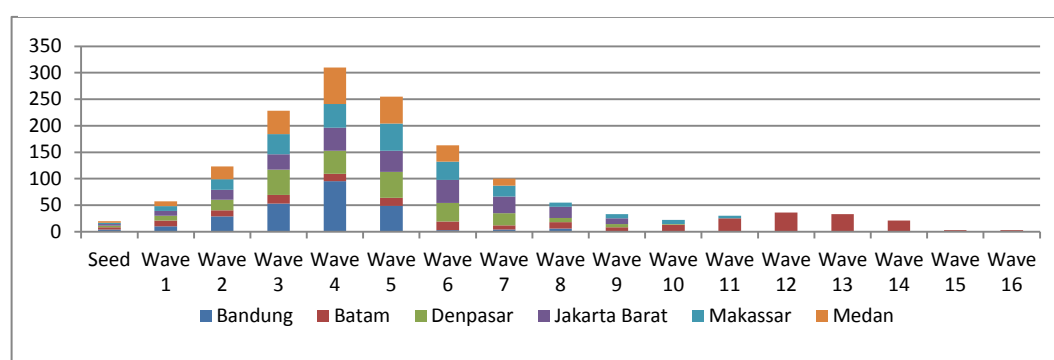
Through 20 seed respondents, a total of 1498 crystal meth users in six cities were recruited to participate in the study. The number of respondents that each seed successfully recruited varied, ranging from 4 to 201 (*see Table 4*). Overall, seed 2, seed 1 and seed 3 recruited the largest number of respondents, while seed 4 recruited 93 respondents.

Table 4: Number of Recruited Respondents based on the Seed Respondent at each City

Seed	City						Total
	Bandung	Batam	Denpasar	West Jakarta	Makassar	Medan	
Seed 1	31	31	38	128	114	136	478
Seed 2	32	210	34	114	94	70	554
Seed 3	101	4	174	8	42	44	373
Seed 4	89	4					93
Total	253	249	246	250	250	250	1498

Depending on the number of respondents that each seed managed to refer, recruitment in each city was completed in 8 to 11 waves, except for the City of *Batam* that completed its recruitment in 16 waves. The length of recruiting waves directly corresponded with the number of respondents recruited, but the largest number of respondents seemed to occur during the third to sixth recruitment waves, as illustrated in the graph below:

Figure 2: Respondents Recruiting Waves Categorized by City



A visual illustration of the recruitment tree plots in each city is provided in the diagram below.

Figure 3: Recruitment pattern in Medan

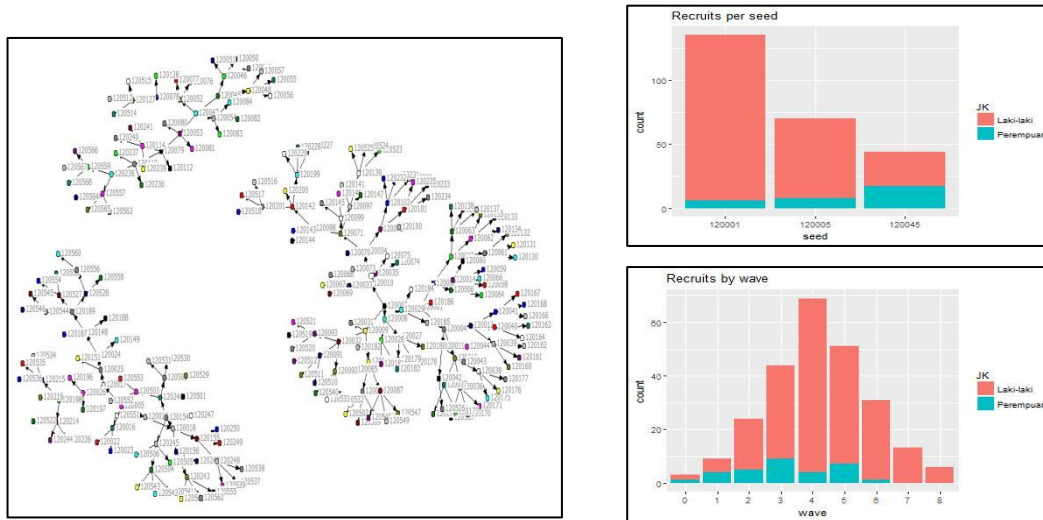


Figure 4: Recruitment pattern in West Jakarta

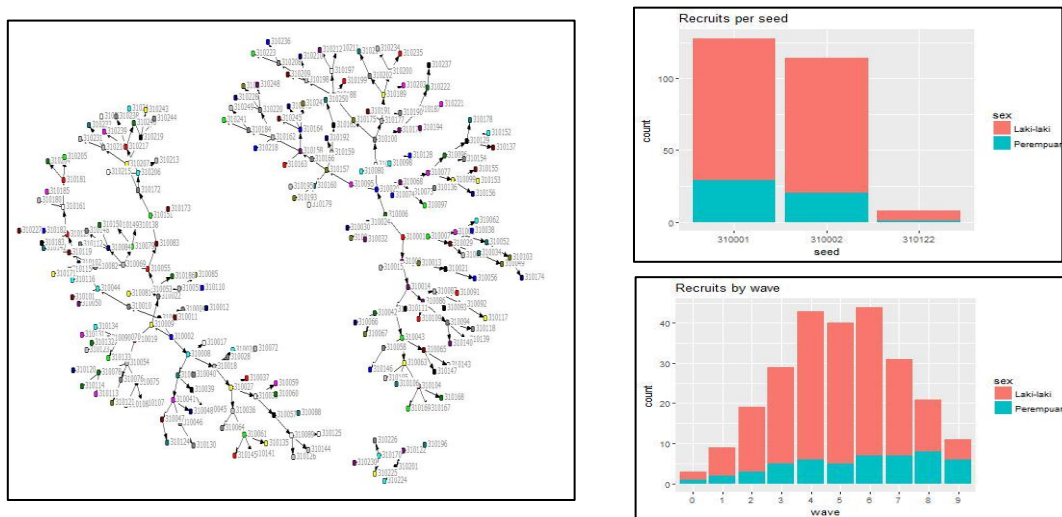


Figure 5: Recruitment pattern in Bandung

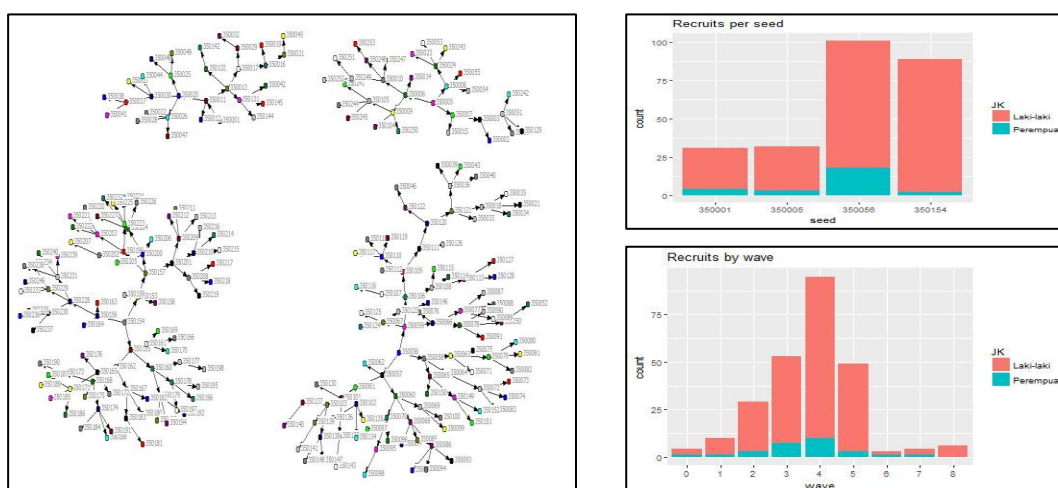


Figure 6: Recruitment pattern in Denpasar

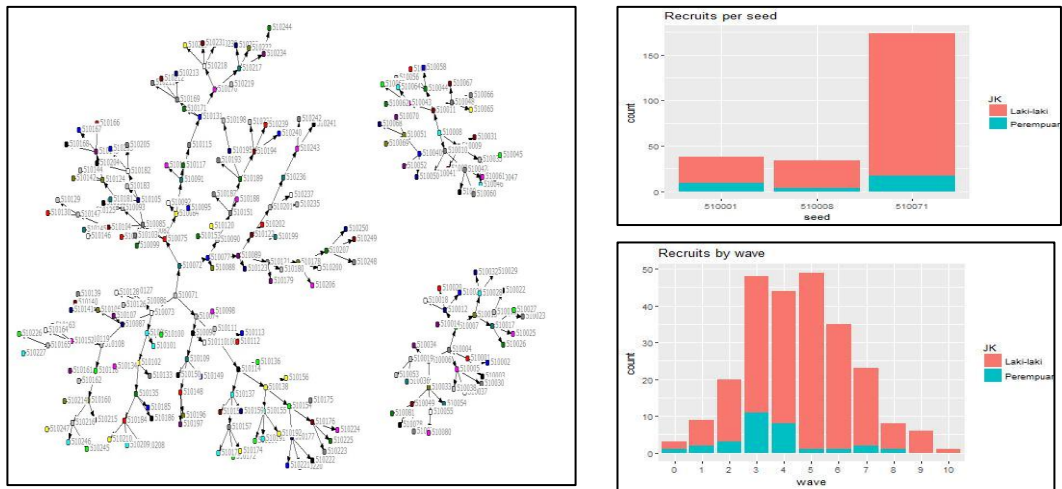


Figure 9: Recruitment pattern in Batam

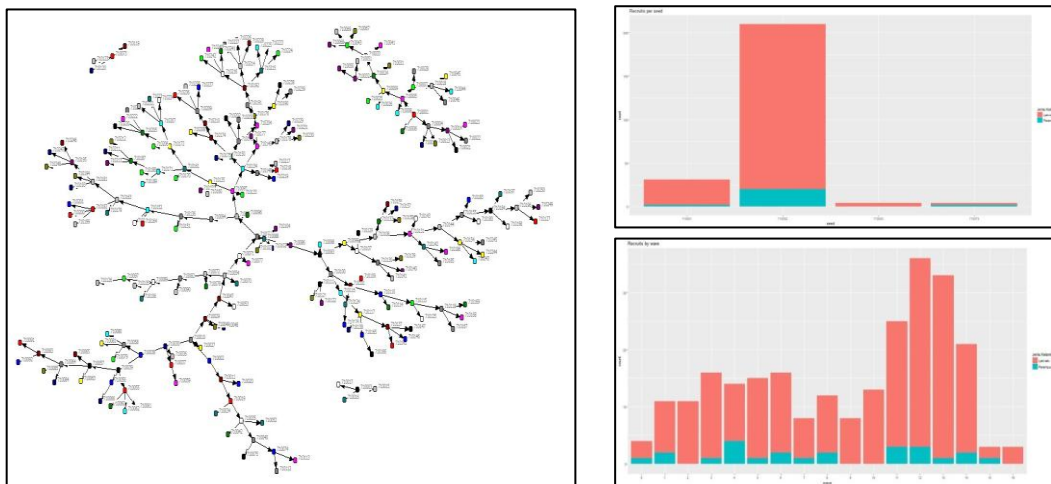
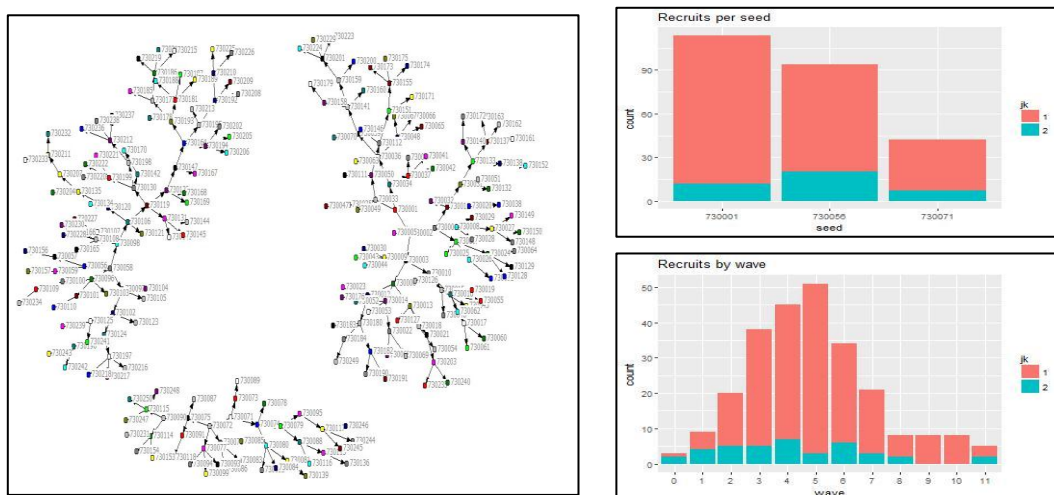


Figure 11: Recruitment Pattern in Makassar

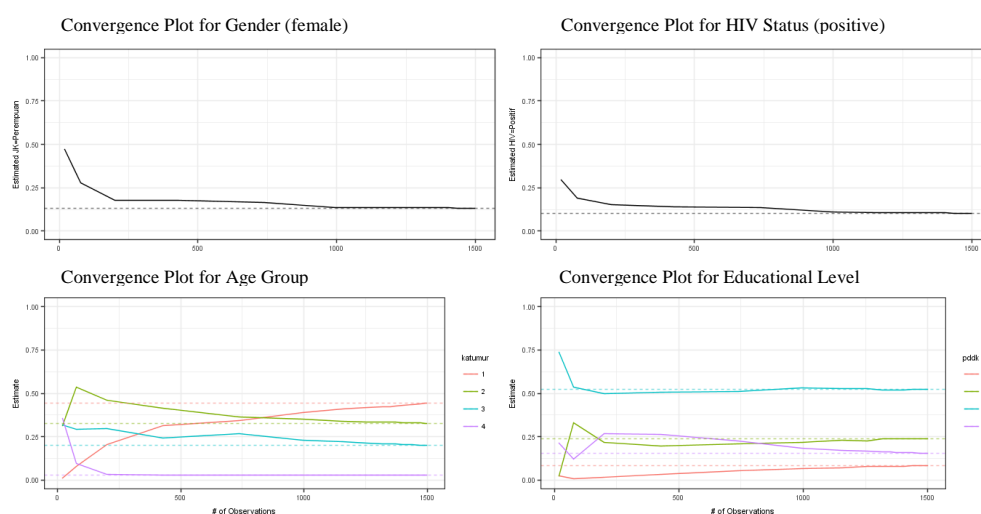


2. SAMPLE CONVERGENCE

One critical element, as well as the objective, of the RDS method, was the achievement of convergence or equilibrium, a condition in which the sample estimation for each variables remains unchanged even with the addition of more respondents. Achievement of convergence is visible at a point where the sample plot estimate **fit** on the population estimate.

Sample convergence was evaluated based on three demographic variables (gender, age group and educational level), and one outcome variable (HIV status). The analysis is illustrated in the following plots:

Figure 12: Convergence Plot of Demographic Variables and HIV Status



The plots demonstrate that all of the four variables achieved convergence, even though for the 18-24-year age group variable, it was not reached until toward the end of the recruitment process. By achieving convergence for the above variables, it could be concluded that the samples were saturated and could be used to obtain population estimates.

3. NETWORK SIZE

Another critical network analysis parameter in RDS was the size of social network that respondents have. One central question that was used to assess a respondent's network size was the number of their peers whom they know use crystal meth. The number ranged from 0 to 1000 individuals, and the average number was 32.18 (unadjusted network size). By controlling the recruitment pattern in the RDS, the adjusted network size at 95% confidence interval was 8.48 (0.75 – 17.71). In other words, an average crystal meth user knows about 8 to 9 additional users. The estimated number of crystal meth users in the six cities then became 12,000 people or twice as high as the previous estimate.

4. HOMOPHILY

Another parameter that can be assessed in a RDS was homophily, the tendency of a respondent to recruit people with similar characteristics. A homophily score of one indicates the absence of homophily, while a score larger than one indicates a positive homophily (people recruit peers with similar characteristics) and a score below one indicates negative homophily (people recruit peers with different characteristics).

Table 5: Homophily Level

Variable	Homophily Level	
	Sample	Population
Gender	1.06	1.18
HIV Status	1.08	1.34
Age Group	1.46	
18-24 years		1.4
25-34 years		1.11
35-44 years		1.28
45 years or older		0.89
Education	1.12	
Academy/University		0.99
High School/equivalent		0.87
Junior High School/equivalent		0.96
Elementary /equivalent		1.04

The homophily value could be interpreted as the odds ratio (OR) value and the above table demonstrates that respondents did have a slight tendency to recruit other respondents of the same gender, the same HIV status and of similar age group. Educational level however did not influence one's decision in peers' recruitment.

B. DEMOGRAPHIC CHARACTERISTICS

The demographic characteristics of crystal meth users in the six cities were relatively variable, even though the population homophily level did not exhibit significant variation. Analysis on 1498 respondents projected that crystal meth was more commonly used by men (86.69%) than by women (13.31%). The largest proportion of male crystal meth users was found in the City of *Batam* (90.4%), while for female the largest proportion was found in Jakarta (20%).

In general, crystal meth users were relatively young, with an age range between 26.6 and 28.6 years old, and an average age of 27. The situation varied from city to city however. For example, in *Medan*, crystal meth users were generally older (32 years old) than the users in *Batam* (24 years old). Looking at age groups, crystal meth use seemed to be dominated by young individuals as 44.3% of users were in the 18-24-year age group. Slight variation existed between cities; while most crystal meth users in

Makassar, Denpasar and Batam were between 18-24 years of age, in *Bandung, Jakarta, and Medan*, the majority of users were of the 25-34-year age group.

Crystal meth users have relatively high education as more than two-thirds of them had at least a high school education, and less than 10 percent of users never obtained schooling or only completed elementary school. At the city level, the educational level of crystal meth users varied significantly. In Denpasar City, most users were high school graduates (70%), while in Jakarta 60% of users only completed junior high school at the most.

At the time of survey, the majority (58.9%) of crystal meth users were unmarried, and a third of them (30.7%) were married. Unmarried users were more commonly found in Batam, Denpasar, Makassar and Medan, while the opposite was observed in Jakarta and Bandung. This fact was reflected in the users' living arrangement. Half of crystal meth users currently stayed with their family (54.9%) and their regular partner (25.3%). The rest either lived alone (12.2%) or with a friend (5.5%).

The majority of crystal meth users, at the time of survey, were employed, either in the formal or informal sector, and only around 10% of users were unemployed. Almost half of them were salaried employees, followed by freelance workers (31.6%). A smaller proportion of crystal meth users earned their income as sex workers (2.85%) and drug traffickers (0.76%), while a relatively large proportion of users (14.40%) were students who were still financially dependent on their parents.

On average, crystal meth users in the six cities earned IDR 2,177,000 each month. The actual income ranged from IDR 1,287,000 in Makassar to IDR 2,811,000 in Bandung.

The average length of residence in the city that was part of the study location was 67 months or 5.5 years. The shortest period was in *Batam* (43.5 months), while the longest was found in *Medan* (90 months). Most crystal meth users in *Batam* were younger than those in Medan, suggesting that age may contribute to the differences in length of residence at a particular city. At the time of survey, crystal meth users have generally resided in their current city for 5 years, but in Denpasar the length of residence was shorter, 3.5 years. Detailed description regarding the demographic characteristics of crystal meth users is provided in Table 6.

Table 6: Demographic Characteristics

Variable	City						Total		
	Bandung	Batam	Denpasar	West Jakarta	Makassar	Medan	Estimate	95% Lower Limit	95% Upper Limit
Gender									
• Male	89.93%	89.41%	85.55%	76.41%	81.42%	83.15%	86.69%	82.45%	90.93%
• Female	10.07%	10.59%	14.45%	23.59%	18.58%	16.85%	13.31%	9.07%	17.55%
Average Age (years)	29.62	24.17	25.21	30.06	24.43	32.74	27.63	26.586	28.669
Age Group									
• 18-24 years	29.21%	65.18%	64.78%	30.34%	60.00%	21.14%	44.33%	42.00%	46.66%
• 25-34 years	39.33%	29.13%	17.58%	44.08%	33.85%	38.53%	32.78%	27.01%	38.55%
• 35-44 years	28.86%	3.98%	13.58%	23.07%	5.83%	30.18%	20.05%	15.01%	25.09%
• 45 years or older	2.59%	1.70%	4.06%	2.52%	0.32%	10.14%	2.84%	- 2.66%	8.34%
Educational Level									
• Academy/University	26.15%	4.17%	9.55%	4.89%	4.44%	2.48%	15.48%	8.20%	22.76%
• High School / equivalent	46.31%	54.87%	68.66%	36.17%	48.77%	58.23%	52.36%	47.83%	56.90%
• Jr. High School / equivalent	20.12%	31.91%	19.81%	32.58%	34.74%	32.19%	23.87%	20.21%	27.52%
• Elementary / equivalent	7.42%	9.06%	1.99%	22.02%	11.73%	6.70%	7.87%	1.47%	14.27%
• Did not go to school	0.00%	0.00%	0.00%	4.34%	0.32%	0.40%	0.42%	- 1.72%	2.56%
Marital Status									
• Unmarried	47.67%	77.21%	76.95%	40.59%	63.99%	51.72%	58.86%	57.60%	60.12%
• Married	40.03%	16.67%	14.34%	47.34%	28.53%	30.96%	30.69%	26.89%	34.49%
• Divorced	11.73%	4.98%	7.89%	10.33%	7.35%	14.33%	9.65%	4.12%	15.17%
• Widowed	0.56%	1.13%	0.83%	1.74%	0.13%	2.99%	0.81%	- 4.16%	5.78%
Residence									
• With spouse / steady partner	34.05%	18.57%	9.03%	29.72%	27.03%	28.82%	25.11%	20.87%	29.36%
• With relatives / family	52.82%	33.25%	63.34%	56.40%	65.73%	49.92%	54.89%	49.04%	60.73%
• Alone	11.78%	16.53%	23.15%	9.26%	3.78%	16.94%	14.30%	13.55%	15.05%
• With friends	0.88%	17.24%	0.32%	0.13%	0.97%	1.29%	2.32%	- 3.06%	7.70%
• Rental room	0.47%	12.91%	3.93%	1.93%	2.16%	2.61%	2.90%	1.29%	4.52%
• No response	0.00%	0.38%	0.23%	0.00%	0.32%	0.00%	0.12%	-	0.58%

Variable	City						Total		
	Bandung	Batam	Denpasar	West Jakarta	Makassar	Medan	Estimate	95% Lower Limit	95% Upper Limit
								0.33%	
• No permanent place (on the street)	0.00%	0.57%	0.00%	0.00%	0.00%	0.00%	0.06%	- 0.21%	0.32%
• Others	0.00%	0.57%	0.00%	2.57%	0.00%	0.42%	0.29%	- 1.87%	2.46%
Source of Income									
• Employee salary	56.24%	36.24%	29.86%	33.93%	26.79%	25.41%	42.38%	37.00 %	47.77 %
• Sex worker	0.13%	8.89%	6.50%	1.58%	1.30%	1.00%	2.85%	- 3.03%	8.73%
• Drug trafficker / courier	0.85%	1.33%	0.00%	1.13%	1.39%	1.15%	0.76%	- 2.04%	3.57%
• Freelance worker	31.69%	37.74%	18.26%	45.70%	41.94%	56.57%	31.62%	30.20 %	33.03 %
• Student allowance	6.85%	3.21%	40.92%	2.77%	5.23%	1.13%	14.40%	14.39 %	14.42 %
• Unemployed	4.24%	12.03%	4.46%	14.88%	23.36%	14.74%	7.92%	4.82%	11.03 %
• No response	0.00%	0.57 %	0.00%	0.00%	0.00%	0.00%	0.06%	-0.68%	0.79%
Total income obtained in the last 1 month (thousands)	2811.31	1459.48	1683.97	2173.90	1287.75	1762.16	2177	1740.7	2614
Average length of stay in the city (months)	84.26	43.50	44.78	68.29	66.36	90.44	67.45	60.176	74.733

C. BIOLOGICAL TEST

The prevalence of HIV, Syphilis, Hepatitis B, and Hepatitis C in the population was estimated to be 10.15%, 1.35%, 2.27% and 14.23% respectively. Hepatitis C was quite prevalent in all cities except *Batam* (0.5%), while for HIV the highest prevalence was detected in Bandung and Jakarta (12.88% and 18.32% respectively). *Batam* and *Medan* had the highest prevalence of syphilis (5.4% and 10% respectively) while none of crystal meth users in Bandung was found to be infected with syphilis. Hepatitis B prevalence ranged from 0.8% in *Bandung* to 4.86% in *Denpasar*.

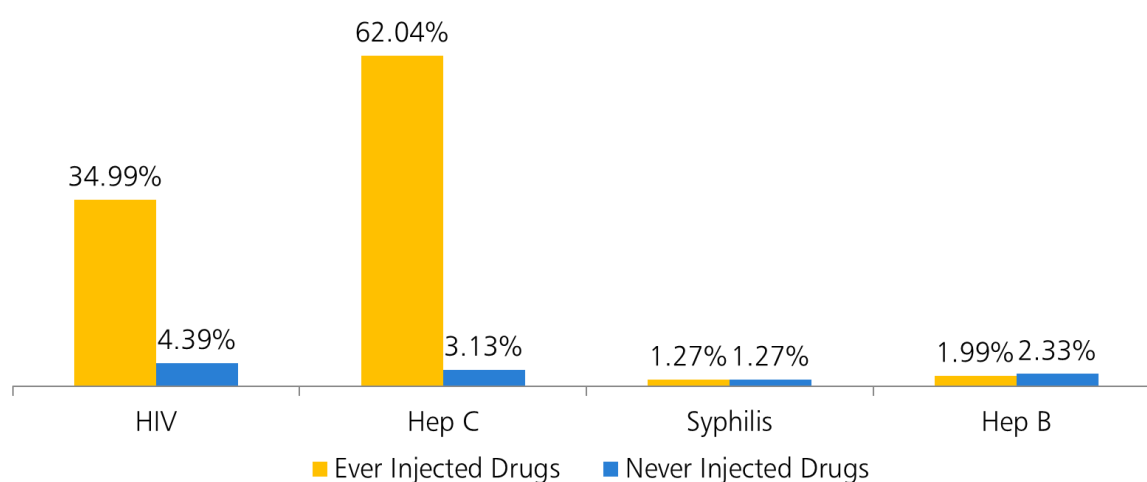
Table 7: Prevalence of HIV, syphilis, Hepatitis B and Hepatitis C categorized by City

City	HIV	Syphilis	Hep B	Hep C
Bandung	12.88%	-	0.83%	16.87%
Batam	3.47%	5.44%	1.78%	0.54%
Denpasar	8.03%	1.26%	4.87%	8.88%
Jakarta	18.32%	2.19%	3.27%	34.71%

Makassar		2.28%	0.71%	1.61%	9.03%
Medan		7.36%	9.97%	2.60%	22.56%
Total	Point Estimate	10.15%	1.35%	2.27%	14.23%
	95% Lower Limit	5.7%	-3.21%	0.03%	8.9%
	95% Upper Limit	14.61%	6.9%	4.45%	19.55%

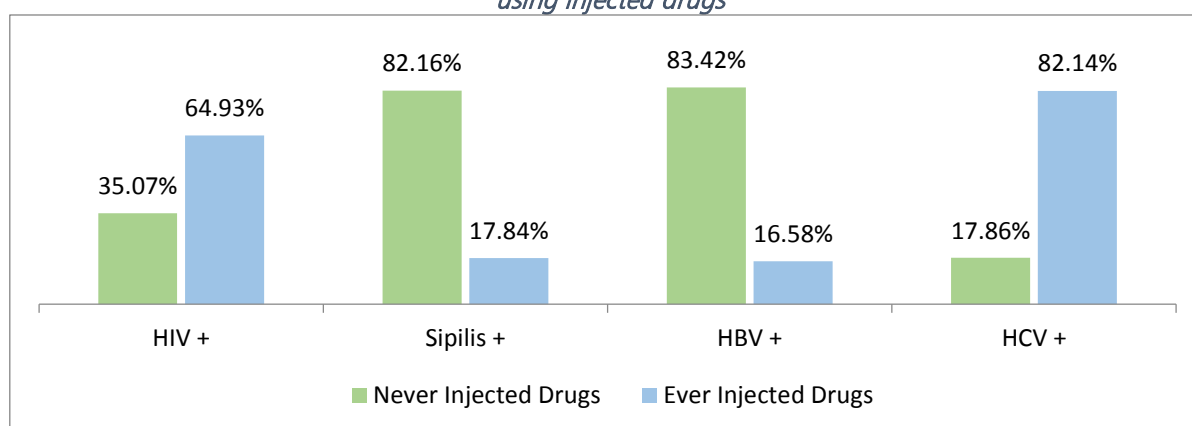
Based on their experience in using injecting drugs, there was significant difference in HIV and HCV prevalence between those who had experience using injected drugs and who never used injected drugs (34.99% and 4.39% for HIV and 62.04% 3.12% for Hepatitis C). However, there was no significant difference in prevalence of syphilis and Hepatitis B in those two groups.

Figure 13: Prevalence of HIV, syphilis, Hepatitis B and Hepatitis C categorized by by experiencing injecting drugs



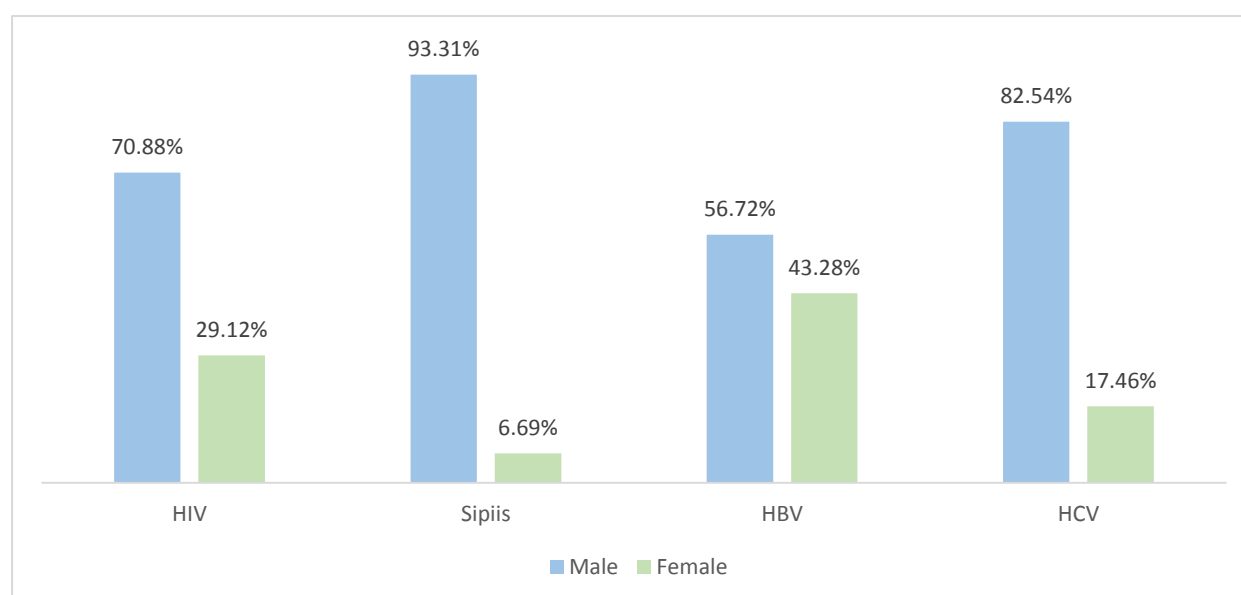
The high prevalence of HIV and Hepatitis C in *Jakarta*, *Bandung* and *Medan* could be explained by the fact that around a fifth of crystal meth users were former PWID and HIV and Hepatitis C are known to be quite prevalent among PWID. Nevertheless, around 35% of HIV positive and 18% of Hepatitis C positive crystal meth users never injected drugs, and transmission was thought to occur through sexual contact. In contrast, more than 80% of crystal meth users who were syphilis and hepatitis B positive had never injected drugs.

Figure 14: The Proportion of crystal Meth Users with Positive Biological Test Categorized by experience in using injected drugs



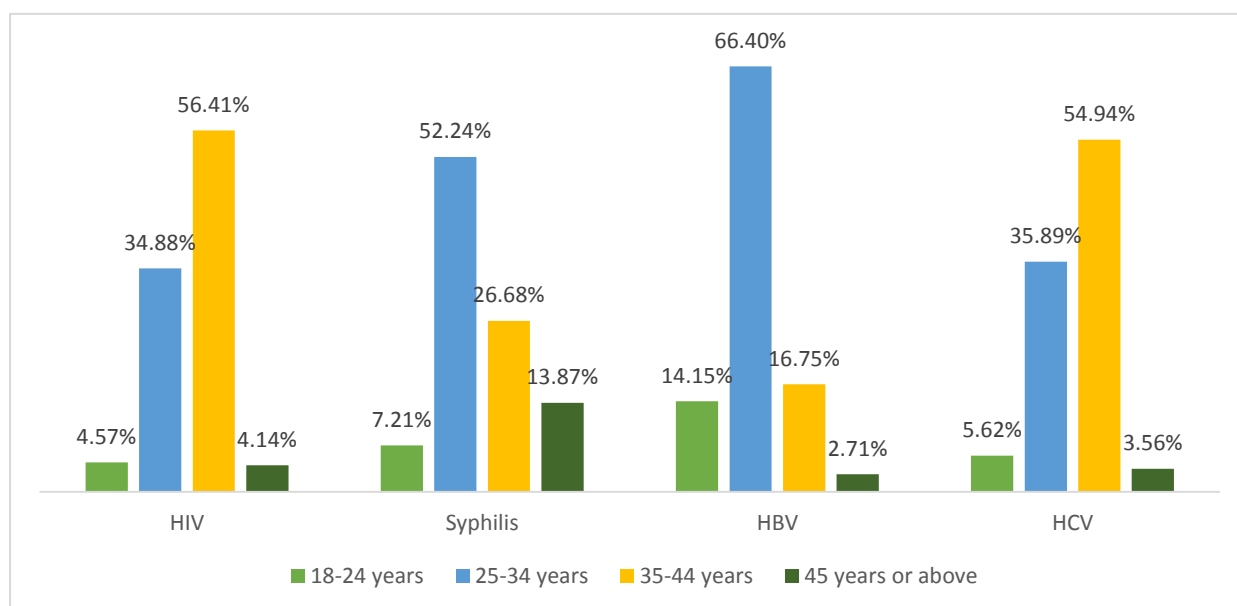
Positive serological test was detected more among male crystal meth users. More than 90% of syphilis positive results were found in men, and so were 70% of HIV positives and 83% of Hepatitis C positives. Similarly, 56% of Hepatitis B positives were detected in men.

Figure 15: The Proportion of crystal Meth Users with Positive Biological Test Categorized by Gender



Agewise, Hepatitis C and HIV were more frequently reported from the 35-44-year age group, while Syphilis and Hepatitis B were more prevalent among the younger age group, between 25 to 34 years of age. The proportion of crystal meth users with prior drug injecting experience was also higher in the older age group, which may explain the higher prevalence of HIV and Hepatitis C among them.

Figure 16: The Proportion of crystal Meth Users with Positive Biological Test Categorized by Age Group

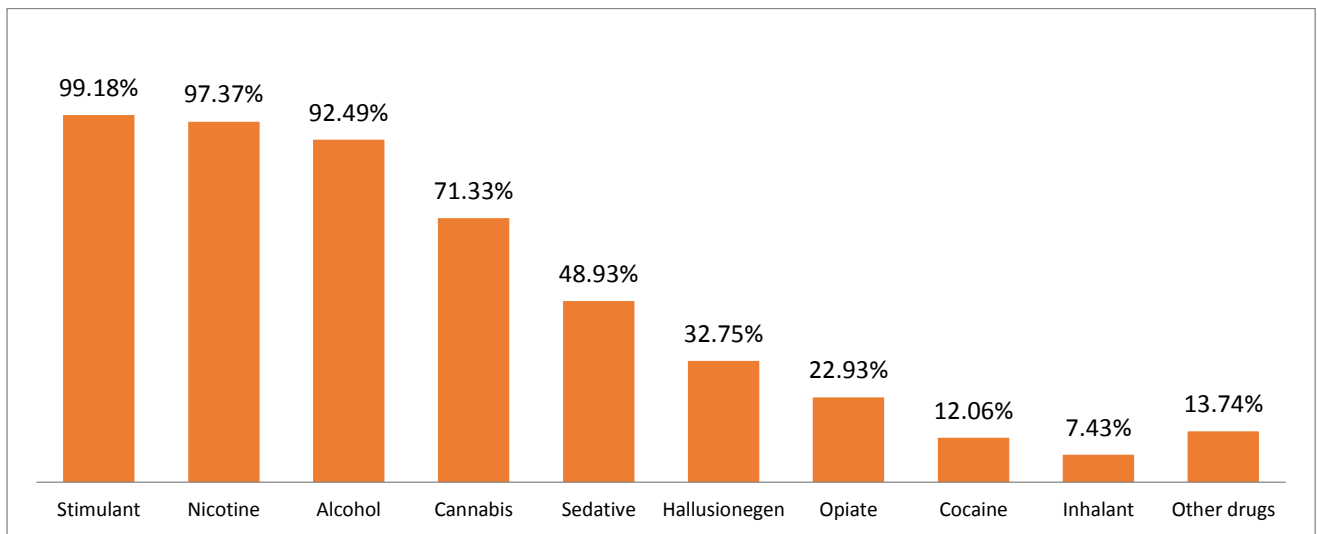


Biological tests also informed a high HIV-Hepatitis C coinfection, where almost 68% of crystal meth users who tested positive for HIV, also tested positive for Hepatitis C. Conversely, 48% of crystal meth users who were Hepatitis C positive were infected with HIV as well. Coinfection also existed for HIV and Syphilis, and 40% of crystal meth users who tested positive for syphilis were also HIV positive. In contrast only 5.4% of HIV positive individuals tested positive for syphilis.

D. SUBSTANCE USE

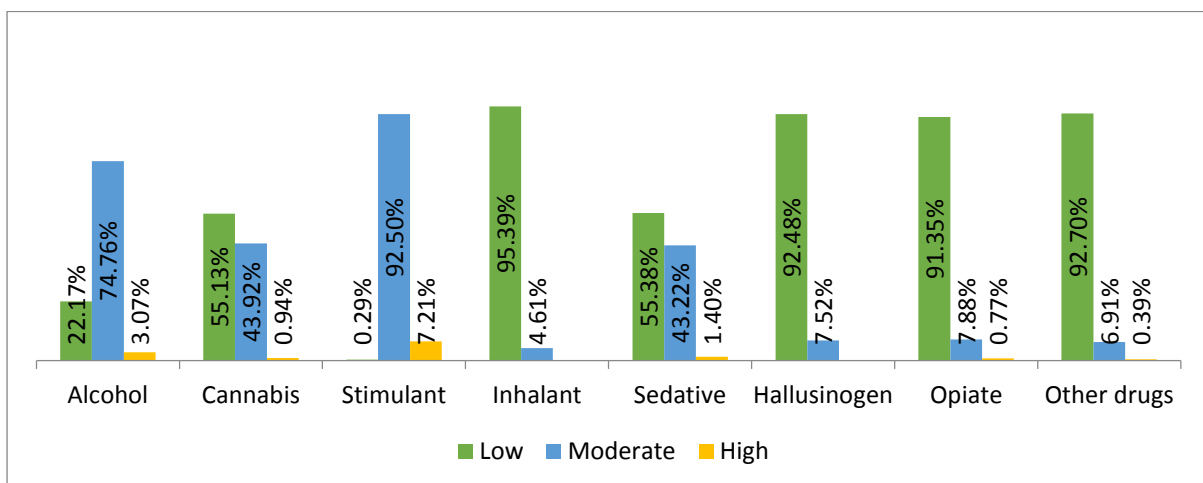
Respondents' experience in using addictive substances other than crystal meth was quite variable (see figure 13). Almost all of crystal meth users interviewed admitted ever smoked cigarettes, used stimulant drugs (extacy, amphetamine, crystal meth), and drank alcohol. About three quarters of them had also used marijuana/cannabis. Sedatives and hallucinogens (LSD or magic mushrooms) were also used by a one third of crystal meth users, but only one of five crystal meth users had experience with opiate (heroin or morphine), and only 11% had used cocaine. Around 13% of crystal meth users also used other substances including new psychoactive substances (NPS) or synthetic nicotine.

Figure 17: Experience with Substance Use



Even though the majority of crystal meth users had experience with other substances, the extent and level of problematic use varied based on the WHO's ASSIST (Alcohol, Smoking and Substance Involvement Screening Test) (Humeniuk *et al.*, 2010). This instrument divides problem related to substance use into three categories: less, moderate, and high. Figure 14 shows that most crystal meth users had less problematic use on inhalant (95.39%), hallucinogen (92.48%), and opiate (91.35%), while moderate problematic use was found for alcohol (74.8%), marijuana/cannabis (55.1%) and sedative (55.4%). In terms of stimulant mainly crystal meth, around 92.5% of users were at moderate problematic use, and 7.21% were at high problematic use.

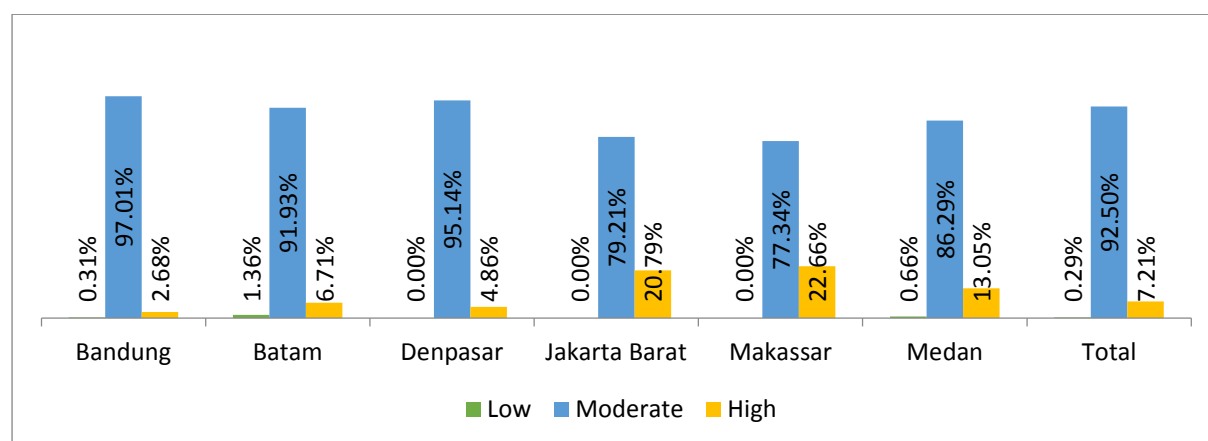
Figure 18: Level of drug dependence based on drug type



The level of problematic use on stimulant varied among cities that were part of study sites. As figure 15 shows, crystal meth users had either moderate problematic or high problematic. None of respondent was categorized as less problematic. Those with least problematic use on crystal meth were practically non-existent. More than 90% of moderate problematic user were detected in *Bandung*, *Batam* and *Denpasar*, while

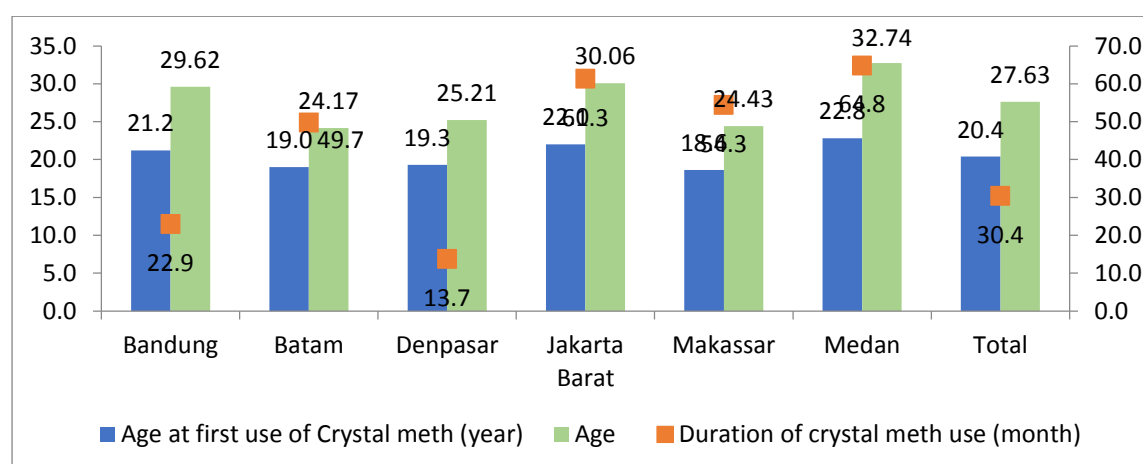
20.8% of users in Jakarta, 13.1% in *Medan* and 22.7% in Makassar had a high problematic use on crystal meth. A very small proportion of crystal meth users in *Bandung* and *Medan* (0.31% and 0.29% respectively) had less problematic use on crystal meth.

Figure 19: Level of crystal Meth Use based on City



Crystal meth consumption starts at a relatively young age, and continues for quite some time. As listed in Table 6, most users started at the age of 20, though there are variations among cities. In *Batam* the starting age was slightly younger (19.92 years old), while in Makassar and Denpasar it was 20.12 years and 23.01 years respectively. Once an individual start using crystal meth, he/she would use it continuously for 55 months on average. The duration of use tended to be longer among male users (57 months) than among female users (44 months) and in some cities, the duration of use was somewhat longer than average, like 65 months in *Medan*, 61 months in Jakarta and 54 months in *Makassar*. This was consistent with the average age of users that was reported in each city.

Figure 20: Age, Age at First Use of crystal Meth and Duration of Use

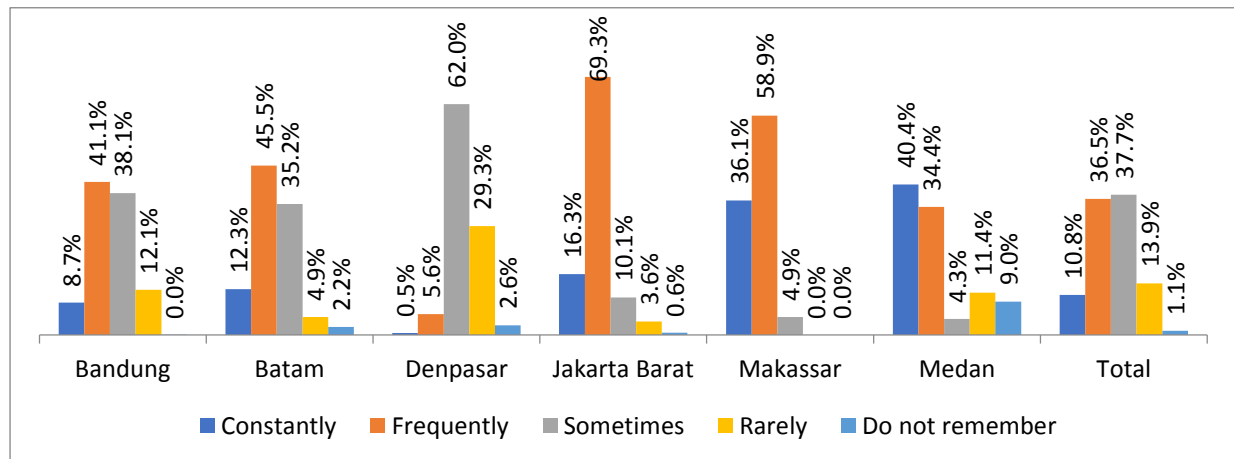


In one typical month, users spent 6 (six) days using crystal meth, which basically translated into one to two days a week. The consumption level varied significantly among cities; from 17 days in Medan, to 15 days in Makassar and 9 days in Jakarta. In

contrast, users in Denpasar spent only 2 days in a month for crystal meth, while those in Bandung spent 5 days in a month.

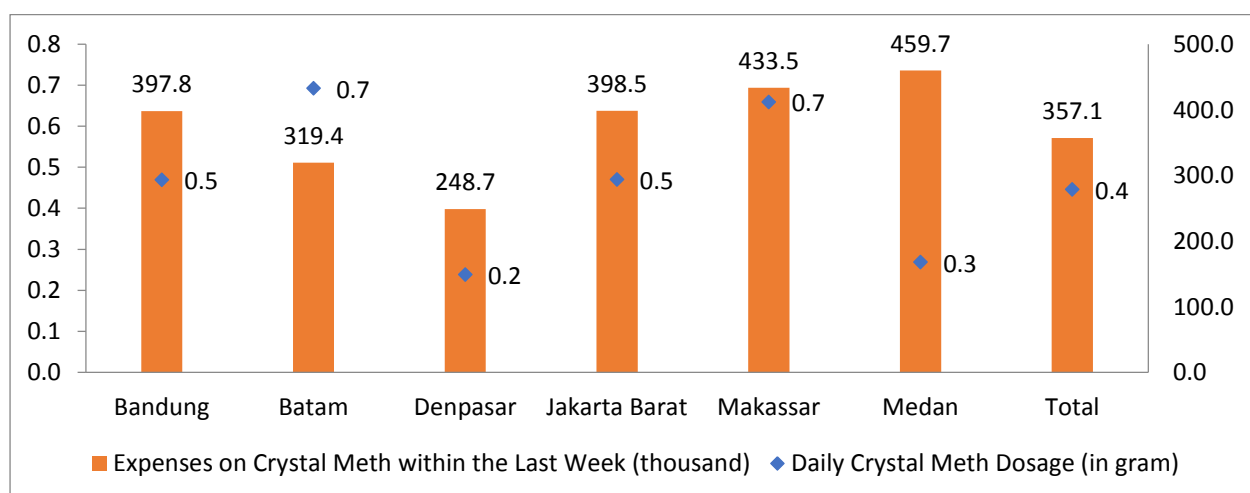
When one looked at the crystal meth consumption pattern within the last year, more than half of crystal meth user could be categorized as frequent users (Jakarta 68%; Makassar 57%, Bandung 51%) as illustrated in graph 4. In addition, 44% of users in Medan were constant users, while 74% of users in Denpasar had a lower frequency of use.

Figure 21: Frequency of crystal Meth Use within the Last Year categorized by City



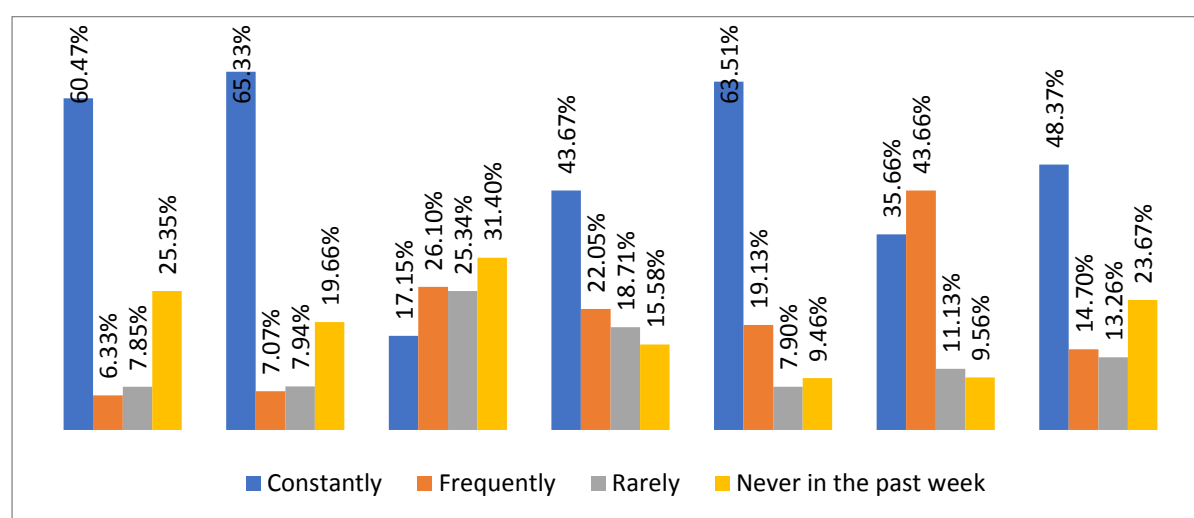
The average daily crystal meth dosage was 0.4 gram, but the variation from one city to another was quite significant, from 0.2 gram in Denpasar to 0.5 gram in Jakarta and Bandung, and 0.7 gram in Makassar and Batam. This daily consumption was proportional to the amount of money that users reported to have spent on crystal meth in the last week. Users in Denpasar who had the lowest dosage, spent the least amount (IDR 248,000/week), followed by users in Jakarta (IDR 433,000/week) and Bandung (IDR 398,000/week). The largest expense was by users in Medan (IDR 460,000/week), while the average weekly expense was IDR 357,000.

Figure 22: Daily crystal Meth Dosage and Expenses on crystal Meth within the Last Week



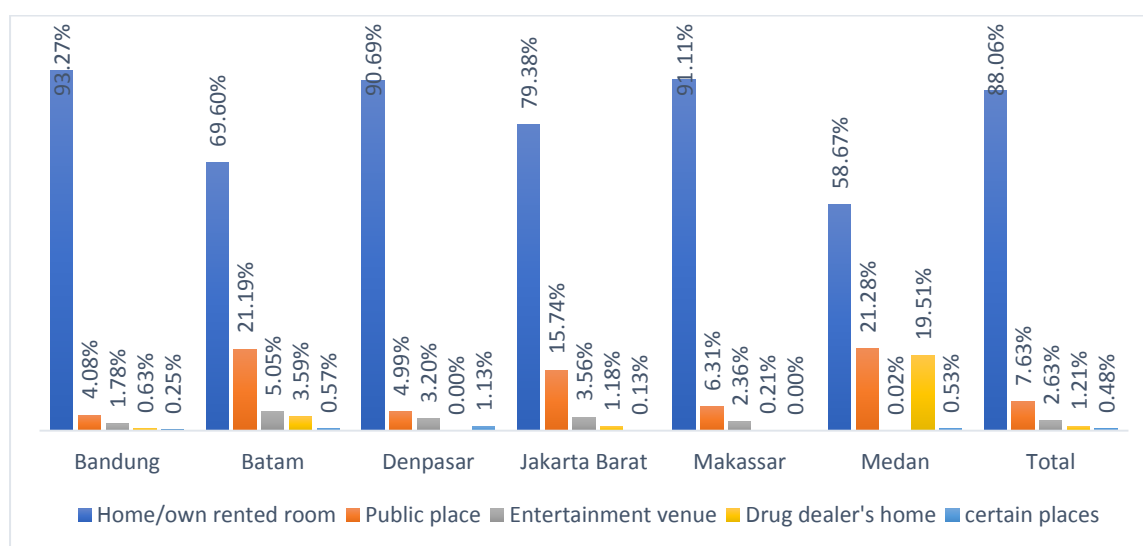
Despite being proportional to the daily dosage of crystal meth, the weekly expenses did not match the price of crystal meth package. This was because users typically pooled their money together to buy crystal meth package as a group. Around 65% of them always or frequently did that, and this practice was quite dominant in *Makasar* (83%), *Medan* (78%), *Batam* (72%), *Bandung* (66%), and *Jakarta* (65%). In contrast, less than half (43%) of crystal meth users in *Denpasar* pooled their money. At the time of the study, the number of crystal meth users who did not pool their money together in the past week was less than 25%.

Figure 23: Frequency of Pooling Money to Buy crystal Meth



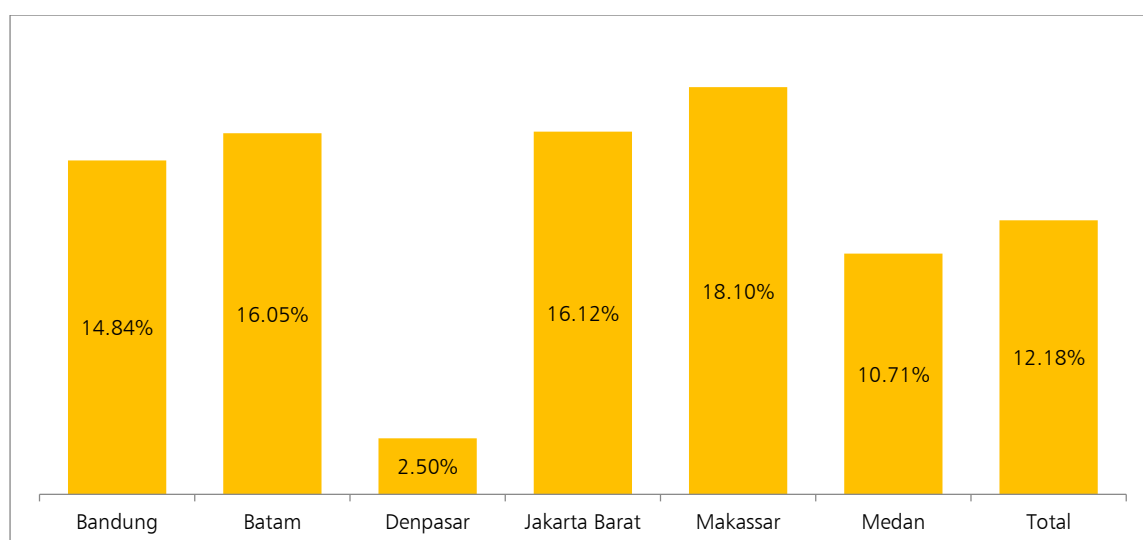
In terms of location for crystal meth consumption, users generally preferred their own home or place (88.06%), though other locations could also appeal to a small proportion of users who reported doing their most recent crystal meth consumption at a public place (8%), an entertainment venue (3%), the drug dealer's home (1%), and a common gathering place (3.3%). This finding was consistent in most of the study sites except for Medan where favored locations included the drug dealer's home and user's home as well (21.8%). In Batam, public places were also quite popular (21.7%).

Figure 24: Location of crystal Meth Consumption in the Past Week



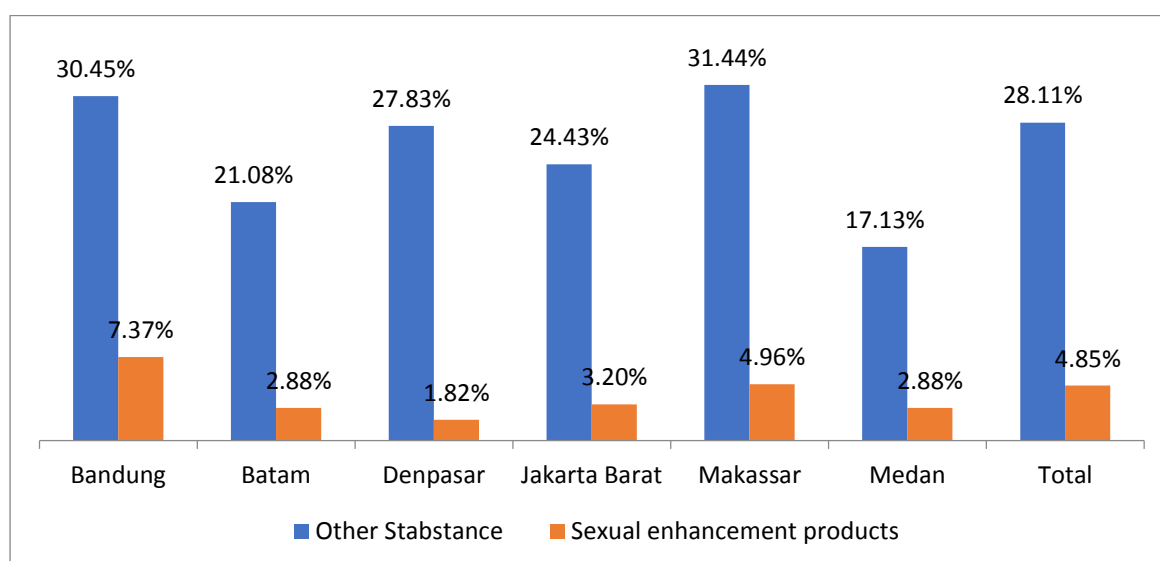
Aside from having preferred locations for crystal meth consumption, some users also used meth in different cities, as what approximately 12% of crystal meth users did within the past year (*see figure 21*). Around one fifth (18%) of users in Makassar City did so, which is considered quite a high proportion relative to the other cities. In contrast, only 2.5% of users in Denpasar City used crystal meth use in another city.

Figure 25: crystal Meth Experience in Another City



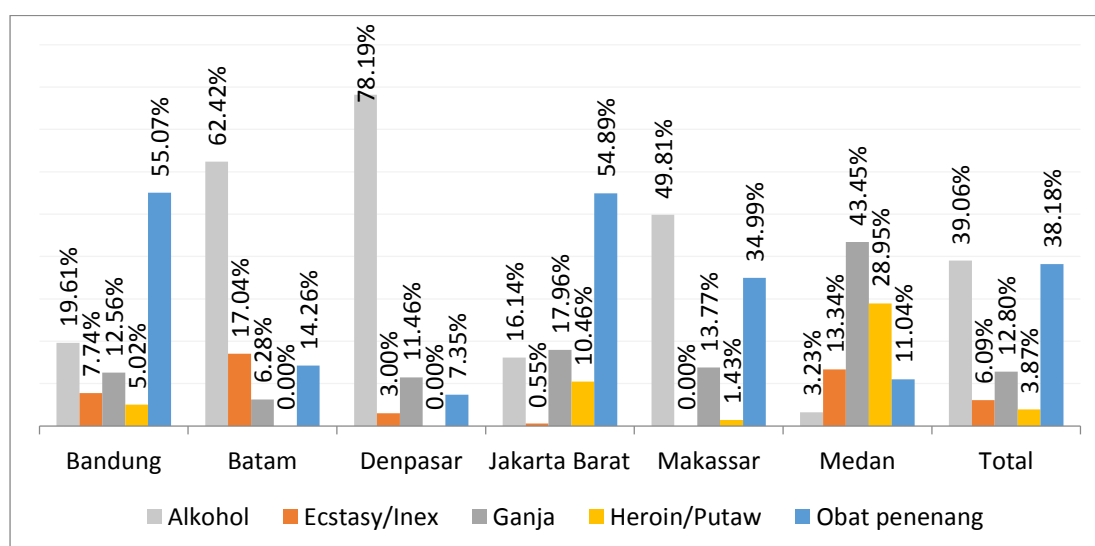
In all study sites, the study also found that some users combined use of crystal meth with other substances like for example sexual enhancement drugs. Overall, almost a third (28%) of crystal meth users admitted using a combination of drugs, and around 5% of them reported using sexual enhancement drugs. The tendency for concurrent use of mixed drugs was quite strong among users in *Bandung* (30.5%), *Makassar* (31.4%) and *Jakarta* (30%). Users in *Bandung* also tended to report their use of sexual enhancement drugs more than users in any other cities.

Figure 26: Concurrent Use of Crystal Meth and Other Substances or Sexual Enhancement Products



Alcohol and sedatives were commonly taken together with crystal meth, but users' preference for other substances seemed to be somewhat site-specific as described in Figure 25 below. For example, alcohol was preferred by users in Denpasar (78.2%), Batam (62.4%) and Makassar (49.8%), while those in Medan opted for marijuana/cannabis (43.5%), and more than half of users in Bandung (55%), Jakarta (54.9%) and Makassar (50%) chose sedatives. At the time of survey, preference for heroin was also quite clear in Medan (29%), Jakarta (10.5%), Bandung (5.6%), and Makassar (2.9%), while a small proportion of crystal meth users in Medan (13%) and Batam (17%) also took ecstasy pills.

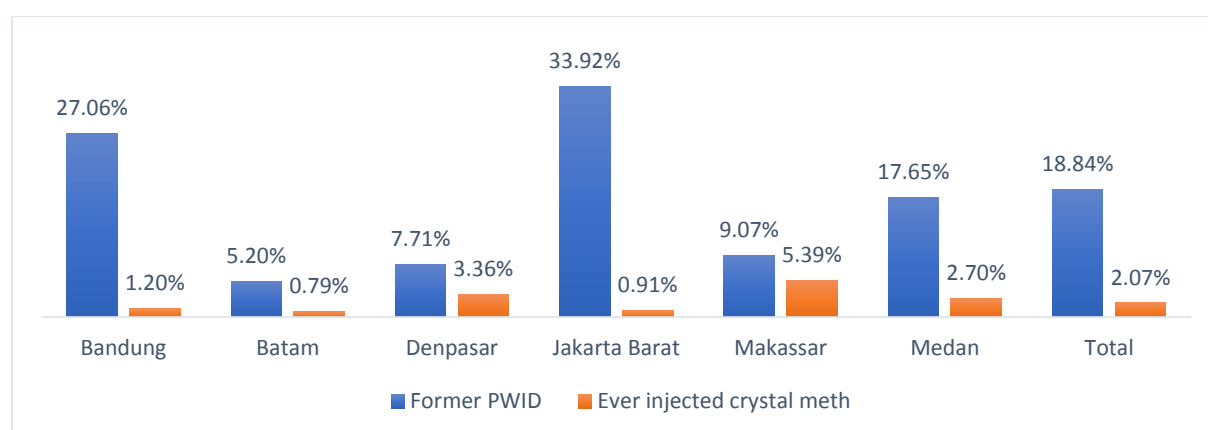
Figure 27: Other Substances Used in Combination with crystal Meth in Each City



Some crystal meth users also had experience with injecting drugs. Among the total study respondents, 18.8% of had been injecting drug users. The largest proportion came from *Jakarta* (33.9%), followed by *Bandung* (27%) and *Medan* (17.6%). In other

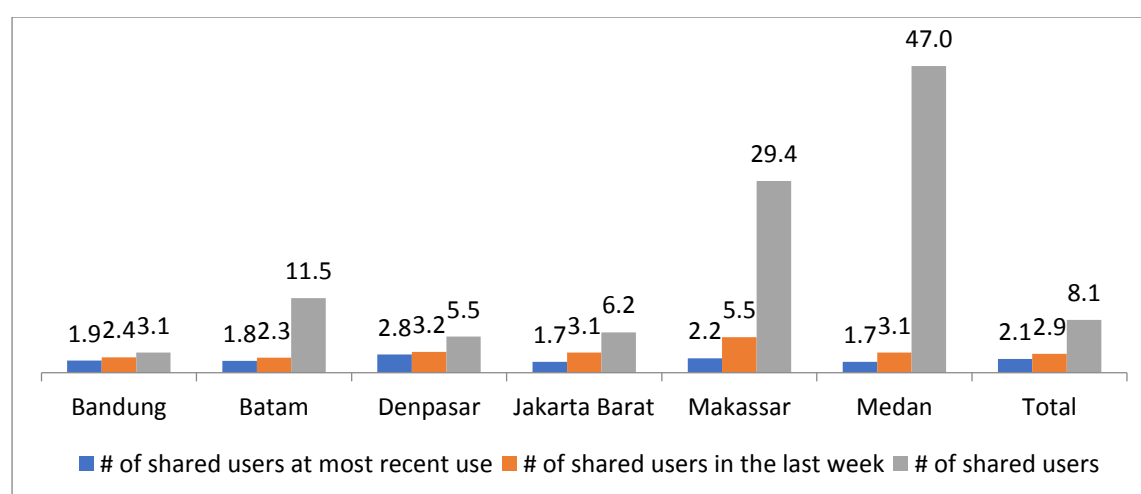
cities, users who had experience as IDUs were less than 10%. Previous experience with injecting drugs however had no relation with the current meth consumption method as less than 3% of meth users in the 3 cities actually injected crystal meth. On the contrary, in *Makassar*, where the percentage of crystal meth users who were former PWID was less than 10%, as much as 5% of them had tried injecting crystal meth. Overall only 3% of crystal meth users ever injected the drug.

Figure 28: Experience with Injecting Drugs and crystal Meth



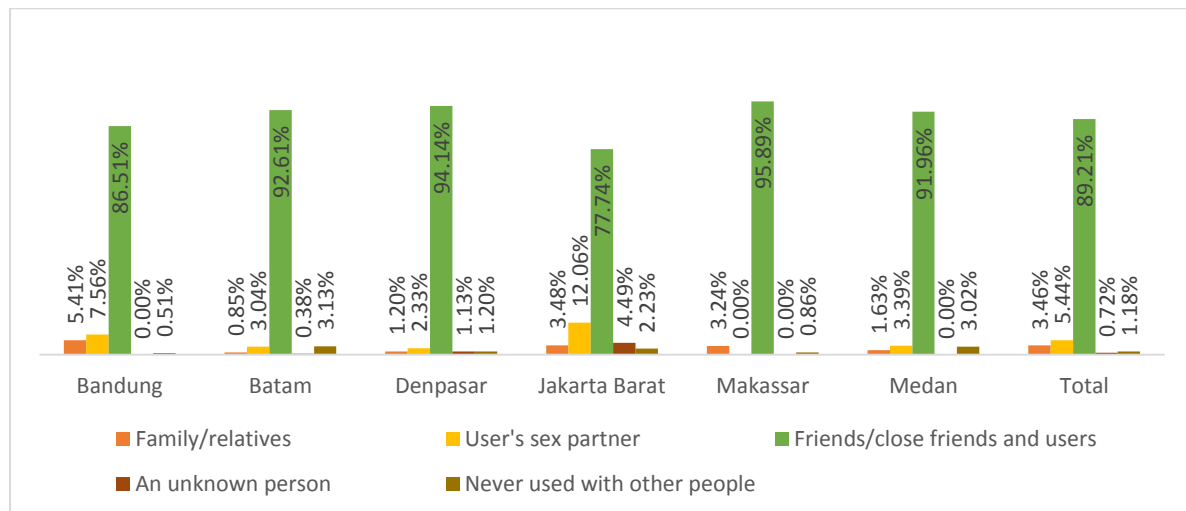
Taking crystal meth together with friends or a partner is an inseparable part of a user's usage experience. Friends were not simply helping in the group purchase of crystal meth, but were meeting the need for a social network and for this, an average user reported using crystal meth with 8 different users. The number varied from one city to another, with the largest network being in *Medan* and *Makassar*. A look at the crystal meth use within the last seven days however revealed that during that period, most users, including those in *Medan*, shared their meth with only three different people (2.9). It's just in *Makassar* where users shared their meth with six different people within the last seven days, and when asked about their most recent crystal meth use, users in all study sites reported only sharing the drugs with two different people.

Figure 29: Number of Different Shared Users of crystal Meth



Very few crystal meth users would take meth alone, unaccompanied. At the same time, very few users would take meth together with people they do not know. Shared use was typically done by users who know each other, or who belong to a known social network. These include friends, close friends, sex partner or family.

Figure 30: People who have Shared crystal Meth



Another consequence of crystal meth use is encounters with the legal system. More than a third (37%) of crystal meth users had experienced arrest at some point of their life; in *Jakarta* (45.2%), *Makassar* (42.4%), and *Bandung* (40.3%) the number was found to be even higher. Despite this high percentage, substance use or possession only accounted for 44.3% of those arrests, while the remaining were mostly due to other criminal violations. The highest frequency of substance abuse-associated arrest occurred in *Bandung* (74.5%), *Jakarta* (56.6%), and *Medan* (54.1%). Generally, almost half (44.4%) of crystal meth users who were arrested would be prosecuted and almost all or around 95% of them would then serve time in prison. Significant differences were observed among cities. While most crystal meth users (71%) in Medan and Jakarta would undergo trial, the opposite was observed in *Batam* and *Makassar* where only 17% and 26% of users respectively would go through court proceedings.

Table 8: Experience with law enforcement

Variable	City						
	Medan	Jakarta	Bandung	Denpasar	Batam	Makassar	Total
Ever experienced arrest (%)	34	45.2	40.3	8.9	37	42.4	37.2
Arrested in relation to substance abuse (% ever experienced arrest)	54.1	56.6	74.5	36.4	22.8	36.8	44.3
Ever underwent trial (% arrested due to substance abuse)	71.8	71.7	35.3	47.6	17	26.4	44.4
Ever served time in prison (% ever been tried in court)	98.4	96.3	88.9	88.9	87.5	96.4	95
Used crystal meth in prison (% served time in prison)	53.9	60.8	62.2	75	5.9	71.4	53.2
Injected crystal meth in prison (% used meth in prison)	5.9	0	0	16.6	0	5.3	2.3

Consumption of crystal meth appeared to continue even while incarcerated, as more than half of users continued their use in prison. This practice was mostly found in *Denpasar* (75%) and *Makassar* (71.4%), but was rarely reported from *Batam* (6.9%). The crystal meth consumption method in prison varied, 2.3% injected it, which was observed in 16.5% of users in *Denpasar*, but injection was never reported from *Jakarta*, *Bandung* and *Batam*.

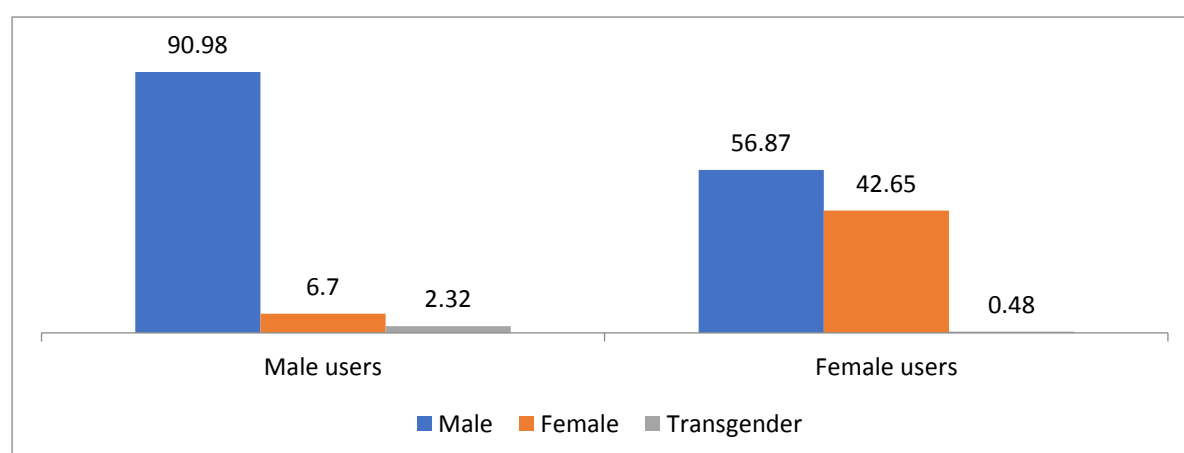
E. SOCIAL NETWORK OF CRYSTAL METH USERS

To identify the social network of crystal meth users, each respondent was requested to name three of their peers whom they know used crystal meth within the last seven days. Respondents were also requested to describe the nature of their relationship with the three people, both social relationship as well as the meth use relationship. From the 1498 total respondents, 1447 of them mentioned three names, while 51 respondents did not mention any names. A total of 3043 names were mentioned, out of which 1447 names were mentioned as the first person, 989 were mentioned as the second person, and 607 were mentioned as the third person. This data was considered non-independent since they originated from the respondents, not directly from each individual person. Hence the data was treated as panel data (xt) and was analyzed with STATA version 14 with an objective to obtain information on the social network characteristics, shared use of crystal meth, and the type of social support that respondents receive from their social network.

A closer look at the respondents' social network revealed that male crystal meth users leaned more toward other male users (90.9%), and tended to take meth together with their male peers. In contrast, female crystal meth users did not lean toward female users, but mentioned more of their male peers instead (56.8%). Transgender was also

mentioned as peers in taking meth by a number of male and female respondents, but the proportion was relatively small.

Figure 31: Proportion of Peers Mentioned by crystal Meth Users categorized by Gender (n=3043)



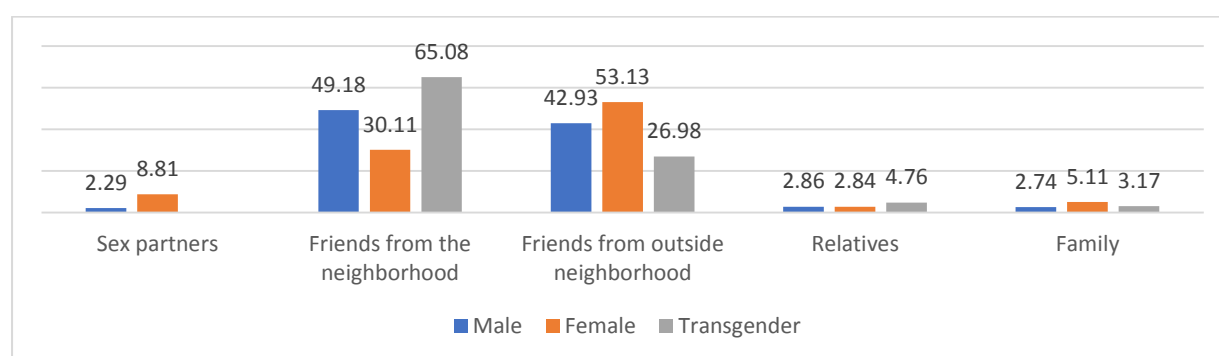
A look at the shared usage pattern in each city (Table 8) revealed that respondents in *Makassar*, *Jakarta*, and *Bandung* did mention more of their female peers than respondents in the other cities, while respondents in *Batam* seemed to take crystal meth together with transgenders quite often, unlike those in *Jakarta* who never mentioned transgenders as shared users in the last week. Overall, crystal meth users had a tendency to associate with users of similar age group. In sharing meth, the female users that respondents mentioned were generally older than their male peers, though all of them would still be within the 30-year-old range. In *Bandung*, respondents generally shared meth with their older peers, while in *Batam*, the opposite was observed.

Table 9: Characteristics of crystal Meth Shared Users in each City

Variable	N=3043					
	Medan	Jakarta	Bandung	Denpasar	Batam	Makassar
Number of friends reported (people)						
Male	384	418	464	360	408	593
Female	53	76	75	36	30	83
Transgender	13	0	1	7	39	3
Average age of friends (years)						
Male	30	29	32	24	24	24
Female	29	28	31	30	26	27
Transgender	29	0	34	26	31	26

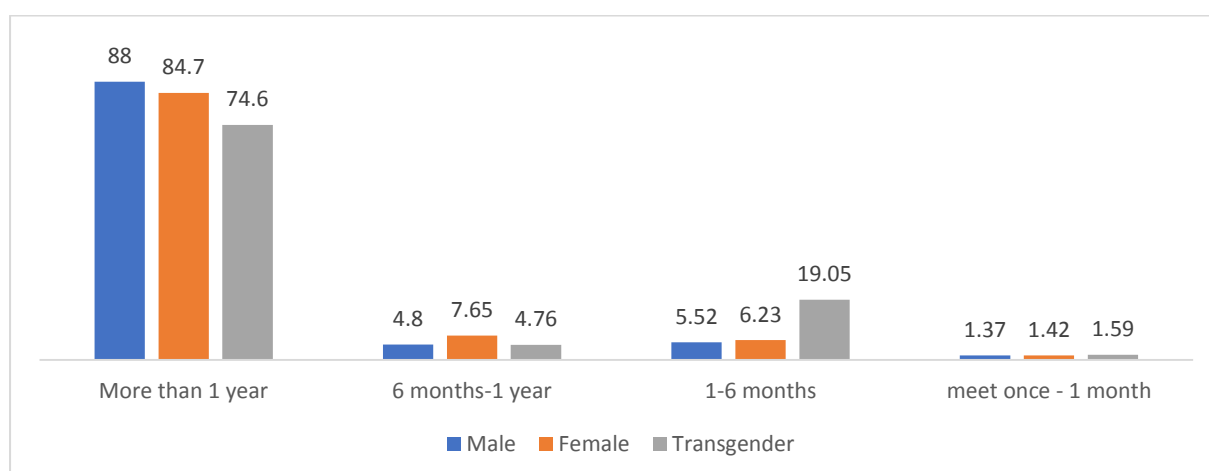
Crystal meth users' circle of friends was found to be quite variable and was somewhat gender-associated. Figure 27 demonstrates that male and transgender users whom respondents share crystal meth with were mostly friends from the neighborhood where respondents live (49.18% and 65.08%). The female shared users however, mostly came from outside the respondents' residential area (53.13%) and only 30% live in the same neighborhood as the respondents. Aside from sharing crystal meth with peers, male users also shared crystal meth with their sex partner (8.81%), while only 2.29% of female meth users did so. Nevertheless, this was insignificant compared to the number of shared users who came from within or outside the respondents' residential area. Other shared users of crystal meth were respondent's family members and acquaintances.

Figure 32: Respondent-Shared-User Relationship categorized by Gender



The length of time crystal meth users has known each other was also one factor in the decision to share meth. As Figure 28 illustrates, most shared users of crystal meth have known each other for at least a year, and this finding was consistent across all genders.

Figure 33: Length of Time Shared Users Know Each Other categorized by Gender



Within the last month, users who shared crystal meth typically gather together several times. Male users would meet with their male peers more frequently (45.5%) than with their female peers (35.23%). A number of them always met with only their male friends (24.36%), their female friends (25.57%), or their transgender friends (54.1%). The situation was slightly different among female crystal meth users, in which 36.86% of them always met with their male friends. Gathering with other female users did occur among 45.75% female users, but only frequently, as opposed to always. There were also male and female users who gathered with their peers at an even lesser frequency; sometimes, or rarely, while a very small number only gathered together once in the last month. The most common activity that users do during the gathering would be sharing crystal meth. Figure 29 illustrates the most recent shared use of crystal meth that generally occurred in the last week, a finding that was consistent across all genders. At the time of the study, users generally just shared crystal meth between 1 day to 1 week beforehand.

Figure 34: Frequency of Meeting between Shared Users categorized by Gender

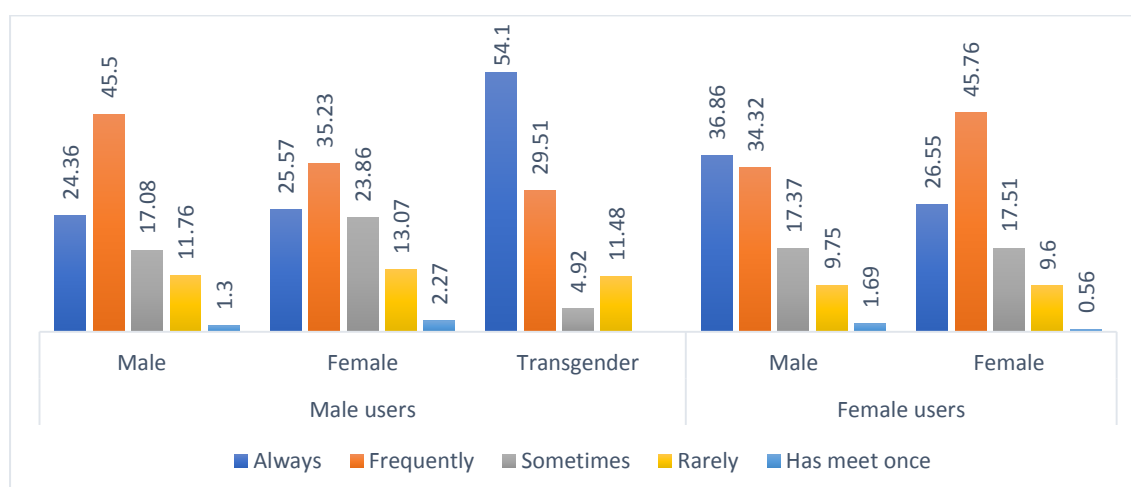
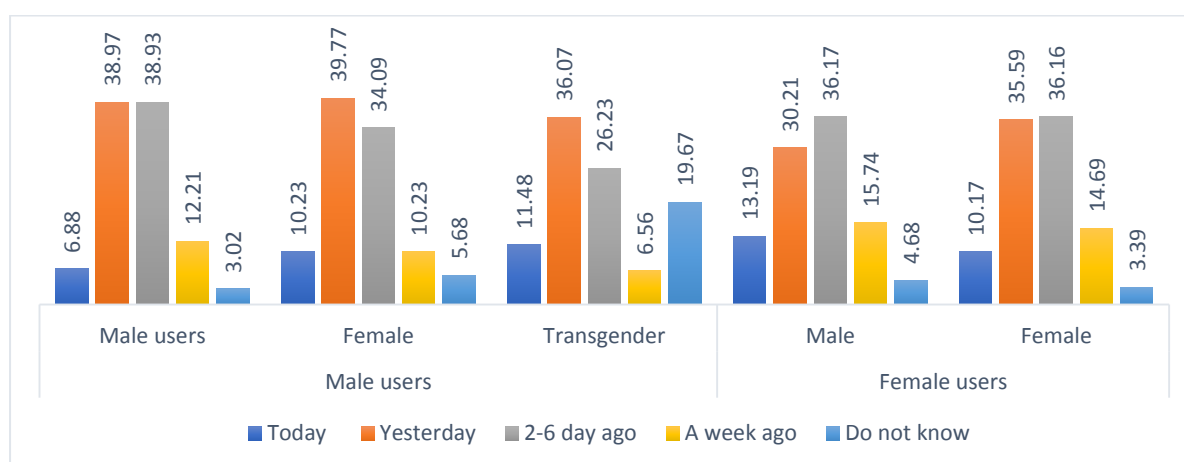


Figure 35: Type of Friends at Latest Shared Use of crystal Meth categorized by Gender



Besides taking crystal meth together, shared users also shared money with each other to purchase meth and visit entertainment venues after a drug-sharing session. Male users generally shared money to buy crystal meth with other male users (81.18%) and transgender (77.05%). Similarly, female users tended to share their money more with other female users (74.58%) than with male users (52.97%). Visiting entertainment venues seemed less popular, and only 64.71% of male users and 41.8% female users did that. From male users who did, 27.8% would prefer to go with a female user, or with a transgender (19.67%) or a male user (18.24%). Female users also chose to go with their female friends (23.16%) rather than with their male friends (18.64%), as detailed in Table 9.

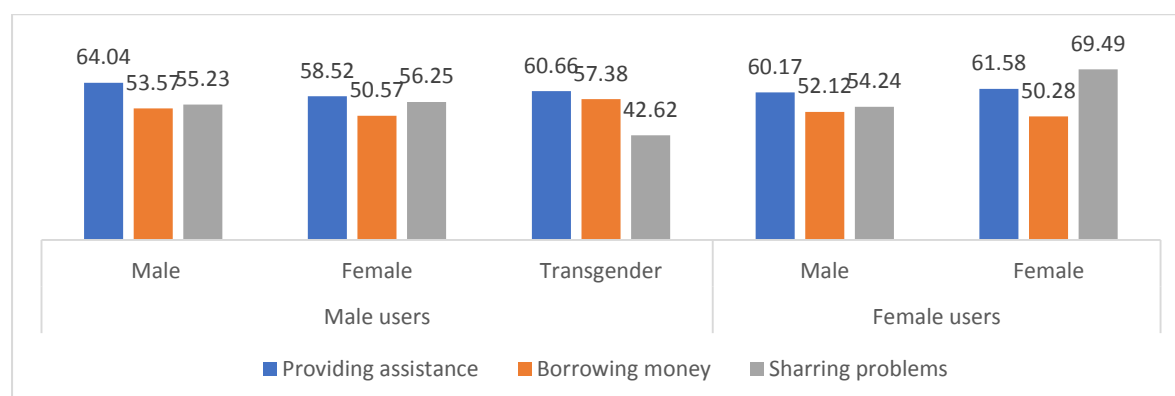
Table 10: Common Activities performed with Shared Users categorized by Gender

Category	(N=3043)	
	Male Users	Female Users
Share money to buy crystal meth		
Male	81.18%	52.97%
Female	61.93%	74.58%
Transgender	77.05%	0.00%
Visit entertainment venues after a meth-sharing session		
Male	18.24%	18.64%
Female	27.80%	23.16%
Transgender	19.67%	0.00%
Total	65.71%	41.8%

The social network of crystal meth users plays a critical role in providing support to users, not just on issues related to substance abuse, but social support as well. This study divided social support into three types i.e. providing assistance, lending money, sharing problems. Figure 34 illustrates the social support that crystal meth users perceived as available from their peers based on gender. The graph shows that in times of need, around 60% of male crystal meth users would request help from their male,

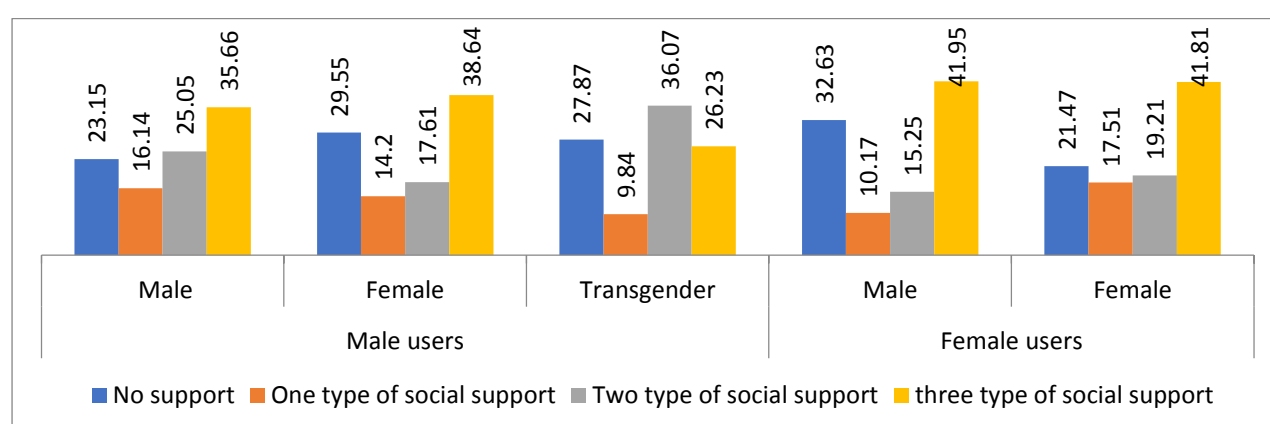
female and transgender peers with whom they shared meth. About 50% of them would also not hesitate to borrow money and share problems with their peers. Female users however would rather share their problems with fellow female users (69.49%) than with male users (54.24%).

Figure 36: Perceived Social Support Based on Gender



The majority of crystal meth users did receive social support from their shared users. Figure 32 demonstrates that only around 27% of male users and 30% of female users did not receive any type of social support from their peers. The rest reported receiving one to three types of social support from users with whom they shared meth. Around 39% of male crystal meth users believed they could obtain the three types of social support from their male peers, and 21% from their female peers. From transgender shared users, 32% of crystal meth users believed they could obtain 2 types of social support. Female users however were slightly different; 34% of them believed they could obtain 3 types of social support from their female peers, and 24% from their male peers.

Figure 37: Types of Support Provided by Shared Users to crystal Meth Users categorized by Gender



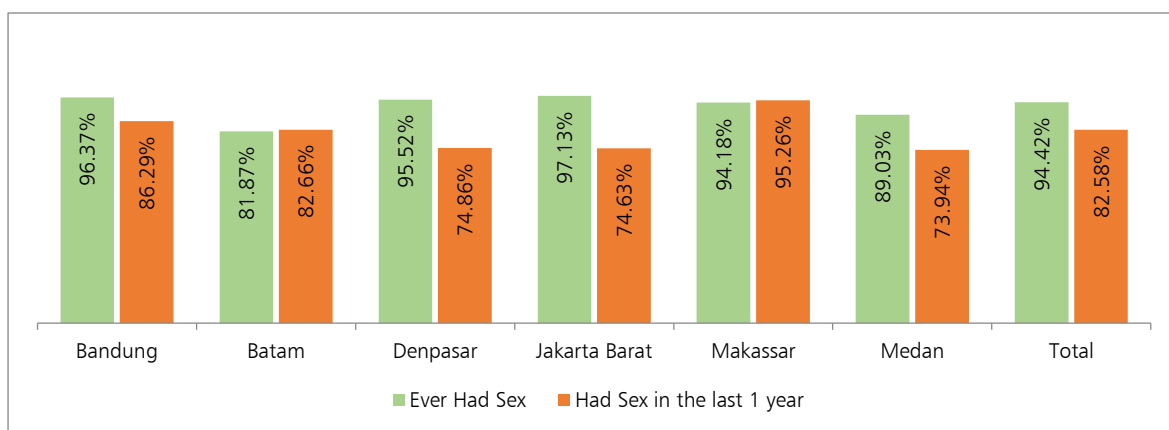
One form of social support that can be facilitated through social network is a call to stop using crystal meth. This was experienced by around 16-29% of male crystal meth users, with invitations coming from mostly their female shared users. A similar situation

was also experienced by female users. They even received more invitations to stop, ranging from 27.68% to 29.91%, which mostly came from their male shared users.

F. Sexual Behavior

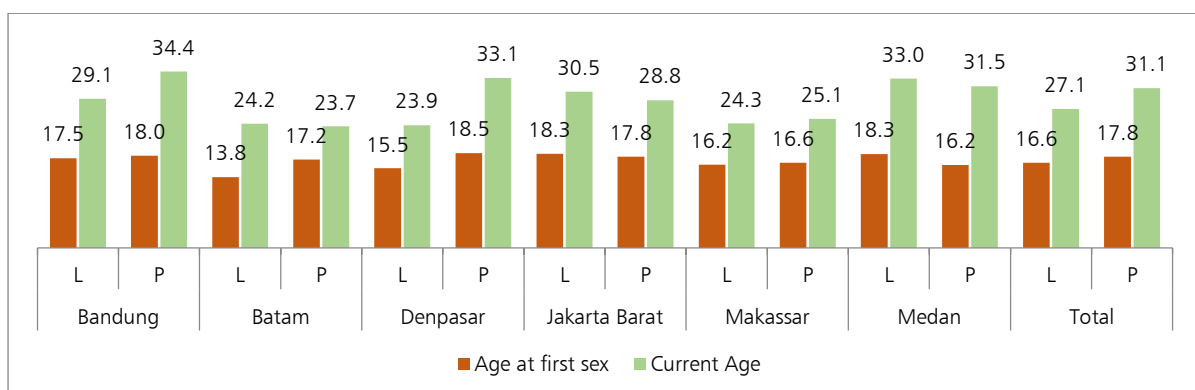
The majority of *crystal meth* users in six cities where the research took place has engaged in sexual encounters through vaginal, anal or oral (94%). Additionally, 84% of this figure reported that they have engaged in sexual encounters in the last one year. This illustration spreads consistently in all cities where the research took place, with an exception to *crystal meth* users in Medan where there has been less report on engagement in sexual activities in general or in the last one year. On the other hand, *crystal meth* users in Makassar have the tendency to have more sexual encounters in the last one year.

Figure 38: Experience on Sexual Encounter



The average age of first encounter on sexual activities is generally the same for male at 17.9 years old, while for female at 18 years old. In general, the average age of the overall respondents is 27.87 years old. This indicates that the majority of the respondents have been sexually active in the last one decade.

Figure 39: Average Age on First Encounter in Sexual Activities and Current Age



Based on on respondent’s sex partner reported, it reveals that not all male and female crystal meth users are engaging in heterosexual relationships. Although not dominant, 5.6% of respondents reported homosexual behavior across the six cities. Furthermore, geographically, it is reported that one out of five female users in Makassar engaged in homosexual activities, while in Batam, 10% was reported. As for male, approximately 13% of male users in Medan engaged in homosexual activities followed with about 7% in Bandung.

Figure 41: Sexual Behavior

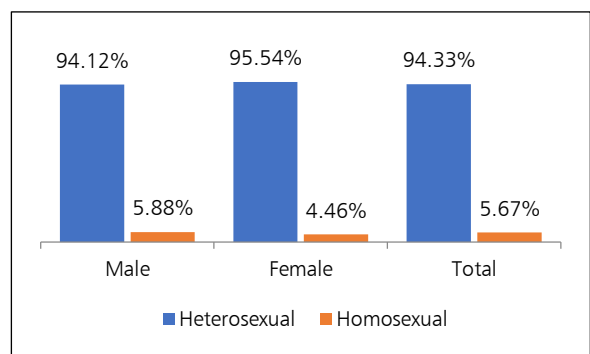
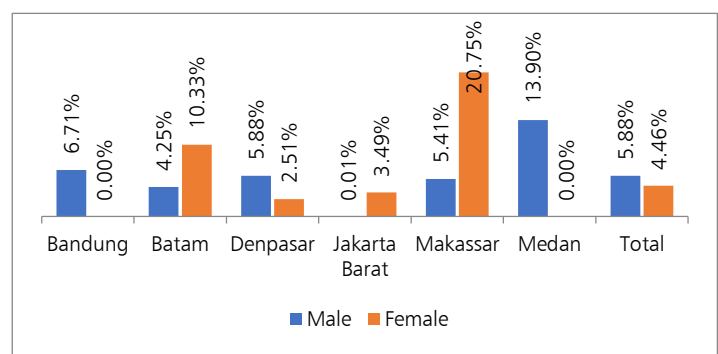


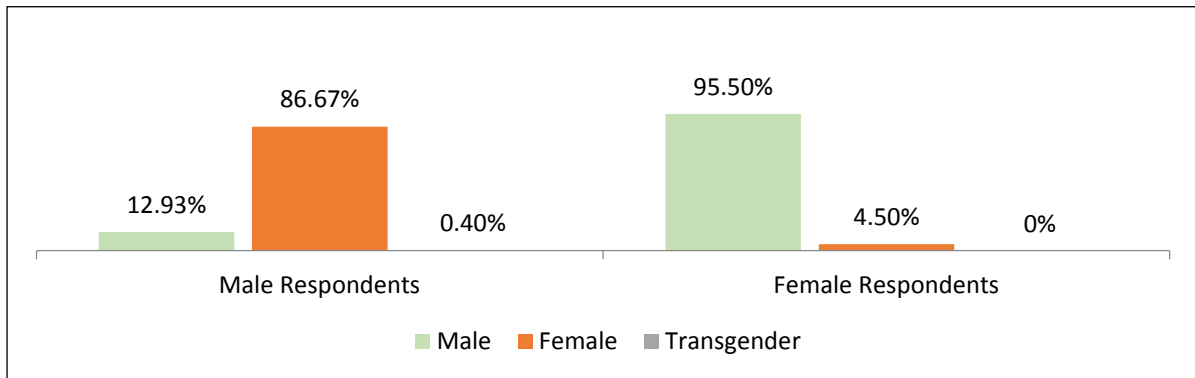
Figure 40: Homosexual Behavior Based on City



In this survey, respondents were asked to name three people they had sexual engagement with in the last one month. Respondents were then asked to identify the sexual interactions with each of the name, particularly related to familiarity, affection, communication and sexual behavior. Similarly, to social network data, sexual network data was also analyzed as panel data since all information on the interaction with the people named were reported by by the respondents.

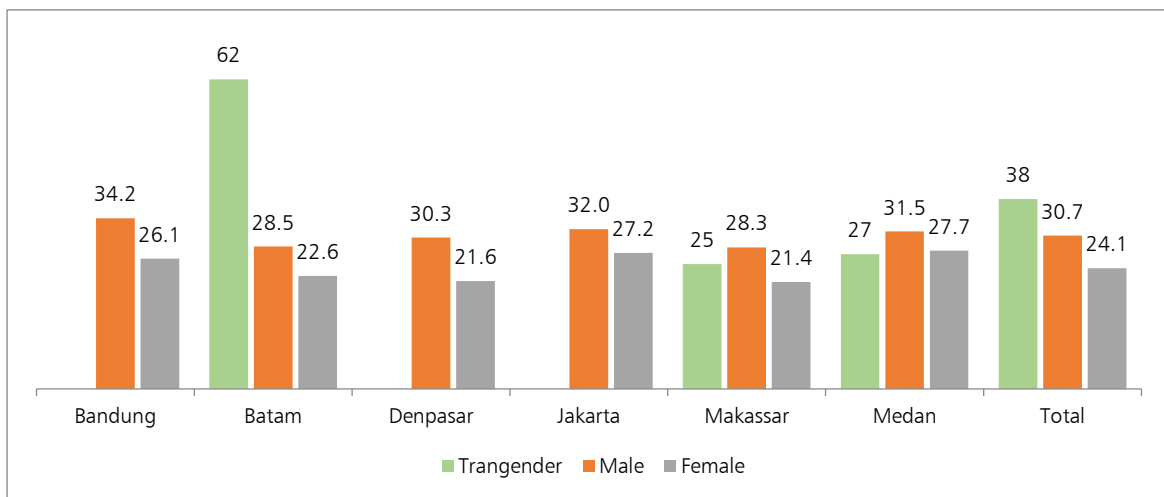
Of 1498 respondents, only 1027 people consisting of 873 males and 154 female mentioned their sex partner’s names. A total of 1442 names of sex partners mentioned, consisting of 353 males, 1088 female and 5 transgenders. Based on all sexual behavior categories mentioned above, not all respondents stated whether their sex partners are from the same sex. 13% of male *crystal meth* users mentioned male sex partners, 0.4% mentioned transgender sex partner. *crystal meth* users in Bandung, Jakarta and Denpasar did not mention any transgender sex partner. While 4.5% female *crystal meth* users mentioned that they had female sex partners.

Figure 42: Sex Partners Based on Gender



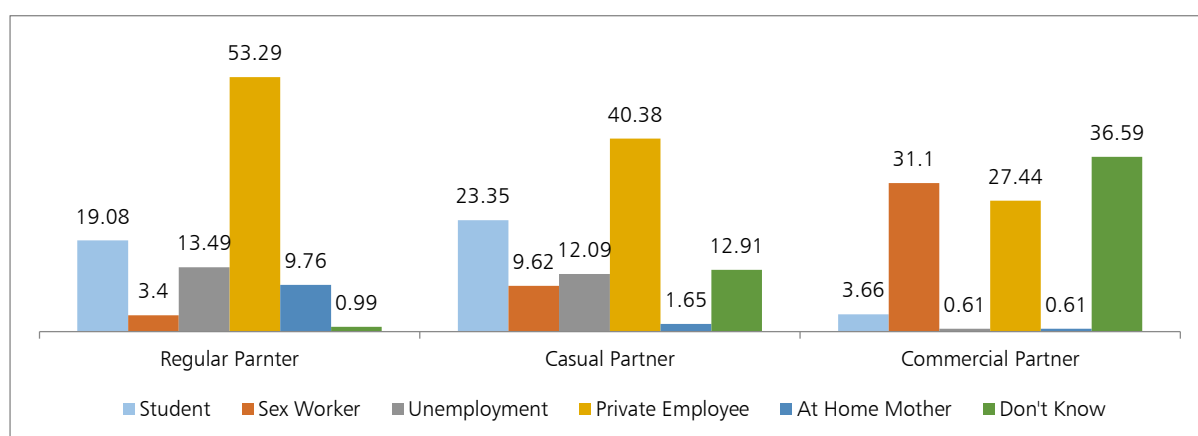
In general, the average age of sex partners mentioned are approximately 25 years old. Based on their gender, the average age of male sex partner is 30.72 years, female sex partner is 24.2 years, while transgender sex partner is 38 years. Therefore, it can be determined from the average age of *crystal meth* users that there is a tendency to have a younger sex partners for both male and female sex partners.

Figure 43: Average Age of Sex Partners Based on City



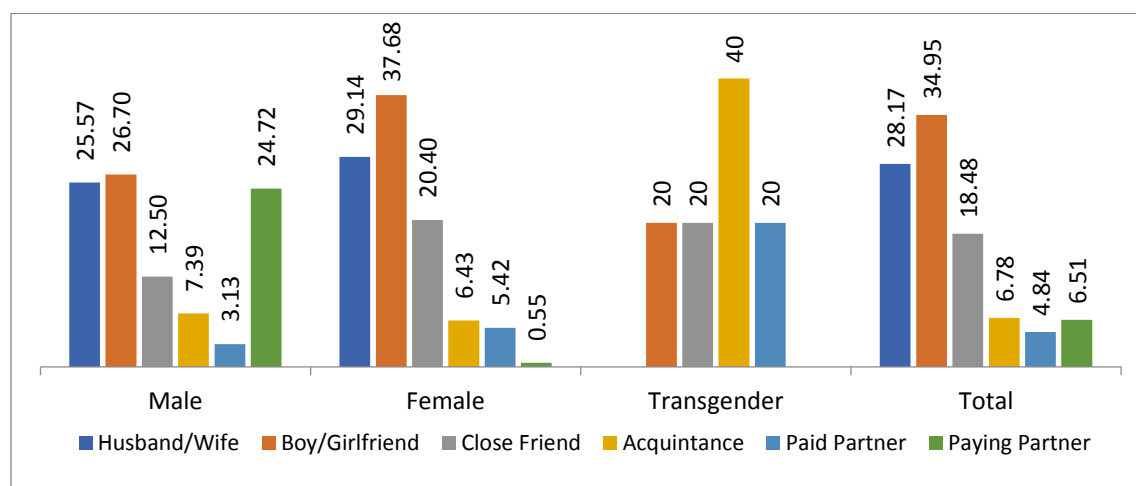
Based on gender, the occupation of male and female sex partners is dominated by private sector employee or entrepreneur. While there are also male, female and transgender sex partners who work as sex workers, although in smaller proportion (0.57%, 10.42% and 20% respectively). Among female sex partners, there are considerably small number of those who are housewives (8.7%). In a much higher proportion, there are many of *crystal meth* users who are not aware of their sex partners' occupation for all male, female and transgender sex partners.

Figure 44: Occupation of Sex Partners Based on Gender



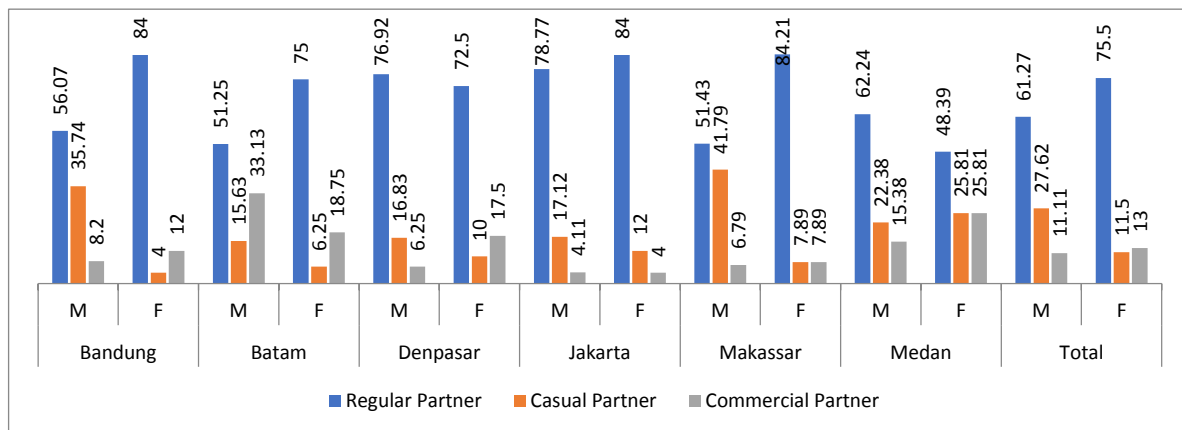
Based on relationship status, in general, sex partner mentioned is a spouse or girl/boyfriend for both male and female sex partner. While for transgender sex partner, many acknowledged them as acquaintances. There is a considerably high proportion of male sex partners who pay (24.7%). In contrast, only 3.1% male sex partners are paid. Among female, there are about 5% of female sex partners who are paid and only about 0.5% pay. While for transgender, 20% of them pay for their sex partners. A notably large proportion based on relationship status and gender is sex partners who are close friends or acquaintances. Almost one fifth of male sex partners are close friends or acquaintance and the proportion on female reaches a quarter and transgender at 60%.

Figure 45: Sexual Relationship Status Based on Gender



Based on relationship status with the mentioned sex partner, therefore, it is possible to develop sex partner categories in accordance to the common types, which are: long-term, casual and commercial partner. The proportion of each sex partner category based on gender is illustrated in the following figure:

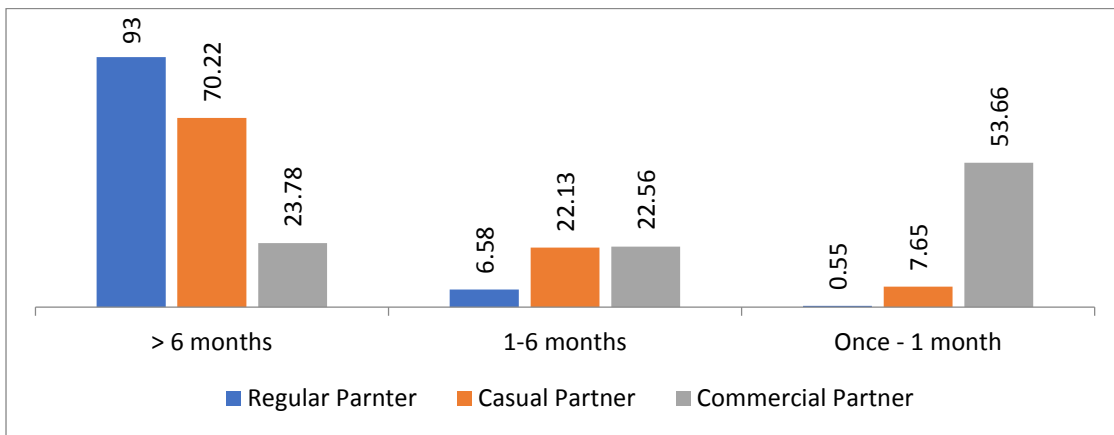
Figure 46: Types of Sex Partner Based on City (of crystal meth Users)



Overall, it is seem that 75% of sex partners of female crystal meth users are their regular partner that can be considered as their husband or boyfriend. While for male crystal meth users, regular partner only covers at about 61%. Casual partner, is numerously mentioned by male users from Bandung (36%), Makassar (41%) and Medan (22%). While the most female users that mentioned casual sex partner are from Medan (25%). About 33% of male users in Batam mentioned commercial sex partner, while at the other cities, there are only 4-12% discovered. On the other hand, more than a quarter of female users reported on their engagement with commercial sex partner. In Batam, one of five users also reported their commercial partner's name in this survey. Based on the category of sex partner, all illustrated variables are selected based on those categories considering the difference in relationship which can provide different information in different situation.

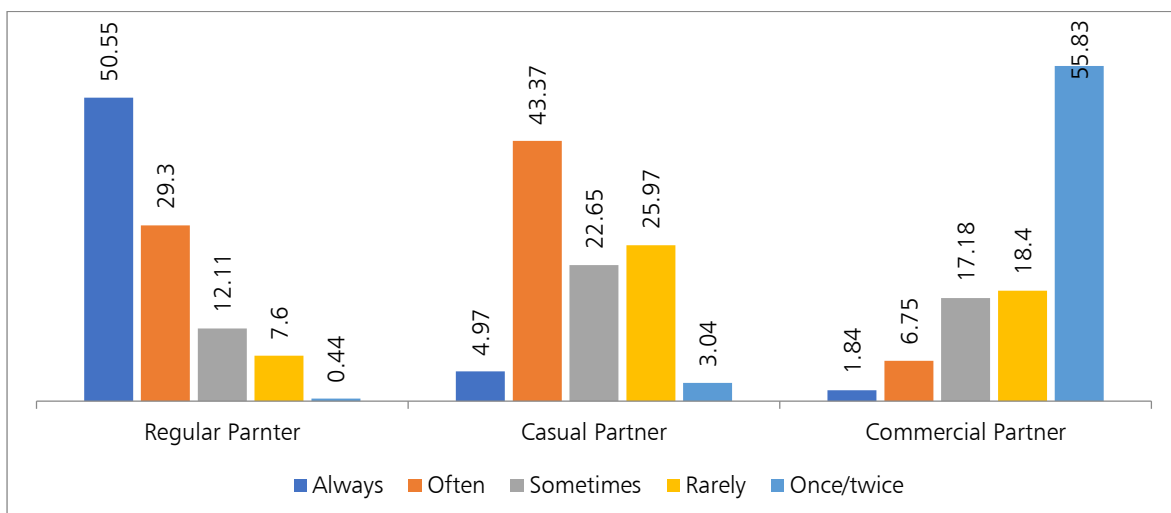
Looking more closely to the length of crystal meth users knowing their sex partners, there is a tendency that the majority of regular sex partners have been known for more than 6 months (93%), followed with significantly less portion of 6.58% of knowing their partner between 1 and 6 months, and less than 1 month (0.55%). Similar proportion is also seen in casual sex partners where partners that have been known for over 6 months reaches 70.22%, 22.13% for those knowing their partners between 1 and 6 months, and 7.65% know their partners for less than 1 month. In the commercial sex partner category, just over half of the group (53.66%) know their partner for less than 1 month, 22.13% know them between 1 and 6 months, and 23.78% have known their partners for over 6 months. This indication shows that intimacy between *crystal meth* users and their sex partners in sexual relationship which involves emotion (husband and wife or boy and girlfriend) tends to require longer time of getting to know each other compared to casual or commercial relationship.

Figure 47: Length of Knowing Sex Partner Based on Types of Partner



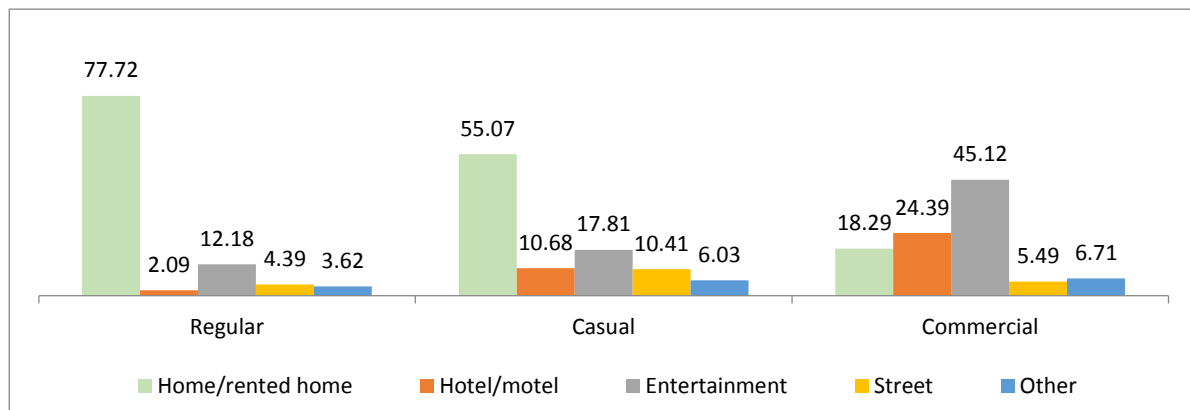
The types of sex partner among crystal meth users essentially cause consequences towards the frequency of meeting. The closer the relationship is, the higher the tendency to continue meeting is. Similarly on the contrary. This can be seen that more than half of *crystal meth* users have reported to always meeting their long-term partner. This, however, does not happen in their other partners. Additionally, more than half of *crystal meth* users have reported that they only met their commercial sex partner once. As for casual sex partner, almost half of *crystal meth* users reported that they often meet their partners. Therefore, it is clearly seen that there is a different pattern in the frequency of meeting based on the type of their sex partners. However, there has been a variation of this meeting frequency based on sex since it has been reported that there are *crystal meth* users who often meet their sex partners (6%), also those who rarely meet their regular sex partner (7.8%).

Figure 48: Frequency of Meeting with Sex Partner Based on Types of Partner



The last meeting location seems to be related to the type of sex partner. The more distance their sex partner is, the more variation of meeting places there are. Home or rented-room are the most popular location to meet with regular sex partner (77.72%), followed with casual sex partner (55.07%). Meanwhile, 45.11% indicated that an entertainment setting and 45.12% at a hotel or motel are the two most popular locations when meeting with commercial sex partners, although home/rented-room was also reported as the last meeting location with commercial sex partner (18.29%).

Figure 49: Last Location of Meeting Sex Partner



The frequency and number of sexual encounters are associated to the types of sex partner. *crystal/ meth* users who have an emotional relationship with their sex partners are likely to have continuous engagement in sexual activities. While for partners that are transactional, sexual engagement tend to be less, at one or two times. The following graph shows continuous sexual activities indicated among regular sex partner at 89.22%, followed with casual sex partners at 53.42% and commercial sex partner at 23.93%. Sex that only happens in one or two occasions are mostly among commercial sex partner at 76.07%, casual sex partner at 46.58% and regular sex partner at 10.78%. Looking more closely to the number of times *crystal/ meth* users engaged in sexual activities in the last one month, on average, it has been reported that the majority of users had 6.1 times of sex with their long-term partner, 2.9 times with their casual partner and 1.9 times with commercial sex partners.

Figure 50: Frequency of Sexual Engagement with Sex Partner Based on Type of Partner

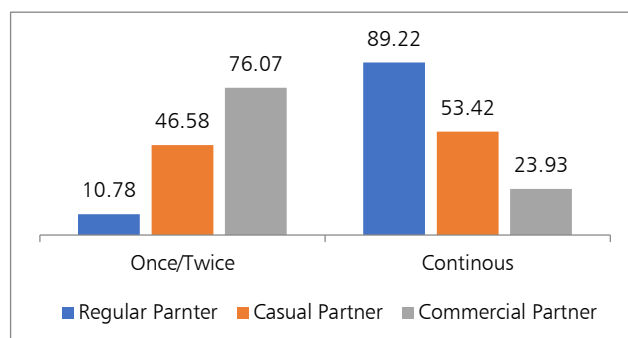
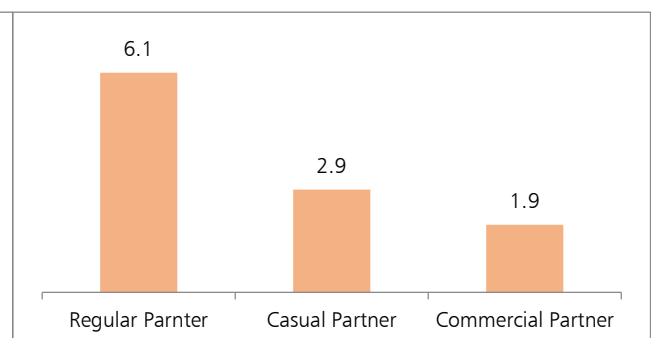
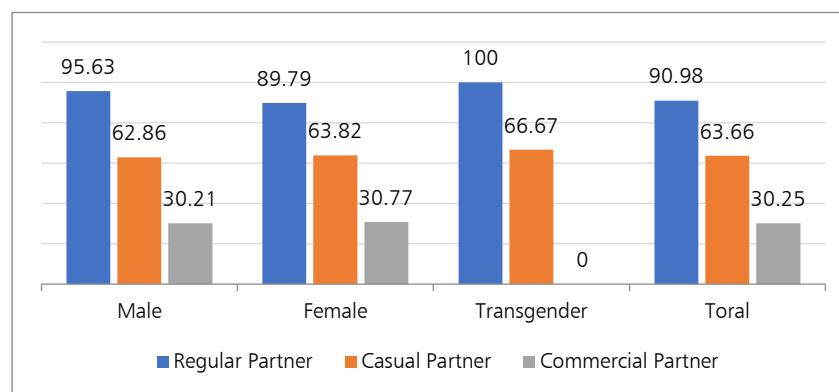


Figure 51: Average Number of Sexual Engagement with Sex Partner Based on Types of Partner



The sexual encounter between *crystal meth* users and their partners is defined by a length of the relationship, which is within the last one year. When the survey was conducted, it was determined whether the *crystal meth* users were still engaging in sexual relationship at the time of the interview. Approximately 30.25% of them were still sexually active with their commercial sex partners, while about twice as much had sexual encounter with casual sex partner (63.66%), and sexual engagement with regular sex partner was defined as much as three times more (90.98%). This result underlines the nature of sexual relationship within the type of sex partners, where the stronger the relationship is, the longer the sexual encounter is. Looking closely on the gender of sex partners (male, female and transgender), it indicates a similar pattern to the continuous sexual relationship based on the types of sex partners.

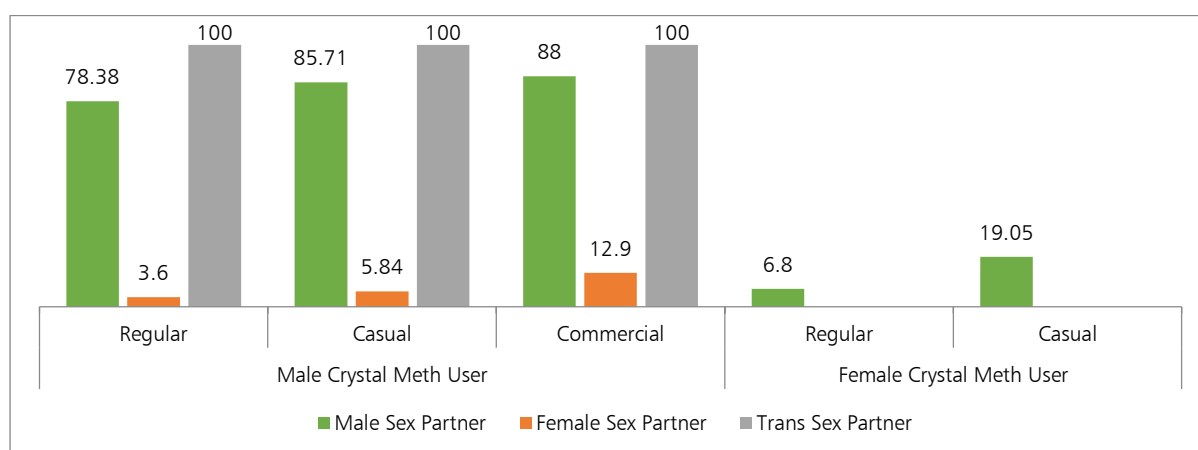
Figure 52: Sexual Relationship in the Last One Year Based on Gender of Sex Partner



Focusing on the types of sexual encounter between *crystal meth* users and their partners, it shows that the majority of male and female heterosexual *crystal meth* users had vaginal sex (99%).

Though, it is also indicated that about 15% and 54% of them engaged in anal and oral sex, respectively. The graph below shows that male *crystal meth* users had anal sex with male, female and transgender sex partner. Most of this happened among male *crystal meth* users and commercial male sex partner (80%), followed with casual male sex partner (85.71%) and long-term male sex partner (78.38%). Despite, this also happened among male *crystal meth* users and female long-term, casual and commercial sex partner. The pattern also shows similarity where anal sex encounter is mostly done with female commercial sex partner. On the other hand, female *crystal meth* users reported their engagement in anal sex with long-term male sex partner as much as 6.8% and 19.05% with casual male sex partner.

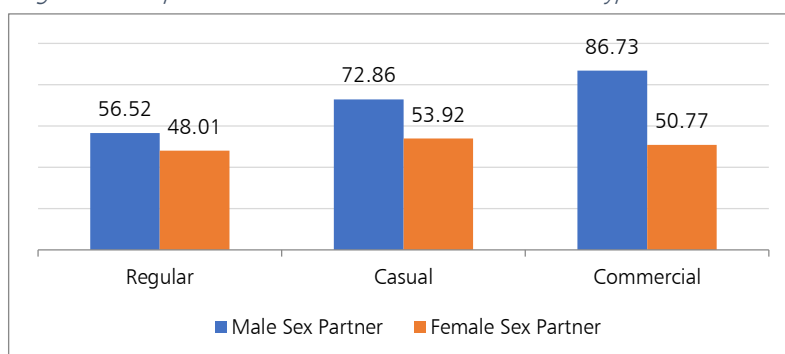
Figure 53: Proportion of Anal Sex Based on Types of Sex Partner and their Gender



The graph below shows respondents engage in oral sex encounter with male partners who are commercial sex partner (86.73%), casual (72.86%) and long-term (56.52%). While oral sex encounter with female partners occurred among casual sex partner (53.92%), commercial (50.77%) and long-term (48.01%). Both anal and oral sex behavior among heterosexual partners shows similarity where this is encountered less with long-term partner either male or female but shown more with more distant sex partner (commercial and casual).

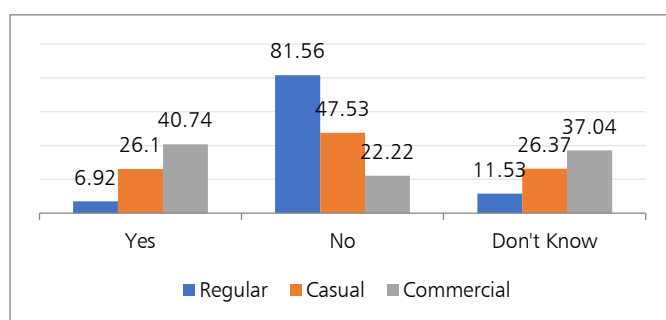
Figure 54: Proportion of Oral Sex Based On Gender and Types of Sex Partners

Two third of *crystal meth* users (65%), both male and female, reported that their sex partners do not engage in sexual activities with other people. While others stated otherwise (22%). The remaining 18% is not aware of their partner's



sexual activities outside their relationship. Looking more closely on the sex partner's gender, it is indicated that 40.74% commercial sex partners are engaged in sexual activities with other people, followed with casual sex partner (26.1%) and 6.91% for regular sex partner. The majority of regular sex partners do not engage in sexual activities with other people (81.56%), while casual sex partners shows 47.53% and the commercial sex partners with 22.22%. This illustrates perception or knowledge of *crystal meth* users about their sex partners becomes less when their relationship is more distant. This is also indicated with the high responses of 'don't know' for their sex partners based on their type of partner.

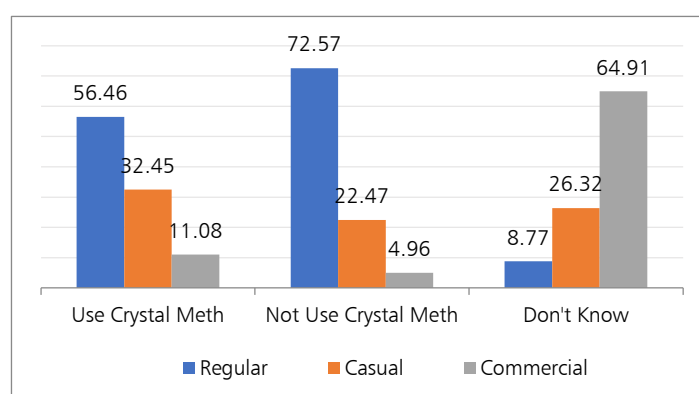
Figure 55: Knowledge on Sex Partners has other sex partner



About 26% of sex partners indicates to also use *crystal meth*, this includes 56.5% of long-term partner, 32.5% casual partner, and 11.1% commercial partner. Further, 7.9% of all sex partners are not identified whether they use *crystal meth* or not, this includes 8.8% long-term

partner, 26.3% casual partner and 64.1% commercial partner. The rest, (65%) has reported that they do not use *crystal meth*.

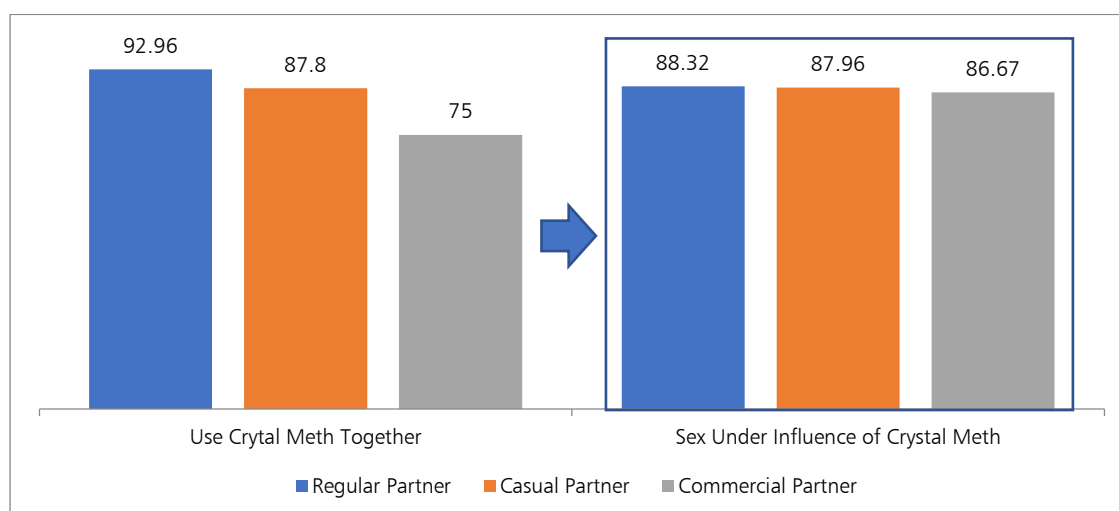
Figure 56: Knowledge on sex partner uses *crystal meth*



Based on partners that use *crystal meth* (26%), the majority of them (89%) have use *crystal meth* together with the respondents with a variety of frequency.

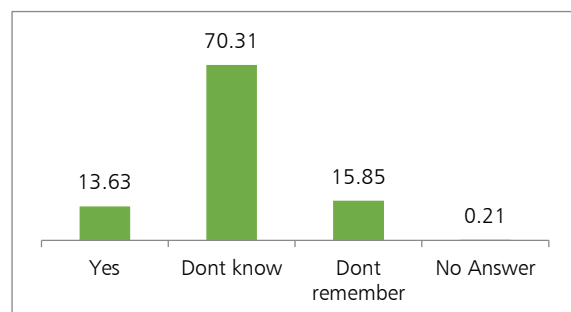
Among this number, based on types of sex partner, 92% long-term partner has used *crystal meth* together. This is followed with 87.8% of casual partner and 75% commercial partner. Meanwhile, looking at the gender of sex partners, 53% are female sex partners, 45% male partners and the rest are transgender sex partners. Additionally, 88% of all sex partners who have used *crystal meth* together with the respondents, reported that they have engaged in sexual activities under the influence of *crystal meth*.

Figure 57: Proportion of *crystal meth* Use (Together) and Sexual Encounter Under the Influence of *crystal meth*



Almost three quarter (70%) of sex partners' HIV status is unknown. Only 13% of them have their HIV status known by the respondents. This illustration shows that HIV awareness is still very low among *crystal meth* users in terms of their engagement in sexual activities.

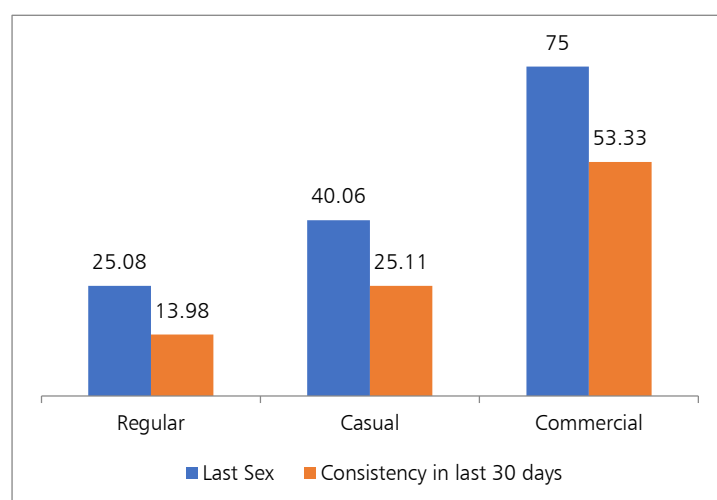
Figure 58: Knowledge on HIV Status of Sex Partners



The previous illustration shows that the majority of *crystal meth* users are engaged in concurrent partnership, that they have more than one partner at the same time. With a considerably high HIV prevalence among them (10%), it is essential to push all efforts to reduce the risk of new HIV infections. One of the preventative measures

that can be done is to use condoms while engaging in sexual activities with a partner with unknown HIV status. However, the following illustration shows a very low rate of awareness to use condom for protection and HIV prevention among *crystal meth* users. In general, condom use in their last sexual activities is only at 34% and their consistency in using condom in the last 30 days is only 17%.

Figure 59: Condom Use Prevalence Based on Types of Sex Partner



Looking closer, condom is used mostly when engaged with commercial sex partners (75%) compared to casual partners at 40% and long-term partner at 25%. Furthermore, consistency in condom use in the last 30 days also indicates similar pattern, where 53% among sex with commercial partner, 25% with casual partner and 14% with regular partner.

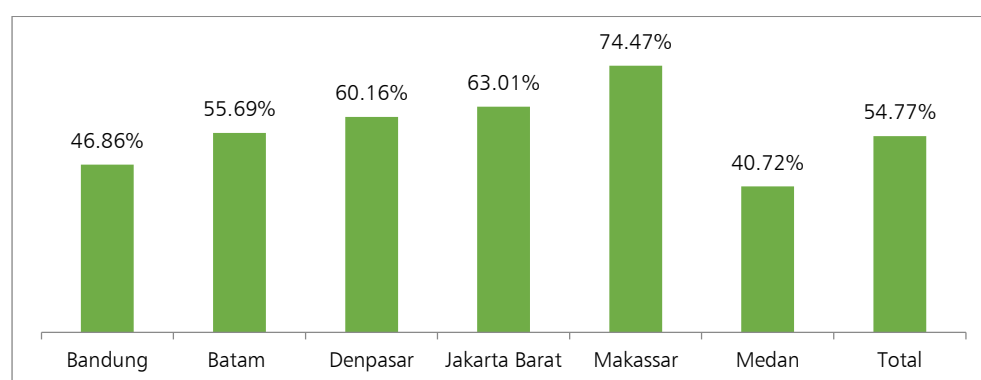
G. Program Exposure

One of the objectives of this survey is to identify current access of *crystal meth* users to health services. This has become essential considering that continuous *crystal meth* use may imply in health consequences. Several topics were assessed in the survey related to health access; among them were, availability and awareness on HIV knowledge, exposure on HIV and other infectious diseases test and service, drug dependency rehabilitation service, outreach and other health facilities. Since the data were gathered through RDS, therefore, all estimations were presented and analyzed through RDSA

with careful consideration on the level of convergence, homophily and the extent of social network for each variable.

Crystal meth users in six cities have adequate knowledge on information about HIV since almost in all cities, at least 54% of *crystal meth* users have received information on HIV. *Crystal meth* users in Makassar had higher exposure to HIV than users from other cities. While in Bandung and Medan, they were less exposed with information on HIV.

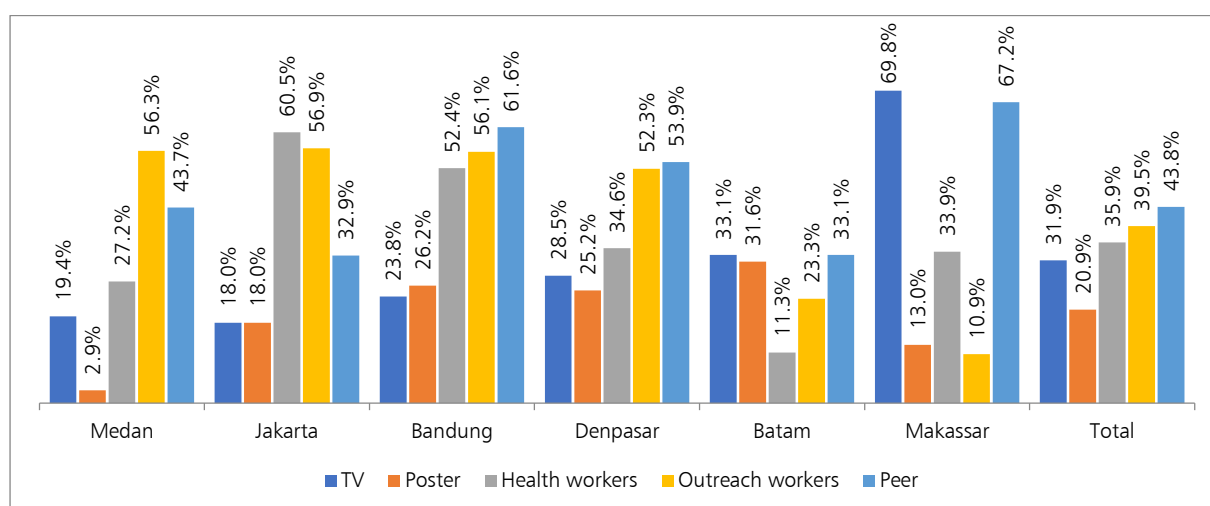
Figure 60: Proportion of *crystal meth* Users Exposed with HIV Information



Source of information on HIV came mostly from friends (43%), peer outreach worker (39%), health officers (35%), television (31%) and posters (20%). There were other sources of information with low proportion including, radio, newspaper, case managers or through edutainment activities. Friends or media became the main source of information, even though information coming from peers or mass media often constitutes myths or general perception that may not accurately reflect the true information. This fact were supported by the fact that their comprehensive knowledge on HIV were low³. Only on third (29%) of *crystal meth* users were able to accurately answer the 5 (five) questions about HIV knowledge.

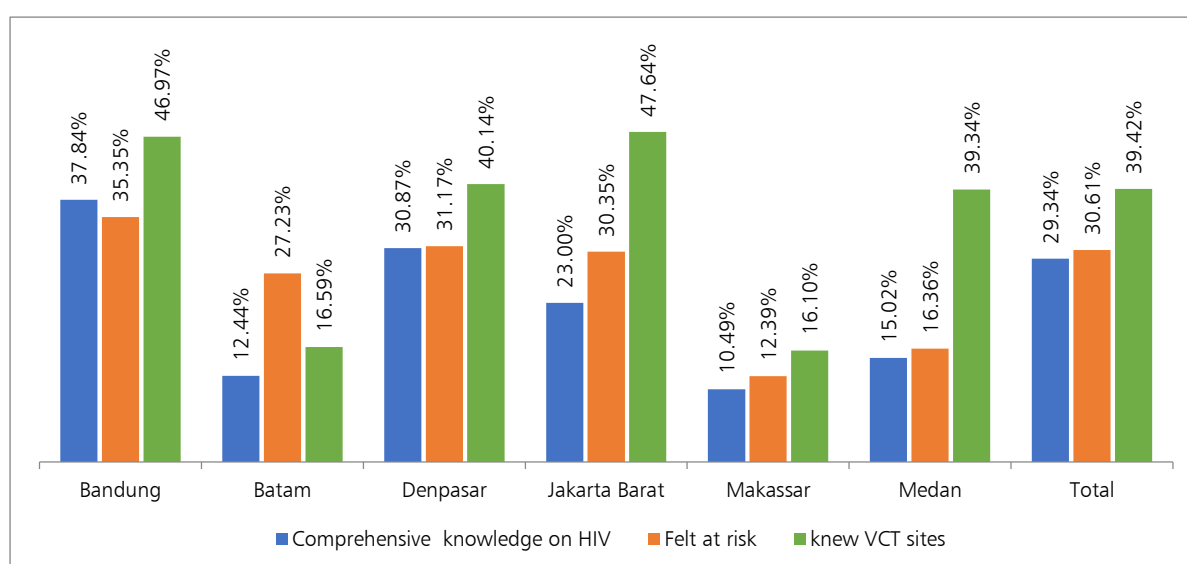
³ Questions of comprehensive of HIV knowledge (5 items) comprise questions about basic information on HIV transmission and myths related to HIV and AIDS. The questions also were used in the previous IBBS for key populations in Indonesia

Figure 61: Main Source of Information for *crystal meth* Users for HIV Information



Looking closer, this result shows that *crystal meth* users in Bandung and Jakarta have the highest comprehension of knowledge on HIV compared to users in other cities with significantly lower at around 10-15%, i.e.: Batam, Makassar and Medan. Having generally low level of HIV awareness, in turn *crystal meth* users consistently had perception that they were at low risk of being infected by HIV.. *crystal meth* users in Makassar and Medan tend to have lower risk perception compared to users in other cities (12% and 16% respectively). On the other hand, higher proportion is shown on their knowledge on locations to get voluntary HIV testing. Almost 40% of all respondents are aware of this, where users from Bandung and Jakarta have more knowledge on this compared with users from other cities.

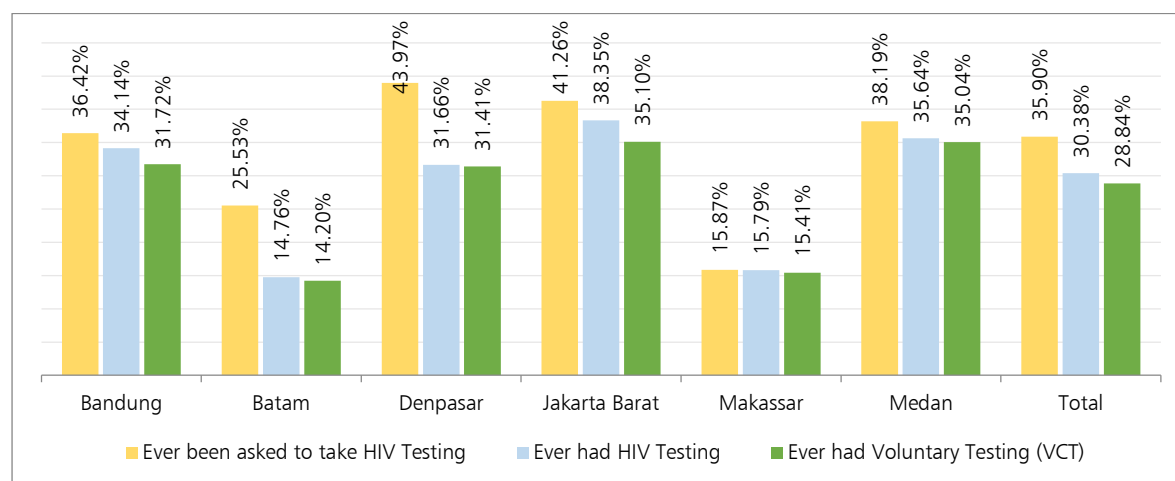
Figure 62: Exposure on HIV Programs



HIV test is the most strategic program in HIV prevention, because by knowing one's HIV status, further measure can be taken; if the result comes back negative, harm and risk reduction can be planned; and if it comes back positive, further treatment can be

provided. Almost on third (35%) of *crystal meth* users report that they have been offered to do HIV test. On overall observation, on 28% of *crystal meth* users have done HIV test voluntarily. *crystal meth* users in Batam and Makassar are less exposed with HIV test service/offer, while those in Jakarta and Denpasar are the most exposed which also led to HIV test conducted. Although still small in proportion, one thing that can be considered from this situation is the probability of people to get tested on HIV when they are offered or exposed with the service ($p=0.00$).

Figure 63: Exposure of Crystal meth Users on HIV Test



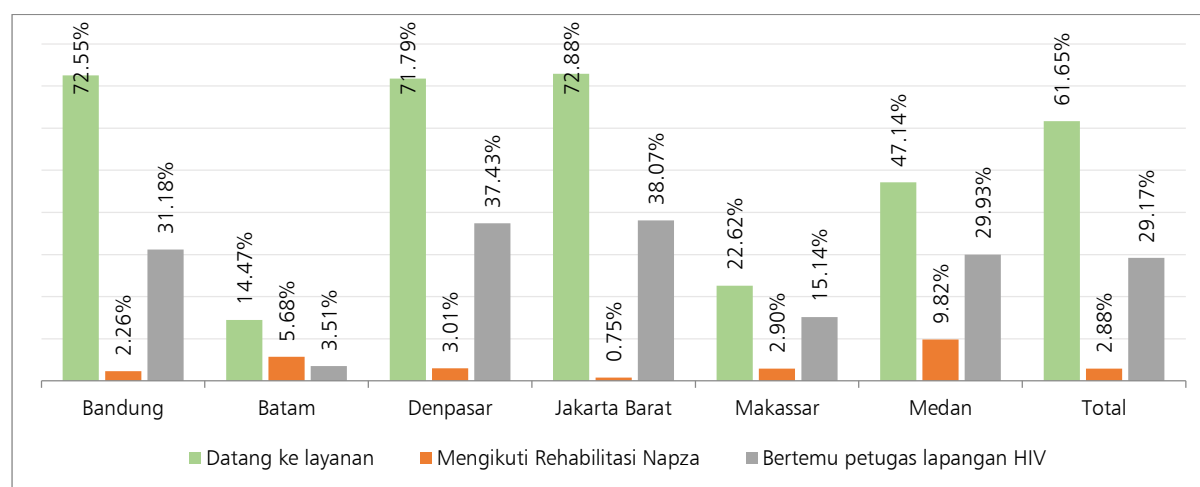
Other than HIV, several other health consequences that are due to *crystal meth* usage including Sexual Transmitted Disease (STD) and Tuberculosis (TB). Overall, 18% of *crystal meth* users reported to have had symptoms of STD. There are more users from Makassar, Bandung and Jakarta that made such report, while only 2% of reports are coming from Denpasar. From those who have had symptoms of STD, only 8% of them carried on with treatment. Therefore, 92% of them did not take any further action. Furthermore, about 11.6% of *crystal meth* users reported to have symptoms of TB, such as coughing for more than two weeks. *Crystal meth* users from Medan have the most TB symptoms (22%), while only 5% from Jakarta.

Table 11: Proportion of crystal meth Users Who Have STD and TB Symptoms

Variable	Bandung	Batam	Denpasar	Jakarta Barat	Makassar	Medan	Total
Have STD Symptoms (%)	26.17%	17.73%	2.19%	22.73%	28.71%	13.16%	18.93%
Have STD Treatment (% have symptoms)	11.28%	3.88%	7.51%	3.80%	4.45%	2.44%	8.14%
Have TB Symptoms (%)	13.57%	11.27%	10.41%	5.12%	8.96%	22.33%	11.60%

In general, about two third (61%) of *crystal meth* users reported to have accessed public health service in their area. But this only comprises 14% of those in Batam and 22.6% in Makassar. These figures are notably lower than those in Bandung, Denpasar and Jakarta (about 70%). Access to drug dependency rehabilitation service in six cities is substantially low at about 3% of *crystal meth* users who have utilized this facility in the last one year. This is an interesting fact considering that *crystal meth* use falls under medium-high category on drug dependency issue rate (see previous section on drug use). In all targeted cities, AIDS intervention and programming are available through outreach to key population such as transgender, people who inject drugs, Men who have Sex with Men (MSM) and female sex workers. Only 30% of *crystal meth* users in all six cities reported to have been reached by NGO workers from those programs. Though, taking into account high scale of programming in Bandung, Jakarta and Denpasar allow more possibilities to expose *crystal meth* users with the current programs and services as a third of *crystal meth* users in these three cities reported to have been reached by outreach officers. On the other hand, cities where AIDS intervention is available in a smaller scale, reduce the probability of higher exposure on HIV prevention among *crystal meth* users, as reported in Batam and Makassar with only 15% of them who have been reach by outreach workers.

Figure 64: Proportion of *crystal meth* Users Exposed with Health Services in the last one year



In relation to barriers on public health services, almost two third *crystal meth* users in all six cities reported that they have almost never used any of the services provided and therefore it is not possible to identify any barriers. While the other one third of the respondents reported that they do not use any of the services because they do not think they are necessary at this moment. The remaining 7% reported to some barriers due to complex procedures, time consumption, travel ability, fear of being known by family members and financial barrier.

Table 12: Barriers on Accessing Health Services

	Bandung	Batam	Denpasar	Jakarta Barat	Makassar	Medan	Total
Never access	72.55%	30.98%	71.94%	73.87%	23.19%	49.78%	63.53%
Don't require	25.86%	45.12%	19.71%	23.96%	74.92%	33.11%	30.52%
Difficult Procedures	0.00%	0.00%	0.23%	0.00%	0.00%	0.97%	0.08%
Fear of arrest	0.00%	0.00%	0.00%	0.00%	0.00%	0.50%	0.01%
Fear/Shame of known by family/friends	0.13%	1.23%	0.00%	0.00%	1.29%	3.48%	0.37%
Financial	0.00%	0.00%	1.13%	0.00%	0.00%	2.97%	0.35%
Time	0.00%	1.17%	5.64%	0.00%	0.33%	5.08%	1.68%
Travel	0.00%	0.00%	0.38%	0.00%	0.26%	1.13%	0.14%
Don't know/remember	0.00%	17.65%	0.51%	0.39%	0.00%	0.00%	1.92%

H. Bivariate Analysis

Condom use in the last sexual engagement and the consistency of using condom during sexual engagement in the last 30 days, using bivariate analysis, show some variations based on the patter of sexual relationship and *crystal meth* users demography (see table 12 & 13). Since it has been collected as panel data; therefore, bivariate analysis using Generalized Estimating Equation (GEE) with binomial logit distribution were used to measure and estimate the association between condom use in the last sexual engagement with the consistency of using condom during sexual engagement in the last 30 days. The estimation reported using Odds Ratio method.

Table 13: Bivariate Analysis on Condom Use in Last Sexual Encounter

	Odds Ratio	[95% Conf. Interval	P>z
Length of Knowing			
More than 6 months	ref		
Between 1 and 6 months	1.39	1.05 1.84	0.02
Meet once (within 1 month)	3.34	.27 4.91	0.00
Type of Partner			
Long-term	ref		
Casual	1.97	1.54 2.52	0.00
Commercial	6.06	4.16 8.82	0.00
Sexual Encounter Frequency			
Once	ref		
Continuous	0.50	0.40 0.63	0.00
Type of Sexual Encounter			
Vaginal	ref		
Non-Vaginal	4.70	3.11 7.09	0.00
Anal	ref		
Non-Anal	0.29	0.21 0.41	0.00

Under Influence of <i>crystal meth</i>					
No	ref				
Yes	0.42	0.24	0.73	0.00	
Gender of Sex Partner					
Male	Ref				
Female	0.60	0.45	0.8	0.00	
Transgender	0.79	0.14	4.22	0.79	
Age of Sex Partner					
< 24 years	ref				
25-34 years	0.94	0.75	1.18	0.63	
35-44 years	1.01	0.74	1.35	0.98	
45 years or more	2.51	1.38	4.56	0.00	
Occupation of Sex Partner					
Student	ref				
Sex Worker	1.07	0.72	1.61	0.73	
Unemployed	0.51	0.35	0.75	0.00	
Employed (Private)	0.55	0.42	0.73	0.00	
Housewives	0.28	0.16	0.49	0.00	
Not Known	1.54	1.03	2.30	0.04	
Gender of <i>crystal meth</i> Users					
Male	ref				
Female	0.73	0.50	1.07	0.11	
Age of <i>crystal meth</i> Users					
< 24 years	ref				
25-34 years	0.83	0.61	1.12	0.24	
35-44 years	0.98	0.70	1.36	0.91	
45 years or more	0.84	0.42	1.67	0.62	
Comprehensive Knowledge on HIV					
No	ref				
Yes	1.72	1.3	2.27	0.00	
HIV Status					
Negative	ref				
Positive	2.52	1.74	3.66	0.00	

The above table shows three groups of variables that illustrate the characteristics of the relationship between *crystal meth* users and their sex partners, demography of sex partners and the characteristics of *crystal meth* users. It is seen that the characteristics of their sexual relationship between *crystal meth* users and their sex partners shows a significant variation towards condom use in their last sexual engagement. It also indicates that those knowing each other for a shorter period of time tend to use condom to one and a half to up to three times more than those who have been in relationship for longer. Similar pattern is seen in sexual relationship with commercial sex partners with possibility of condom use to up to six times more than sexual

engagement with long-term partner. The use of condom in sexual engagement with casual sex partners also is also twice higher than with long-term partners.

Partners who are engaged in more than one sexual encounter is twice less likely to be using condom than those who are only engaged once or twice. The type of sexual encounter also contributes a significant variation where those engaging in anal sex is three times more likely to be using condom compare to those who are not engaged in such encounter. On the other hand, those engaging in vaginal sex are four times less likely to be using condom. Sex partners who are under the influence of *crystal meth* at the time of sexual encounter are two and half times less likely to be using condom than those who are not under the influence of *crystal meth*.

Looking at the characteristics of sex partners' demography, female sex partners are one and half times less likely to be using condom in their last sexual encounter compared to male sex partners. Meanwhile, there is no significant difference among male and transgender sex partners in using condom during their last sexual encounter. Additionally, age also contributes to the variation of behavior towards condom use. Sex partners who are over 45 years old are twice more likely to be using condom in their last sexual encounter compared to those aged under 24 years old. There is no major difference in terms of condom use among those aged under 24 years old, 25-34 years old and 35-44 years old. Furthermore, based on the occupation of the sex partners, compared to those who are students, sex partners who are currently employ or unemployed are twice less likely to use condom in their last sexual encounter. Even among those who are housewives, condom use is four times lower in their last sexual encounter.

In contrast, the demography characteristics of *crystal meth* users, particularly on gender and age do not provide significant variation towards condom use in their last sexual engagement. The variable that provides major variation in condom use is the comprehensive knowledge of HIV and HIV status. *crystal meth* users who have comprehensive knowledge on HIV are almost twice more likely to use condoms than those with less knowledge. Additionally, *crystal meth* users who are HIV positive are two and half times more likely to use condom compared to those who are HIV negative.

Table 14: Bivariate Analysis on Consistent Condom Use in Sexual Encounter in Last 30 Days

	Odds Ratio	[95% Conf. Interval		P>z
Length of Knowing				
More than 6 months				
Between 1 and 6 months	1.98	1.33	2.94	0.0010
Meet once (within 1 month)	2.89	1.41	5.92	0.0040
Type of Partner				
Long-term				
Casual	2.24	1.58	3.17	0.0000

Commercial	6.47	3.52	11.86	0.0000
Sexual Encounter Frequency				
Once				
Continuous	0.31	0.21	0.44	0.0000
Type of Sexual Encounter				
Vaginal				
Non-Vaginal	4.57	2.73	7.66	0.0000
Anal				
Non-Anal	0.34	0.21	0.53	0.0000
Under Influence of <i>crystal meth</i>				
No				
Yes	.455	0.20	1.03	0.059
Gender of Sex Partner				
Male				
Female	0.60	0.40	0.88	0.01
Transgender				
Age of Sex Partner				
< 24 years	Ref			
25-34 years	1.08	0.76	1.53	0.68
35-44 years	1.19	0.76	1.86	0.45
45 years or more	4.82	2.31	10.05	0.00
Occupation of Sex Partner				
Student				
Sex Worker	0.95	0.50	1.77	0.8640
Unemployed	0.52	0.29	0.91	0.0210
Employed (Private)	0.65	0.44	0.97	0.0330
Housewives	0.26	0.11	0.60	0.0020
Not Known	1.23	0.58	2.60	0.5920
Gender of <i>crystal meth</i> Users				
Male	Ref			
Female	0.76	0.45	1.27	0.30
Age of <i>crystal meth</i> Users				
< 24 years				
25-34 years	0.85	0.55	1.31	0.46
35-44 years	1.50	0.97	2.31	0.07
45 years or more	1.14	0.47	2.76	0.76
Comprehensive Knowledge on HIV				
No	ref			
Yes	2.23	1.56	3.20	0.0000
HIV Status				
Negative	ref			
Positive	3.58	2.35	5.48	0.0000

The association of consistent condom use in the last 30 days and the relationship characteristics, sex partner' demography and *crystal meth* users' demography are similar to the pattern of condom use in the last sexual encounter. All relationship characteristics (length of knowing each other, type of partner and frequency of sexual encounter) have significant association with consistent condom use in the last 30 days. Similarly, for type of sexual encounter (anal or vaginal) also has equal association. However, sexual encounter under the influence of *crystal meth* creates a variation to a marginal association ($p=0.59$) where condom use in the last sexual encounter shows significant association.

Looking at demography characteristics, the main variation is seen among sex partners aged 35-44 years old, where in their last sexual encounter, condom use was not significant, has changed to become significant in consistent condom use in the last 30 days. Condom use when engaged with female sex partners is still significantly lower than male sex partners (OR: 0.6, $p=0.01$). While based on occupation, only housewives who are consistent to be associated significantly with less possibility on using condom compared to students (OR: 0.26, $p<0.5$). While other occupations remain in the same pattern in terms of consistent condom use in the last 30 days.

In terms of *crystal meth* users' demography characteristics, comprehensive knowledge on HIV and HIV status are still producing significant association with consistent condom use in the last 30 days. The odds of both variables resulted in even bigger figures compared to condom use in the last sexual encounter (OR: 2.23, $p=0.00$ & OR: 3.58, $p=0.00$, respectively). Gender and age categories are equally not significant in consistent condom use.

I. DISCUSSION

Comprehensive biological and behavioral survey on HIV, Syphilis, Hepatitis B and C infections among *crystal meth* Users in six cities in Indonesia is the first survey that is targeted towards *crystal meth* Users in Indonesia. Many of the previous surveys and studies have focused mainly on people who inject drugs that are known to have very high risk of HIV infection due to the nature of needles and syringes sharing behavior. Despite, several studies conducted in other countries to assess the association between *crystal meth* use and HIV infection have been highlighted more due to the increasing risk of HIV infection among *crystal meth* users whether it be through injecting *crystal meth* or engaging in sexual activities under the influence of *crystal meth* that may reduce the possibility of using condom (Molitor 1998; Semple, Patterson, & Grant., 2002; Buchacz et al 2005; Wong, et al, 2005. Shoptaw & Reback 2006; Salamanca et al, 2014; Vu, Maher, & Zablotska, 2015; Pan et al, 2015; Liao, et al 2014; Liu et al, 2017). Therefore, it is essential to conduct a survey on behavior that is at risk of HIV infection among *crystal meth* users in Indonesia considering that this type of drugs has

the second largest population of users after marijuana (BNN, 2015) which may also contribute to the risk of new HIV infection. The aims of this survey are: 1). to identify the prevalence of HIV, Syphilis, Hepatitis B and C infection among *crystal meth* users, 2). to identify several behaviors of *crystal meth* users and sexual behaviors that may increase the risk of HIV infection, and 3). to assess the extent of utilizing and accessing public health services, including public health, HIV and drug dependency services. This survey shows HIV prevalence among *crystal meth* users at 10.15% with a range of 2% up to 18% in six cities where the survey is conducted. This prevalence is lower than among people who inject drugs (PWID) in 2015 at about 28%, MSM at about 25% and transgender at about 24%, but higher than among direct FSW at 7.8% (STBP 2015, Ministry of Health). Meanwhile, Syphilis prevalence is shown at 1.35%, similar to the prevalence among PWID in 2015, but lower than other key population groups. HCV prevalence among *crystal meth* users is indicated at 14.23%, which is significantly lower than the estimated prevalence on HCV among PWID at 82-84% (Aceijas & Rhodes, 2007). When compared with a study among *crystal meth* users in general population in China, HIV prevalence is at a range of 0.2%, HCV at 3.7% and Syphilis at 9.6% (Liao et al., 2014); therefore, it is clear that both HIV and HCV prevalence is higher in this study, but lower for Syphilis. The study conducted in Indonesia also shows lower HIV prevalence compared HIV prevalence among MSM in other countries at a range of 24% up to 86% (Shoptaw & Reback, 2006).

The high prevalence on HIV and HCV among *crystal meth* users is mainly contributed among PWID who have recently shifted drug of choice, where the prevalence for both had already been high, and therefore this has created a sub-population that contributes significantly to the high prevalence of both HIV and HCV. For instance, Jakarta and Bandung are two cities with the highest HIV prevalence compared to other locations, each contributes 18% and 12% respectively. The high HIV prevalence among *crystal meth* users in Jakarta and Bandung may be affected by the number of PWID who have recently shifted to using *crystal meth* who are involved in this study (27% and 34% respectively). The shift pattern from heroin to methamphetamine is also reflected at the global situation that there is a tendency of increasing *crystal meth* usage as heroin supply has continuously decreasing over years (Fairbairn et al, 2007; Horyniak et al, 2015; Mehta et al, 2014; Wright et al, 2017). For cities with *crystal meth* users population where there have been less PWID, the HIV and HCV prevalence does not reach as high as in Bandung and Jakarta, i.e.: Makassar and Batam.

Setting aside the reality that this HIV prevalence may be affected and contributed by PWID, where the fact that 65% of *crystal meth* Users who are HIV positive are those who injected drugs previously, this situation is emerging and require immediate attention among AIDS program developers as it also indicates mixtures of sexual behavior and drug use between key population groups (Strathdee & Stockman 2010). It is also becoming more essential because this study has shown that *crystal meth* users

also have variety of behavior including PWID, MSM, Transgender, Sex Workers and partners of Sex Workers. With these backgrounds, program development and scale-up towards *crystal meth* users are crucially important as the mixing behaviors have created a bridge for HIV, HCV, HBV and STD infections among non PWID.

Another risk factor on HIV infection among *crystal meth* users (in other countries) is through injecting *crystal meth* (Werb et al, 2013; Al-Tayyib et al, 2017; Colfax et al, 2010). This survey shows that the practice of injecting *crystal meth* is still considerably low in proportion at only about 2% from all six cities where this survey is conducted. However, anticipation and preventative measures are required to be done as early as possible learning from the experience of injecting *crystal meth* use in Vancouver and Denver that contributed to the high incidence of new HIV infections for many years (Werb et al, 2013; Al-Tayyib et al, 2017).

Another risk that may contribute towards new HIV infection is through sexual transmission due to practicing unsafe sexual engagement, or without a condom. This is an important aspect for consideration as *crystal meth* users have the tendency to have more than one sex partner at the same time. This survey identifies about a quarter (26%) of *crystal meth* users are engaged with more than one sex partner. This situation, known as concurrent partnership can create rapid HIV infections (Morris & Kretzchmar 1995). The types of sex partners among *crystal meth* users include long-term, casual and commercial partners which also vary in terms of condom use behavior. From the sexual interaction aspect, consistent condom use is still very low, particularly when engaged with partners that are known for a longer time, meeting frequently and developing emotional relationship. This inconsistency of condom use is also associated with the influence of *crystal meth* while engaging in sexual activities. Though, the result of this survey has been predicted in previous studies (Forrest et al, 2010; Ludwig-Baron et al, 2014; Gouse et al, 2016; Semple et al, 2004).

Other than identifying risk factors, this survey also identifies protection factors on HIV infection or drug dependency issues. Bivariate analysis result shows that *crystal meth* users who have comprehensive knowledge on HIV have higher possibility in using condom in their last sexual encounter or in the last 30 days. However, only one third of *crystal meth* users have acquired this comprehensive knowledge, and even lower in several cities such as Batam, Makassar and Medan where AIDS intervention programming is not as upscale as in other three cities. Therefore, it is important to include scale-up of programming in order to reach out to more *crystal meth* users considering the fact that outreach officers and health workers are the main source of information for them, particularly when it comes to HIV and AIDS.

Another protection factor that is identified is HIV status. There is a tendency among HIV positive *crystal meth* users to be more consistent in using condom in their last sexual encounter or in the last 30 days. This implies that HIV test, or knowing their HIV status

can play an important role to promote HIV prevention. This is firmly possible as this survey indicates that *crystal meth* users who have been offered or asked to get HIV test will eventually volunteer themselves to get tested.

Looking at the drug use factor, social support that is developed from *crystal meth* users' social network can also create positive impact for them to attempt to stop using *crystal meth* (Quinn, Stooove, & Dietze, 2016). On the other hand, their social network may also create more risk if it only consists of other fellow *crystal meth* users; however, this can also provide social support as in general, the nature of drug use is a group behavior that one can initiate an end by doing it together. This is indicated by those who have larger social network have a tendency to have attempted to stop using *crystal meth* even without any influence or initiation from other users.

Another important aspect that needs to be taken into account is the very low rate on accessing health services, including basic health services, HIV and drug treatment services. About 65% of *crystal meth* users have reported that they have never used any of the services. Moreover, there is only a matter of 2.88 % of them have attempted to access rehabilitation service in the last two years. This situation requires urgent attention as *crystal meth* usage falls under medium to high issue, according to ASSIST. Cumming et al. (2016) states that factors that prevent *crystal meth* users to access addiction services other than not (yet) having the desire to seek help, are stigma, attempting on stop using alone and confidentiality issue. Similarly, from those who have had symptoms on STD, only 8% of them attempted to seek treatment. One of the main reasons reported on barriers on accessing health services is the perception of not (yet) having to require such services. Financial limitation, fear of arrest or being identified, or time limitation do not seem to be dominant factors for them to not utilizing the available services.

The development of intervention that is aimed towards increasing the quality of health due to *crystal meth* use needs to also consider the findings on serology estimation and information related to *crystal meth* users' behaviors. Although, currently health interventions focus more on PWID, the fact that non-PWID also bear as high risk as they need to be taken into account. Other than developing intervention among non-PWID, this study also emphasizes particularly on sex partners of *crystal meth* users, considering that they are affected by the risky behaviors, particularly on sexual behaviors.

SECTION 3: CONCLUSION AND RECOMMENDATION

A. CONCLUSION

In general, this survey presents adequate information to answer the needs in understanding the situation related to *meth* use and HIV in Indonesia. Since this is a biological and behavioral survey that is conducted for the first time among *meth users* in relation to HIV, the data shall be considered as initial data to assess the trend of this issue in the future. The result of the survey is concluded as following:

1. Biological Result

- HIV and HCV prevalence is 10.15% and 14.23% respectively. Disaggregated data based on experience in using injected drug showed that the HIV prevalence among crystal meth users is 34.99% for those who have experience in injecting drugs, while only 3.39% for those who do not have experience in using injected drugs. Similarly, the HCV prevalence among people who injecting drugs are far higher than who do not use injected drugs (62.04% and 3.13%, respectively).
- Syphilis and HBV prevalence is 1.3% and 2.27%. Positive results are found higher among *Sabu* users with experience in injecting drugs (82% and 83%).
- Based on gender, all positive results are found more on male. However, among female users, proportions of HIV and HBV test for posiive result are found to be higher than proportions of positive result for syphilis and HCV test.
- HIV and HCV positive are found more among those who are 35-44 years old (56% and 55%). On the other hand, HBV and Syphilis are reported more among 25-34 years old (52% and 66%).

2. Crystal Meth Use

- Average age of crystal meth users is 27.3 years old, with predominantly senior high school graduates. The majority of occupation is private sector employee and they are mostly unmarried.
- Based on according to WHO-ASSIST's scale, 92.5% crystal meth users in six cities reported to have medium level of problematic use and 7% at high level problematic use.
- Crystal meth users are not only use crystal meth, but also use other types of drugs including cannabis, hallucinogen, sedative, opiate and alcohol in comabincation with crystal meth.
- In general, one fifth of crystal meth users have had experience in injecting drugs, but only 2% has injected the drug.
- The length of crystal meth use in six cities is reported on average at 30 months, with a range of 13.7 months to 64 months, where male is likely to use crystal meth longer than female.

- The frequency of crystal meth use is on average 6 days per month, with a variation of 2 days to 17 days with a maximum dose per day at approximately 0.4 gram (0.3 – 0.7 grams).
- Mixing crystal meth with other drugs, particularly alcohol, marijuana and anti-anxiety drugs has been reported by 28% of crystal meth users. Only about 4.8% have used crystal meth in combination with sexual enhancement drugs.
- One of three crystal meth users has been arrested by the police, and 2 out of 5 have been arrested in drug possession cases.
- One of two crystal meth users who arrested due to drug possession underwent to trial. Those who reported experience with imprisonment reported that they have used crystal meth while in prison. About 2% reported to have injected crystal meth while in prison.

4. Social Network of *Sabu* Users

- Social Network of male crystal meth users is likely to be larger with small number of female members. While for female, although dominated by male, the number of female members are more.
- Social network members are roughly at the same age, almost half of the members are coming from the same hometown and the majority of them have known each other for over one year, and more than half of them add to the pot when buying crystal meth.
- In relation to the social network of crystal meth users, each member of the network reported that he/she knows other 8 users. They usually use crystal meth in a group consisted of 2-3 friends.
- Friends in the neighborhood were mostly reported as their confidence and their partners in using drugs. Family members and relatives were also reported as partners in using drugs.
- About one third of the network members provide full social support (instrumental, financial and emotional support) to each crystal meth user. While a quarter of them do not give support at all.
- Less than one third of the members have initiated and influenced them to stop using crystal meth.
- Controlling age and gender of the network members, members who have provide financial and emotional support were more likely to initiate and influence to stop using drugs.
- On the other hand, types of relationship (sex partner, friend in the neighborhood, or acquaintance) were less likely to initiate and influence to stop using crystal meth.

5. Sexual Network

- Despite two third of crystal meth users are unmarried, the majority of them (84%) are sexually active in the last one year.

- Both male and female crystal meth users have variety of sexual behaviors, which are heterosexual, homosexual and bisexual.
- All vaginal, oral and anal sex have been reported by both male and female crystal meth users.
- Types of sex partner illustrate the level of intimacy and types of different sexual encounters.
- Types of sex partner are also vary, including long-term, casual or commercial, and having more than one partner at the same time (concurrent).
- One third of the sex partners are also crystal meth users, and sexual activities are often done under the influence of crystal meth.
- Condom use in the last sexual encounter is 34% and its consistency in the last 30 days is only 17%. The lowest proportion is seen when engaging sexual activities with regular sex partners, while the highest is with commercial partners.

6. Exposure to Services

- About three quarter of crystal meth users do not have comprehensive knowledge on HIV.
- Only one third crystal meth users have met outreach workers from HIV program in the past year. Therefore only one third of crystal meth users have known VCT sites and eventually undergo to the test..
- About 3% of crystal meth users have accessed drug treatment services in the last one year. The main reason of not accessing services is that crystal meth users do not feel that require such services.

B. RECOMMENDATION

1. Policy and Program

- The program should reach out crystal meth users through existing programs as there are part of key populations in HIV programs (MSM, PWID, Transgender, Sex Workers and Client of Sex Workers).
- Although the practice of injecting crystal meth is still relatively low, this requires early anticipation and prevention through observing and monitoring crystal meth use behavior, also considering that HIV and HCV positive crystal meth users are those who have had experience as PWID.
- One third of crystal meth users are HIV and HCV positive, and the prevalence of HBV and Syphilis is higher among the others, it is very important to include crystal meth users into the current HIV Prevention Programs (harm reduction and sexual transmission prevention program)
- Being offered on getting HIV test has influenced crystal meth users to get tested, therefore HIV prevention needs to be consistently promoted. Scale-up of HIV test among crystal meth users as many of their sexual network are those at risk, this shall be done intensively to increase coverage of HIV testing and eventually will support the goal of 90-90-90.

2. Research

- Adopting crystal meth section component into the National Integrated Biological and Behavioral Survey (IBBS) for all key population groups (PWID, Transgender, FSW, MSM and High-Risk Men) and youth to achieve bigger picture of crystal meth use in the country.
- Inclusion of social and sexual network component into the IBBS would enable to identify contextual factors of HIV transmission among the key populations due to incidence of HIV infection may occur within these groups. This information will allow the development of targeted prevention messages.
- Conducting qualitative research on crystal meth use using life course perspective in order to develop contextual strategies in delivering services for crystal meth users considering different patterns of crystal meth use based on age and gender categories.

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