An assessment of alcohol consumption, substance use and sexual risk behavior among men who have sex with men (MSM) in Yangon and Mandalay Myanmar

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A Thesis Submitted in Partial Fulfillment of the Requirements
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การประเมินการดื่มเครื่องดื่มแอลกอฮอล์ การใช้สารเสพติด และพฤติกรรมเสี่ยงทางเพศในกลุ่มชายที่มีเพศสัมพันธ์กับชายในย่างกุ้งและมัณฑะเลย์ ประเทศเมียนมา

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Thesis Title	An assessment of alcohol consumption, substance use and sexual risk behavior among men who have sex with men (MSM) in Yangon and Mandalay Myanmar
By	Mr. Kyaw Min Htut
Field of Study	Public Health
Thesis Advisor	Associate Professor CHITLADA AREESANTICHAI, Ph.D.

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จอว์ มิน ทัต : การประเมินการดื่มเครื่องดื่มแอลกอฮอล์ การใช้สารเสพติด
และพฤติกรรมเสี่ยงทางเพศในกลุ่มชายที่มีเพศสัมพันธ์กับชายในย่างกุ้งและมัณฑะเลย์ ประเทศเมียนมา. (An assessment of alcohol consumption, substance use and sexual risk behavior among men who have sex with men (MSM) in Yangon and Mandalay Myanmar) อ.ที่ปรึกษาหลัก : จิตรลดา อารีย์สันติชัย

การดื่มเครื่องดื่มแอลกอฮอล์และการใช้สารเสพติดมีความสัมพันธ์กับพฤติกรรมเสี่ยงทางเพศในประเทศพม่ายังขาดการศึกษาวิจัยเกี่ยวกับการดื่มเครื่องดื่มแอลกอฮอล์การใช้สารเสพติดและพฤติกรรมเสี่ยงทางเพศในกลุ่มผู้ชายที่มีเพศสัมพันธ์กับผู้ชาย (ชายรักชาย) และการวิจัยนี้ศึกษารูปแบบการดื่มเครื่องดื่มแอลกอฮอล์ การใช้สารเสพติดและพฤติกรรมเสี่ยงทางเพศในกลุ่มผู้ชายที่มีเพศสัมพันธ์กับผู้ชาย (ชายรักชาย) โดยใช้แบบคัดกรอง ASSIST กลุ่มตัวอย่างชายรักชายทั้งหมด ๒๕๖คน อายุเฉลี่ย ๒๗.๓±๗.๗ปี อายุของกลุ่มชายรักชายแบ่งออกเป็น ๑๕-๒๔ปีและ≥๒๕ปีเป็นกลุ่มชายรักชายกลุ่มชายรักชายวัยผู้ใหญ่ ผลการวิจัยพบว่ามากกว่าร้อยละ ๓๙ เป็นกลุ่มชายรักชายวัยรุ่นและ ร้อยละ ๕๘.๙ เป็นกลุ่มชายรักชายวัยผู้ใหญ่ ที่เรียกว่า “apwint”(ชายรักชายที่เปิดเผย) ชายรักชายประมาณร้อยละ ๖๑ จากทั้งสองกลุ่มนี้ ดื่มเครื่องดื่มแอลกอฮอล์ในเดือนที่ผ่านมาและร้อยละ๖๘ ดื่มเครื่องดื่มแอลกอฮอล์ภายในสามเดือนที่ผ่านมา ในช่วงเวลาที่แตกต่างกันเห็นว่าในกลุ่ม“thange”(คู่ของชายรักชาย)มีประสบการณ์การดื่มเครื่องดื่มแอลกอฮอล์อย่างหนักมากกว่ากลุ่ม“apwint”(ชายรักชายที่เปิดเผย)และ“apone”(ชายรักชายที่ซ่อนไว้)และความสัมพันธ์อย่างมีนัยสำคัญทางสถิติที่ (p<๐.๐๕) มากกว่าร้อยละ ๔๗ ในกลุ่มชายรักชายวัยรุ่นและร้อยละ ๓๐.๘ ในชายรักชายวัยผู้ใหญ่ใช้สารเสพติดชนิดใดในชีวิต กลุ่มชายรักชายวัยรุ่นร้อยละ ๑๓-๑๙ และกลุ่มชายรักชายวัยผู้ใหญ่ร้อยละ ๕-๘ใช้สารเสพติดชนิดใดชนิดหนึ่งในช่วงเวลาอื่น ในกลุ่มผู้ใช้สารเสพติด พบว่าร้อยละ ๙๐.๙ ของวัยรุ่นและร้อยละ๘๗.๕ ในชายรักชายผู้ใหญ่มีความเสี่ยงปานกลางจากการ ใช้เมทแอมเฟตามีน ประมาณร้อยละ ๗๖ ของวัยรุ่นและร้อยละ ๖๕.๒ ของวัยผู้ใหญ่มีความเสี่ยงต่ำจากการดื่มเครื่องแอลกอฮอล์ในกลุ่มชายรักชายที่เปิดเผยมีสัดส่วนที่สูงที่มีคู่นอนมากกว่า๑คนเมื่อเทียบกับชายรักชายในกลุ่มอื่น อย่างมีนัยสำคัญ (p<๐.๐๐๑)ในช่วงเวลาที่ต่างกัน ร้อยละ๓๓.๓ถึง๓๙.๑ในกลุ่มชายรักชายวัยรุ่นและร้อยละ๑๗.๙ถึง๒๔.๖ของกลุ่มชายรักชายผู้ใหญ่ไม่เคย/ไม่ได้ใช้ถุงยางอนามัยทุกครั้งกับคู่นอนชั่วคราวการศึกษานี้เสนอแนวทางนโยบายเกี่ยวกับการควบคุมการดื่มเครื่องดื่มแอลกอฮอล์ในกลุ่มชายรักชายที่มีประสบการณ์การดื่มเครื่องดื่มแอลกอฮอล์อย่างหนักรวมทั้งควรเร่งให้มีมาตรการลดความเสี่ยงการมีเพศสัมพันธ์ในกลุ่มชายรักชาย

สาขาวิชา	สาธารณสุขศาสตร์	ลายมือชื่อนิสิต .....
ปีการศึกษา	2562	ลายมือชื่อ อ.ที่ปรึกษาหลัก .....

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Kyaw Min Htut : An assessment of alcohol consumption, substance use and sexual risk behavior among men who have sex with men (MSM) in Yangon and Mandalay Myanmar. Advisor: Assoc. Prof. CHITLADA AREESANTICHAI, Ph.D.

Alcohol consumption and substance use are associated with sexual risk behaviors. In Myanmar, lack of study was reported on alcohol consumption, substance use and sexual risk behavior among men who have sex with men (MSM) and current study was conducted to identify patterns of alcohol consumption, substance use and sexual risk behavior among MSM in Yangon and Mandalay, Myanmar. The Alcohol, Smoking and Substance Involvement Screening Test (ASSIST) was also used. A total of 256 MSM included in the study and their mean age was 27.3±7.7 years. Age of MSM was categorized as 15-24 years as young MSM and ≥25 years as adult MSM. Over 39% of young MSM and 58.9% of adult MSM were “apwint” (open type). About 61% of MSM from both groups had consumed alcohol within one month and about 68% consumed alcohol within three months. At different time periods, higher proportions of Thange (partner of MSM) had experienced of binge drinking than apwint (open type) and apone (hidden type) and the association was statistically significant (p<0.05). Over 47% of young MSM and 30.8% of adult MSM used any kind of substance in their life time. Nearly 13-19% of young MSM and 5-8% of adult MSM used any kind of substance at other time periods. Among substance users, 91% of young and 87.5% of adult MSM had moderate risk from methamphetamine use. About 76% of young and 65.2% of adult MSM had low risk from alcohol consumption. Significantly higher proportion of open type MSM had more than one sexual partner than other types (p<0.001). At different time periods, 33.3% to 39.1% of young MSM and 17.9% to 24.6% of adult MSM never/inconsistently used condom with non-permanent partners. It is suggested to develop and implement alcohol control policy for MSM since many of them had binge drinking. Intervention to reduce unsafe sexual practices should be done.

Field of Study:	Public Health	Student's Signature .....
Academic Year:	2019	Advisor's Signature .....

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Kyaw Min Htut

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Chapter 1

Introduction

1.1 Background and rationale

Globally, alcohol is widely consumed as a beverage and for recreation and socialization. Alcohol consumption pattern varies widely across the regions and ranging from daily heavy drinking to occasional hazardous drinking which resulted in significant public health problems (Ennett et al., 2016; World_Health_Organization, 2018). Excessive alcohol use and chronic alcohol binging are associated with high morbidity and mortality (Stockings et al., 2016). About 40% of global population aged over 15 years had consumed alcohol while 2.3 billion of them are current drinkers. Increasing consumption of total alcohol per capita was seen from 5.5 litres of pure alcohol in 2005 to 6.4 litres in 2016 among the population over 15 years in 2016. Among different regions of the world, the highest levels of per capita alcohol consumption are observed in the WHO European Region. Worldwide, 44.8% of total recorded alcohol is consumed in the form of spirits. The second most consumed type of beverage is beer (34.3%) followed by wine (11.7%) (World_Health_Organization, 2018).

Similar to global trend, alcohol per capita consumption in litres of pure alcohol increased from 3.5 litres in 2010 to 4.5 in 2016 in South-East Asia Region (SEAR). Among countries in SEAR, total alcohol per capita consumption among population over 15 years varied widely from 0 litre in Bangladesh and 8.3 litres in Thailand. Types of alcoholic beverage varied among countries in South-East Asia region. Spirit was most common in Democratic People's Republic of Korea (97%), India (92%), Sri Lanka (85%), Philippines (72%), Thailand (69%), Myanmar (68%), Bhutan (50%), Laos (50%). Similarly, wine was the commonest type in Indonesia (76%), Nepal (49%), and Maldives (37%) while beer was common in Brunei Darussalam (100%), Vietnam (91%), Cambodia (88%), Singapore (70%), Timor-Leste (68%), and Malaysia (61%) (World_Health_Organization, 2018). Increased per capita consumption was also seen in Myanmar with 2.9 litres in 2010 to 4.8 litres in 2016 which was 3rd highest in SEAR.

Most common type of alcoholic beverage in Myanmar was spirits which was consumed by 68% of drinkers (World_Health_Organization, 2018).

Previous studies have highlighted that hazardous alcohol drinking was common among men who have sex with men (MSM) ranging from 14% to 52% and it was also related with unsafe sexual behaviours (Davis, Kaighobadi, Stephenson, Rael, & Sandfort, 2016; Herrera et al., 2016; Liu et al., 2016; Santos et al., 2018). Furthermore, significant association was noted between hazardous alcohol drinking and sexually transmitted infections including HIV. Recent study done in US in 2018 among MSM has indicated that higher levels of alcohol use were significantly associated with physical/sexual and HIV-related intimate partner violence (IPV) victimization. IPV was measured using the IPV-GBM scale and 54% experienced at least one incidence of IPV in the past 12 months (Davis et al., 2016). According to a study done in China, 14.4% of MSM reported hazardous drinking and 16.8% reported binge drinking. Hazardous or binge drinkers were associated with various sexual risk behaviours such as have multiple partnerships, pay for sex, and have condomless insertive anal intercourse. Importantly, MSM who reported binge or hazardous drinking were more likely to be HIV-infected (Liu et al., 2016).

In a study in Peru, 45% of MSM and TW had an alcohol use disorder. Higher incidence of condomless anal intercourse was seen among participants with alcohol use disorder (AUD). Additionally, significant association was detected between anal sex in two or more risky venues and AUD positive. However, AUD positive was not associated with either condomless anal intercourse or recent STI/HIV infection (Herrera et al., 2016). Another study in US has documented the heavy alcohol use patterns and correlates in a diverse sample of MSM using respondent-driven sampling. It was found out that prevalence of RDS adjusted weekly drinking was 24.9% and weekly binge drinking was 19.3%. Independent correlates of hazardous alcohol consumption were identified as being moderately or extremely interested in reducing alcohol use; ever receiving alcohol treatment; using ecstasy; reporting syphilis diagnosis; and having more than 5 male partners (Santos et al., 2018).

Globally, an estimated number of 271 million people, or 5.5 per cent of the global population aged 15–64, had used drugs in 2017, while 35 million people are suffering

from drug use disorders. According to UNODC Annual Report 2017, 585,000 of global population died due to drug use. In addition, the rising trend in the use of drug behaviour among global population was discovered by comparing to 2009 and 2017 data (UNODC, 2019b).

Worldwide, the most widely used drug is cannabis while 188 million of people worldwide had used the drug. Moreover, about 54 million of global population had used opioids during 2016. Among them, heroin and opium use was seen in 29.2 million people which was 50 per cent higher than the 2016 estimate. Methamphetamine use is rising across several regions and South-East Asia emerges as the world's fastest-growing methamphetamine market. Since the later part of 2000s, pattern of drug use has been shifted from opiates to methamphetamine in South-East Asia regions (UNODC, 2019b).

There are varieties of effects which will be resulted from drug use. The effects are short and long term, direct and indirect effects. Short term effect will lead to adverse consequences on cardiovascular system, neurological system, mental health, gastrointestinal system and so on. Moreover, long term drug use could lead to addition and development of other diseases like hepatitis, HIV, cancer, heart and lungs diseases etc. There were adverse consequences of substance use including health, social problems and crime. In addition, opioid use disorders were responsible for most of the drug-use related deaths and disabilities.

Regarding substance use in Myanmar, the official data on the number of drug users was not available. However, estimate of 300,000 to 400,000 was reported including 75,000 people who inject drugs (UNAIDS, 2015b). The prevalence of problematic drug use is considered to be high with the main health consequences including high rates of HIV, Hepatitis B and C transmission and overdose due to unsafe injection practices (National_AIDS_Program, 2015)

Substance use has been increased considerably among men who have sex with men. Poly-drug use behavior among MSM was detected according to the literature review (Balán et al., 2018; Daskalopoulou et al., 2014). In a previous study, about 30% of MSM used one drug, followed by nearly 20% used two drugs and 16% used three, 10% used four, and 21% used five or more recreational durgs (Daskalopoulou et al., 2014).

There was an association between higher frequency of drug use and more sexual partners as well as more condomless anal sex according to the information of previous studies (Balán et al., 2018; Daskalopoulou et al., 2014).

According to the local terminology in Myanmar, there were three common subgroups of MSM such as Apwint or open type, Apone or hidden type and Tha Nge. Apwint or open MSM are defined as "individuals born biological male but who openly express themselves femininely by dress and/or social interactions". Apone or hidden MSM are defined as "individuals born biological males who may also want to express themselves femininely but may not disclose this behavior to all segments of their social networks". Tha Nge are defined as "having a masculine outward appearance but have sex with men" (National_AIDS_Program, 2019).

Sexual risk behaviours among MSM have been documented in previous studies. According to a systematic review of studies done in high-income countries, increasing trend of sexual risk behaviours was seen among MSM such as condomless anal sex, condomless anal sex with casual partners and main partners, condomless anal sex with partners of unknown or discordant HIV status. Similarly, sexual risk behaviors among MSM were reported in many Asian countries. A study conducted in Malaysia identified that having multiple sexual partners was common and about 60% of them had unprotected sex within six months (Koh, Kanagalingam, Tai, & Kamarulzaman, 2013). Likewise, in Vietnam, 70% among 1695 MSM had multiple sexual multiple sexual partnerships in the last 6 months. More than half of them also reported penetrative sex with concurrent partners within last 6 months (García et al., 2016). All these sexual risk behaviours were crucial for further HIV transmission among MSM population.

In Myanmar, HIV is concentrated among key affected population like men who have sex with men whereas HIV prevalence among MSM was over 10% (UNAIDS, 2015a). Alcohol drinking was common among MSM like other general men. Although previous studies have focused on the sexual risk behaviours among MSM, very scarce or limited studies were noted regarding hazardous alcohol drinking, substance use and sexual risk behaviours among MSM. Similarly in Myanmar, very little or no known study was reported on alcohol consumption, substance use and sexual risk behaviours among MSM. Therefore, current study will be conducted to identify pattern related to alcohol

consumption, substance use and sexual risk behaviours among men who have sex with men.

1.2 Research question

What are the patterns of alcohol consumption, substance use and sexual risk behaviours among men who have sex with men?

1.3 Research objectives

1.3.1 General objective

To identify pattern related to alcohol consumption, substance use and sexual risk behaviours among men who have sex with men

1.3.2 Specific objectives

(1) To identify pattern related to alcohol consumption among men who have sex with men in terms of type, amount and frequency

(2) To determine the pattern of substance use among men who have sex with men

(3) To assess the sexual risk behaviours among men who have sex with men

1.4 Definitions

Type of MSM:

According to the local terminology in Myanmar, three groups of MSM will be included in the study: Apwint or open type, Apone or hidden type and Tha Nge (National_AIDS_Program, 2019).

Apwint or open MSM are defined as individuals born biological male but who openly express themselves femininely by dress and/or social interactions.

Apone or hidden MSM are defined as individuals born biological males who may also want to express themselves femininely but may not disclose this behaviour to all segments of their social networks.

Tha Nge are defined as having a masculine outward appearance but have sex with men".

Type of alcohol consumed by MSM will include Beer, Wine and Spirits (Vodka, Whisky, Rum, Gin, Brandy and Tequila)

Beer is an undistilled alcoholic drink which made from the sugar in malted barley (A type of grain). It contains 4-8% of alcohol.

Wine is one of the undistilled alcoholic beverages that made from the sugar in grapes. There is a range of 14-16% of alcohol in the content of wine.

Vodka is a distilled spirit made by distilling fragmented grain like wheat or corn. It has an alcoholic content of 40%-95%.

Whisky is a type of distilled alcoholic beverage which derives from fermenting a combination of different grains including barley, malted barley, rye, corn and wheat. Its alcoholic content is ranging from 36-50%.

Rum is a distilled alcoholic drink made by fermenting sugarcane juice or by fermenting molasses or sugarcane juice, one of the byproducts of sugarcane. The content of alcohol included in Rum is 36-50%.

Gin is a type of distilled spirit that is prepared from juniper berries. It has an alcoholic content of 36-50%.

Brandy is a kind of distilled alcoholic beverage which is made by distilling wine. The content of alcohol included in Rum is 30-60%.

Tequila is a distilled alcoholic drink which derives from Blue Agave plant. It has an alcoholic content of 35-55%.

Binge drinking

Binge drinking can be defined as 5 or more drinks in a sitting for men and 4 or more drinks in a sitting for women.

Standard drink

Standard drink will be calculated as:

The number of standard drinks = volume of container in litres multiplied by the percentage of alcohol volume multiplied by 0.789 (the specific gravity volume of ethyl alcohol)

For instance: One can of beer 330 ml of full strength 5% alcohol by volume

0.33 x 5 x 0.789 =1.31 standard drinks

: One glass of wine 140 ml of full strength 12% alcohol by volume

0.14 x 12 x 0.789 = 1.32 standard drinks

Screening tool will be used by applying alcohol, smoking and substance involvement screening test “ASSIST”. It includes 8 questions focusing on 10 different substances. Total scores for each substance will be categorized into “low risk” for three or less, “moderate risk” for between 4 and 26, and “high risk” for 27 and higher.

Type of substance use among MSM included Tobacco products (Nicotine), Cannabis (marijuana, pot, hash, etc.), cocaine (Coke, crack, etc.), Amphetamine, Methamphetamine (meth), Inhalants, sedative or sleeping pills, hallucinogens and opioids (heroin, morphine)

Nicotine (Stimulant): Chemical in cigarettes, cigars, chewing tobacco that gets a person addicted.

Cannabis is also known as marijuana and it is derived from the plant Cannabis sativa. It can be used by the method of smoking.

Marijuana is a dried leaf and subtending leaf and stems of the female cannabis plants. It is usually smoked in cigarettes or pipes.

Harsh is depressant and made from the roots of the marijuana plant. It has strong effect than Marijuana. It is smoked in cigarettes or pipes.

Cocaine is an addictive stimulant drug made from the leaves of the coca plant. Cocaine can be used in different ways through the nose by snorting, smoking and directly into the blood stream by injecting or rubbing it into gums above the teeth. Similarly, Coke is also known as cocaine.

Crack is a form of cocaine that has been prepared like a rock crystal that people smoke.

Amphetamine is usually taken in pill form. Many are prescribed for legitimate illness. It can cause increasing in blood pressure, enhanced mood and alertness. It can be used in the way of smoking, sniffing or injection.

Methamphetamine (meth) is a synthetic crystal like drug that is smoked through a glass pipe and it can cause aggression, disorientation, rapid heart rate.

Ice is a stimulant and it can be smokeable form of pure meth.

Inhalants are the toxic substances which are inhaled to reach a quick high. Commonly used of inhalants are glue, petrol and paint thinner (oil-based paint)

Sedative or sleeping pills are sedative drugs which may lead to depress the nervous system of the brain. Generally, these pills are usually used to sleep better.

Hallucinogens are a kind of drugs that can lead to hallucinations that may result in misleading of one's reality. Hallucinogens can be found in some plants and mushrooms. These substances can be administered by different methods like swallowing or inhalation.

Opioids are the depressants and narcotic used to control pain.

Heroin (Depressant): is considered a narcotic or pain killer and is highly addictive. It can be used with the method of smoking, sniffing or injection.

Morphine (Depressant): is a narcotic used to control pain and it leads to drowsy, and it can be used via injection.

Codeine is a kind of depressant and it is a narcotic pain killer produced from morphine. It is weaker than morphine and used in cough syrups and pain relievers

Condomless anal intercourse is defined as having an anal intercourse without using condom.

Anal intercourse is a form of sexual intercourse in which the penis is inserted into the anus.

Multiple sexual partner is defined as individuals having more than one sexual partner those who are permanent or non-permanent partners.

Family is defined as a basic social unit consisting of parents and their child/children closely related by blood, considered as a group.

Friend is a person who you know well and who you like a lot, but who is usually not a member of your family.

Working environment can be described as the surrounding of physical conditions like office, beauty parlour that can be related to working procedures.

Acceptance can be defined as the status of a person as a MSM could be acceptable by his parents, guardians and siblings as well as the colleagues from his work place.

1.5 Conceptual framework

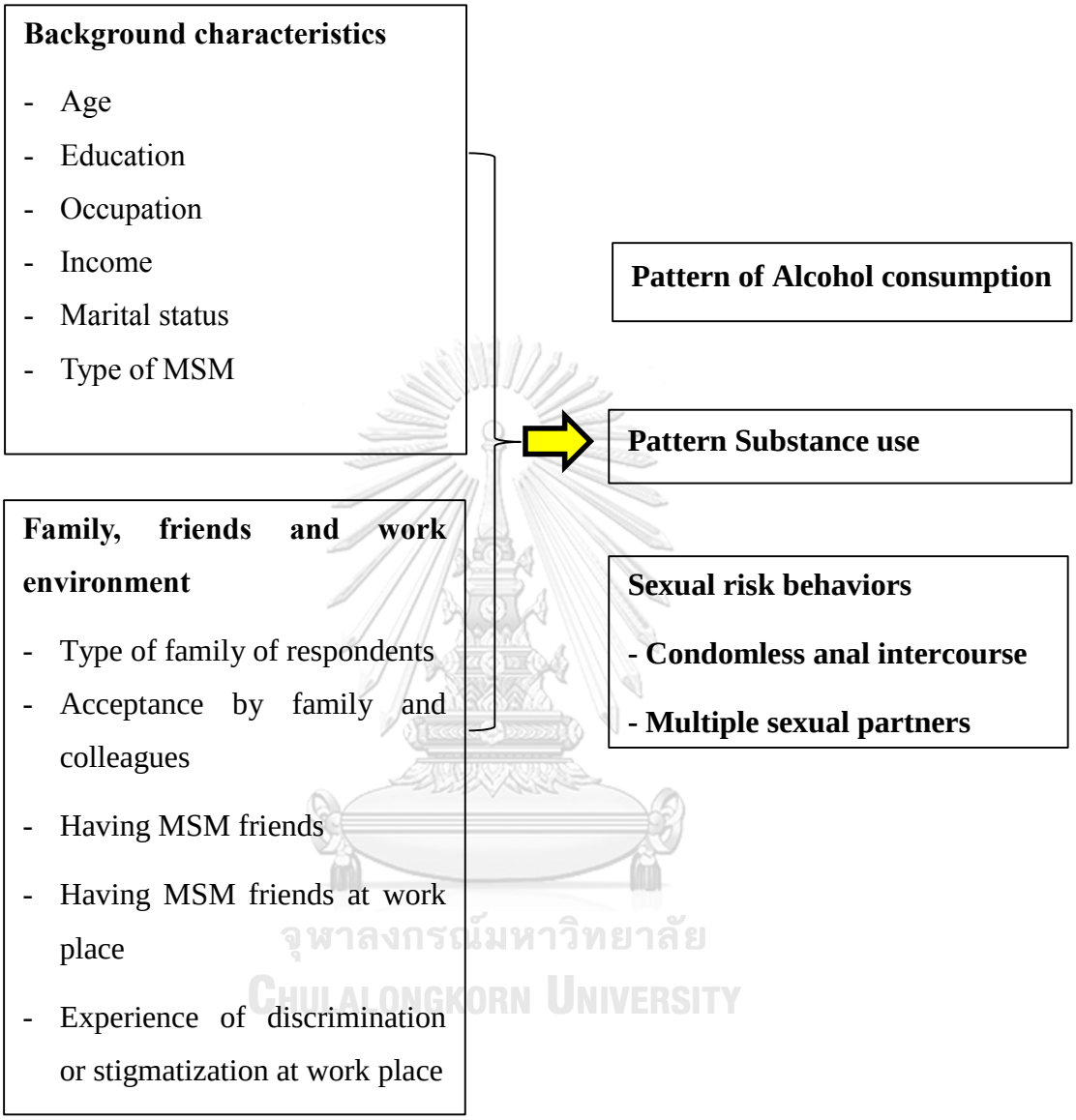

Figure 1 Conceptual framework

Chapter 2

Literature Review

This session will describe the review and discussion about the previous studies on men who have sex with men, alcohol consumption, substance use and sexual behaviors.

2.1 Situation of Substance use

2.2 Substance use and consequences

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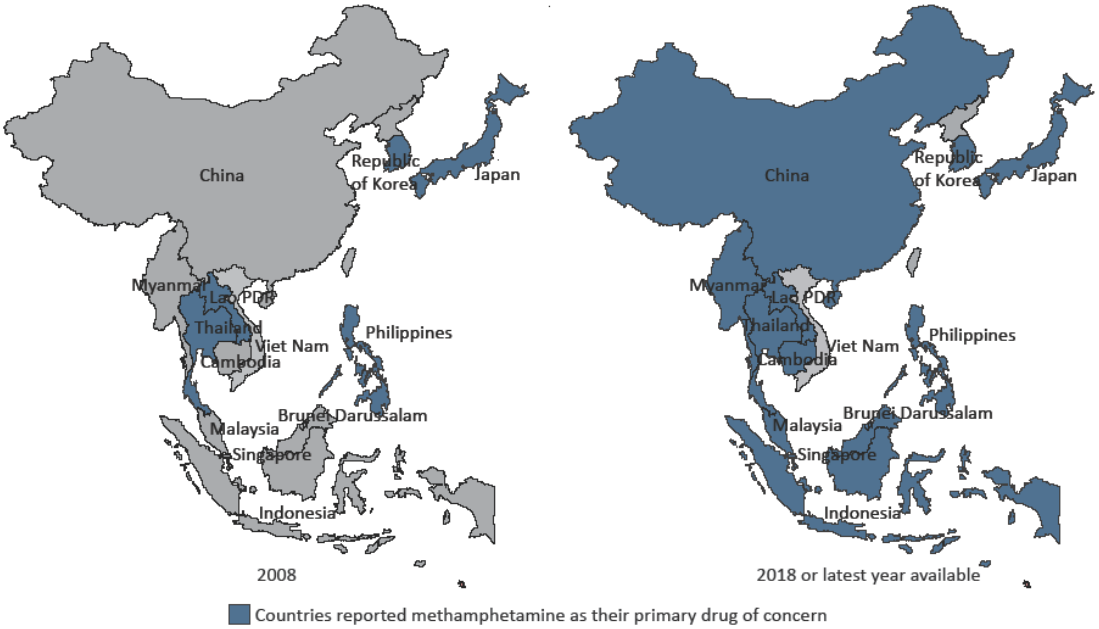
2.1 Situation of Substance use

According to World Drug Report 2019, an estimated 5.5 per cent of the global population aged 15–64 (271 million) had used drugs in the previous year. It was described that the number of people who use drugs in 2017 is 30 per cent higher than it was in 2009 (UNODC, 2019b).

Cannabis remains as the most widely used drug worldwide while an estimated 188 million people have used the drug in the previous year. The rising trend in the prevalence of cannabis use was seen in the Americas and Asia. According to 2017 data, 53.4 million people worldwide had used opioids in the previous year which was 56 per

cent higher than the estimate for 2016. Among them, heroin and opium use was seen in 29.2 million people which was 50 per cent higher than the 2016 estimate (UNODC, 2019a).

Map 1. Countries reporting methamphetamine as their primary drug of concern, 2008 and 2018 (or the latest year available)[6]



*Note: Data for the Democratic Republic of Korea, Hong Kong, China, Macau, China, Mongolia and Taiwan Province of China are not available.
Source: Drug Abuse Information Network for Asia and the Pacific (DAINAP); Official Communication with Japan and the Republic of Korea, January 2019.

Figure 2 Countries reporting methamphetamine as their primary drug of concern

Methamphetamine use causes rising concern across several regions and South-East Asia emerges as the world's fastest-growing methamphetamine market. There are also signs of an increase in crystalline methamphetamine use in South-East Asia. In these regions, pattern of drug use has been shifted from opiates to methamphetamine since the later part of 2000s. All countries in the region except Viet Nam reported methamphetamine as their primary drug of concern in 2018 as shown in the Figure (UNODC, 2019b).

Recreational drugs are chemical substances people take for pleasurable experience, enjoyment, or leisure purposes, rather than for medical reasons. Recreational drugs may be legal such as nicotine and alcohol, illegal, and controlled such as benzodiazepines. But most drugs are illegal and its use may result in the consequences of breaking the

law. Though people used recreational drugs to get pleasure, it can lead to addiction, health and social problems and crime. Furthermore, all these drugs have some kind of effect on mental health (National_Association_for_Mental_Health, 2016; UNODC, 2019b).

Regarding substance use in Myanmar, the official data on the number of drug users was not available. However, estimate of 300,000 to 400,000 was reported including 75,000 people who inject drugs (UNAIDS, 2015b). The prevalence of problematic drug use is considered to be high with the main health consequences including high rates of HIV, Hepatitis B and C transmission and overdose due to unsafe injection practices (National_AIDS_Program, 2015)

Previous studies have reported the prevalence and patterns of drug use among different population groups such as university/college students, primary care patients and key population like MSM (Gupta, Sarpal, Kumar, Kaur, & Arora, 2013; John et al., 2018; Schilling et al., 2017; Zhao et al., 2017). Prevalence of substance use was about 53% among college students as described in a study in India. Alcohol was most commonly used substance followed by smokers, tobacco chewers and cannabis. Nearly half of them were using substances on daily basis with the reasons of release from psychological stress and easy availability. It was also stated that substance use was more common among male students regardless of their age, religion, parental education, occupation and socio-economic status (Gupta et al., 2013).

A study done in US identified the prevalence and correlates of multiple substance use disorders among more than 2000 primary care patients. More than one-third of participants had at least one substance use disorder of drug, tobacco or alcohol in last one year. Multiple substance use disorders were seen in 13.8% of respondents, of which 7.4% had 2 substance use disorders and 6.4% had 3 or more substance use disorders. Multiple substance use disorders were reported among 93.8% of heroin users, 90.2% of cocaine/crack users, 73.8% of cannabis users. Having multiple substance use disorders were associated with being male, lower educated and unemployed. In addition, it was associated with greater odds of moderate/severe tobacco/alcohol use disorder. The study suggested the primary care physicians to be aware of multiple

substance use disorders and highlighted the need of intervention addressing the problem at primary care setting (John et al., 2018).

Zhao P. et al identified the recreational drug use among Chinese MSM and transgender by conducting national online cross sectional study. Ever use of recreational drug was reported by over 77% of MSM while over 21% of MSM used poppers in last one year. MSM who used popper had engaged in sexual risk behaviors with 2.6 times higher chance to engage in group sex in the last three months, 1.8 times higher risk of engaging in commercial sex in the last 12 months, and 2.1 times higher chance of using gay mobile apps to seek sexual partners in the last six months. Authors stated the possibility of bias due to the nature of online survey and self-reported behaviors that might had some limitations (Zhao et al., 2017).

In conclusion, cannabis was the most widely used drug globally while crystalline methamphetamine was using increasingly among many regions. Similarly, cannabis was being used widely among the people who use drugs; however, methamphetamine and opioid use was common in Asia. Furthermore, substance use was seen in different groups of population including students, primary care patients and MSM.

2.2 Substance use and consequences

An estimation of 5.5% of the global population aged 15-64 years (271 million) had used drugs according to World Drug Report 2019. Moreover, the number of people who use drugs in 2017 is 30% higher than that of 2009. Globally, about 188 million of people have used the drug in the previous year and the most widely used drug is Cannabis. An estimated number of global population who had used opioids was 53.4 million during 2017. Such kind of population was 56% higher than the estimate for 2016. Among them, heroin and opium use was seen in 29.2 million people which was 50% higher than the 2016 estimate (UNODC, 2019b).

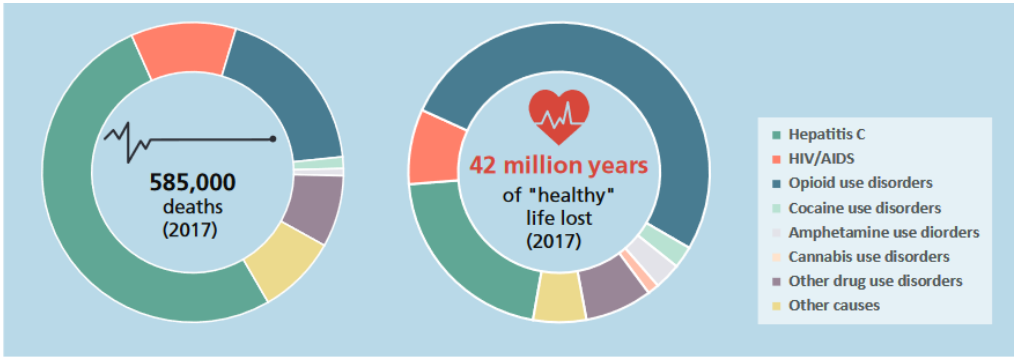
Methamphetamine use is increasing among several regions while the world's fastest-growing methamphetamine market is developed in South-East Asia region. In addition, crystalline methamphetamine use is also growing in South-East Asia. After the year of

2000, pattern of drug use has been changed from opiates to methamphetamine in these regions (UNODC, 2019a).

Opioid use disorders were responsible for most of the deaths and disability attributed to the use of drugs. In 2017, methamphetamine related treatment admissions continued to account for a large majority of all treatment admissions in several countries in East and South-East Asia. This included countries such as Myanmar, who traditionally have a larger proportion of other drug related admissions, other than methamphetamine (UNODC, 2019a).

Worldwide, drug use disorder was detected in 35 million people and they required treatment services. In 2017, over half a million deaths was seen as a result of drug use. Almost one third of those deaths were attributed to drug use disorders. Among the deaths attributed to drug use disorders, two thirds was related to opioid use. As a result of drug use, there was 42 million years of healthy life lost such as premature deaths and years lived with disability. These were mostly attributed to the opioid use. Of different regions worldwide, East and South-East Asia had greatest burden of disease (UNODC, 2018, 2019b).

One of the consequences of substance use in Myanmar was transmission of HIV and other blood borne diseases among people who inject drugs leading to high HIV prevalence among them. Nearly one in every three injecting drug users in Myanmar is living with HIV which was 48 times higher than that of general population (UNODC, 2019b). Currently, no official data was available regarding the number of drug users, their drug use patterns and consequences though Myanmar is the second largest opium producer in the world.



Sources: Institute for Health Metrics and Evaluation, "Global Burden of Disease Study 2017", Global Health Data Exchange.

A systematic review conducted in 2014 summarized the association between amphetamine-type stimulants and HIV infection among MSM. Nearly 90% of the studies were from high-income countries and used different study designs. Across all studies, methamphetamine or amphetamine use was significantly associated with HIV infection. However, evidence of association between ecstasy use and HIV infection was not detected (Thu Vu, Maher, & Zablotska, 2015). According to a systematic review study, a consistent positive association was identified between substance use and suicidal ideation and behavior across all substances such as alcohol, tobacco, cannabis and illicit drugs. Although there were many studies from upper-middle income countries available and included in the review; only one-fifth of the studies were from lower-middle and low-income countries (Breet, Goldstone, & Bantjes, 2018).

In summary, cannabis was the most widely used drug globally while increase in crystalline methamphetamine use was seen in many regions. There were adverse consequences of substance use including health, social problems and crime. In addition, opioid use disorders were responsible for most of the drug-use related deaths and disabilities.

2.3 Substance use among men who have sex with men

Research found that substance use has increased considerably among men who have sex with men. Using different kinds of substances were detected in variety of regions according to their context and availability of substances. There were wide variety of substances such as marijuana, tranquilizers, amyl nitrate, cocaine, amphetamines, crack, heroin, ecstasy and hallucinogens. Among these substances marijuana and

cocaine were used very frequently (Balán et al., 2018; Sandfort et al., 2017). Similarly, marijuana is the most common used substance according to the global data (UNODC, 2019b). Studies had shown that MSMs also had an experience of poly-drug use behaviour (Balán et al., 2018; Daskalopoulou et al., 2014). In a previous study, 32% of MSM used one drug, 21% used two drugs and 16% used three, 10% used four, and 21% used five or more recreational durgs (Daskalopoulou et al., 2014). According to the information obtained from the previous studies, there was an association between higher frequency of drug use and more sexual partners as well as more condomless anal sex (Balán et al., 2018; Daskalopoulou et al., 2014).

Using recreational drug was also common in men who have sex with men as well as the risks of recreational drug use were found in a number of studies. There are many kinds of recreational drugs like nitrites, cannabis, erectile dysfunction drugs, cocaine, ketamine, 3,4-methylenedioxy-Nmethylamphetamine (MDMA), gamma-hydroxybutyrate or gamma-butyrolactone, methamphetamine, and mephedrone (Daskalopoulou et al., 2014; Xu et al., 2014; Zhao et al., 2017). A cross-sectional study in UK examined the pattern of drug use and association with condomless sex and other sexual risk behaviors among HIV-diagnosed MSM. Within previous three months, more than half used recreational drugs, and of which nearly half used three or more drugs. Drug use was related to younger age, harmful alcohol drinking, smoking, having HIV positive stable partner while poly-drug use was associated with condomless sex (Daskalopoulou et al., 2014).

A nationwide cross sectional online study in China reported the recreational drug use among Chinese MSM and transgender. It was documented that more than three-fourth of MSM have ever used any kind of recreational drug in their lifetime and over one-fifth of MSM used popper in last year. Using popper was associated with sexual risk behaviors like having group sex, engaging in commercial sex and using mobile apps to seek sexual partners. However, results should be interpreted carefully and had limitation in generalizability due to the nature of online survey (Zhao et al., 2017). Under the effect of recreational drug use, the users engaged in group sex, commercial sex, multiple sexual partnerships and condomless anal intercourse which may promote further HIV transmission (Xu et al., 2014; Zhao et al., 2017).

It can be concluded from the review of previous studies that substance use has increased among MSM and they had an experience of poly-drug use. Association was also found out between drug use and sexual risk behaviors like group sex, multiple sexual partners and condomless anal intercourse.

2.4 Situation of alcohol consumption

Prevalence of current drinkers or abstainers is one of the indicators which can measure level of alcohol consumption in a country or region. Globally, 2.3 billion people, 43% of the total population, were current drinkers and the percentage of drinkers has remained stable in the South East Asia Region. More than one-fourth of all 15-19 years old adolescents were current drinkers. On the other hand, about half of the global adult population has never consumed alcohol. With regards to gender, the prevalence of women's drinking reduced in most regions of the world except in the South-East Asia and Western Pacific Regions (World_Health_Organization, 2018).

The average per capita alcohol consumption varied widely across the world with the highest intake across Europe at around 15 liters per person per year (Ritchie & Roser, 2018). There were a range of factors that influenced the differences in the levels of alcohol consumption between regions of the world (World_Health_Organization, 2018). The prevalence of drinking also varied according to gender with higher prevalence in men. However, this gender difference was lowest in countries where overall prevalence was high (Ritchie & Roser, 2018). Worldwide in 2016, annual average alcohol consumption is 6.4 liters per person among the persons older than 15 years. Alcohol content of different alcoholic drinks (e.g. beer, wine, spirits), were reported in liters of pure alcohol per year. This global average of 6.4 liters of pure alcohol equals 53 bottles of wine since one liter of wine contains 0.12 liters of pure alcohol (Ritchie & Roser, 2018).

Likewise, in South-East Asia Region (SEAR), alcohol per capita consumption in litres of pure alcohol increased from 3.5 litres in 2010 to 4.5 in 2016. Among the countries, total alcohol per capita consumption among population over 15 years varied widely from 0 litre in Bangladesh and 8.3 litres in Thailand. Similar to global and regional trend, increased per capita consumption was also seen in Myanmar with 2.9 litres in

2010 to 4.8 litres in 2016 which was 3rd highest in SEAR. In Myanmar, types of alcoholic beverages commonly consumed were spirits (68%), beer (22%), wine (10%) and other type of drinks (1%). Furthermore, prevalence of heavy episodic drinking among population over 15 years in 2016 was 16.3% in male and 9.1% in both sexes. In the same year, percent of lifetime abstainers among population over 15 years was 34.7% in males and 50.1% in both sexes. Prevalence of alcohol use disorders was 1.9% for both sexes which was much higher than 0.7% in WHO South-East Asia region (World_Health_Organization, 2018).

A study in China identified the current status of drinking behavior and its influencing factors among young adults aged 18 to 34 years in Wuhan. Among 1634 participants, prevalence of drinking was reported as 45%. In addition, it was identified that the earlier the age of first drinking, the higher the level of current drinking. According to logistic regression analysis, age, marital status and emerging adulthood were positively related to drinking status (Lu et al., 2019). Previous studies in Myanmar have also documented the pattern of alcohol consumption in adult population (Oo, Aung, Soe, Lwin, & Win, 2015; Win & Areesantichai, 2014). Both were small scale studies covering only one township with small sample size. A study in one township from eastern part of Myanmar reported that almost half of the participants have consumed alcohol drinking in their life time and they consumed different type of alcohol such as palm tree juice, beer, and home-made alcohol. About 60% drank alcohol 1-5 times and over 30% drank more than 30 standard drinks in the last two weeks (Win & Areesantichai, 2014). Another study was conducted in one peri-urban township of Yangon Region among adult males. The prevalence of current alcohol drinking, ex-drinking and never drinking were reported as 20.5%, 9.0% and 70.5%, respectively. From the same study, significant risk factors of alcohol consumption were age, education status and practice of smoking and betel chewing (Oo et al., 2015).

In conclusion, alcohol consumption is very wide spread around the globe and average per capita consumption varied across the regions. Level of alcohol consumption of a country or region was measured by prevalence of current drinkers or abstainers.

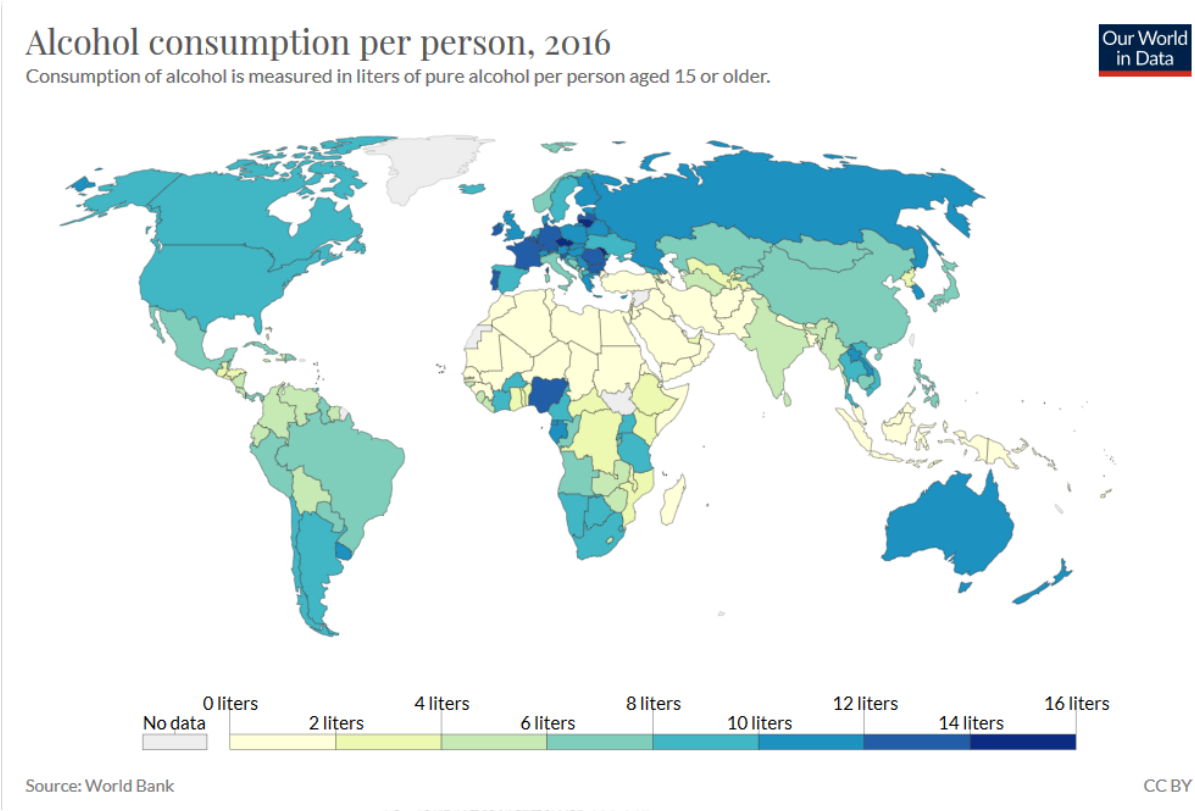


Figure 3 Alcohol consumption per person during 2016

2.5 Alcohol consumption pattern

Worldwide, alcohol consumption pattern varies widely ranging from daily heavy drinking to occasional hazardous drinking which could lead to substantial public health and safety problems. Huge variation exists in adult per capita consumption of alcoholic beverages across the countries whereas highest consumption level can be found in the developed world. In fact, overall level of alcohol consumption is associated with a country's income level. Additionally, the type of alcohol people drink, such as beer, wine, spirits, is linked with the geographical differences. Over 45% of total recorded alcohol consumed is the spirits, mostly in the South-East Asia and Western Pacific regions (World_Health_Organization, 2011, 2018).

Influencing factors related to patterns of drinking include abstention and heavy episodic drinking. Describing the prevalence of abstention is similarly as the levels and patterns of alcohol consumption. Specifically, one of the important characteristics of a pattern of drinking in a population is the past-year abstention rate. In 2016, 57% of the world

population aged 15 years and above had abstained from alcohol in the preceding 12 months while 2.3 billion people are current drinkers. On the other hand, another measureable pattern of alcohol consumption is heavy episodic drinking (HED) which is defined as “drinking at least 6 grams or more of pure alcohol on at least one occasion in the past seven days”. Prevalence of HED has declined to 18.2% in 2016 from 22.6% in 2000 among the total population. Total alcohol per capita consumption rose from 5.5 liters in 2005 to 6.4 litters in 2016 among population over 15 years worldwide especially in South-East Asia Regions (World_Health_Organization, 2018).

In Myanmar, alcohol consumption is also common among the age of over 15 years of population. Total alcohol per capita consumption in Myanmar among population over 15 years of age increased from 2.9 litres of pure alcohol in 2010 to 4.8 litres in 2016. Among them, 68% were drinking spirits followed by beer (22%) and wine (10%). Regarding total consumption of alcohol per capita among the people aged over 15 years, about 18 L of pure alcohol were consumed among both sexes during 2016. In contrast, half of them were lifetime abstainers and 73% of the population was the abstainers within one year. In addition, alcohol using disorders and alcohol dependence were also discovered about 1.9% and 0.7% in Myanmar (World_Health_Organization, 2018).

Earlier studies in Myanmar have documented the pattern of alcohol consumption among adult population (Oo et al., 2015; Win & Areesantichai, 2014). One study identified that 50% of participants have alcohol drinking in their life time and their preferred types of alcohol were palm tree juice, beer, and home-made alcohol. About 60% drank alcohol 1-5 times and over 30% drank more than 30 standard drinks in the last two weeks. Another study among adult males identified that the prevalence of current alcohol drinking, ex-drinking and never drinking were 20.5%, 9.0% and 70.5%, respectively. From the same study, significant risk factors of alcohol consumption were age, education status and practice of smoking and betel chewing (Oo et al., 2015; Win & Areesantichai, 2014).

It can be seen from the above evidences that alcohol consumption pattern varied globally from daily drinking to heavy episodic drinking leading to significant impact on public health and safety problems. Additionally, total per capita consumption rose

worldwide especially in South-East Asia Regions including Myanmar. The type of alcohol people drink is linked with the geographical differences and nearly half of total recorded alcohol consumed in South-East Asia is the spirits.

2.6 Alcohol and health consequences

Approximately 2.5 million deaths resulted each year contributed to alcohol which is a causal factor for more than 60 diseases and injuries. Globally in 2016, of all deaths attributable to alcohol consumption, commonest causes were injuries (28.7%), digestive diseases (21.3%), cardiovascular diseases (19%), infectious diseases (12.9%) and cancers (12.6%). From the perspective of global burden of disease, about 4.5% of diseases and injuries are attributed to alcohol (World_Health_Organization, 2011). Alcohol consumption is a unique risk factor for population health as it affects the risks of developing many infectious diseases, non-communicable diseases and injuries. Globally, hazardous alcohol drinking resulted in 5.3% of all deaths (3 million) and 5.1% of disability-adjusted life years (DALYs) (132.6 million) in 2016. The important contributors to the burden of alcohol-attributable deaths and DALYs among men included injuries, digestive diseases and alcohol use disorders (World_Health_Organization, 2018).

According to the WHO data in 2017, total deaths of population due to alcohol in Myanmar were 1,686 (0.43%) (LeDuc, 2018). Among them, major death attributable to alcohol consumption in Myanmar was cirrhosis of liver followed by road traffic accidents and cancers in 2016. In addition, Myanmar reached the ranking number of 27 in the world according to the age adjusted death rate (3.36 per 100,000 of population) (World_Health_Organization, 2018).

Evidences had shown that alcohol consumption may lead to adverse health consequences. One of the systematic review which included 572 studies (nearly five hundred thousand cancer cases) were identified that risk of oral, pharyngeal and esophageal cancer among heavy drinkers were five times higher than non-drinkers and occasional drinkers (Bagnardi et al., 2015). A study conducted in Uganda documented that one fourth of the respondents had consumed alcohol when their last sexual intercourse. In addition, frequent alcohol consumption was associated with sexual risk

behaviors like multiple sexual partners and inconsistent condom use. In this way, sexually transmitted infections and HIV could be infected among the sexually risky participants who were frequent drinkers (Choudhry, Agardh, Stafström, & Östergren, 2014). Similarly, previous studies highlighted that hazardous alcohol drinking was common among men who have sex with men. In addition, there was an association between hazardous alcohol drinking and sexually transmitted infections as well as HIV (Herrera et al., 2016; Liu et al., 2016).

In summary, adverse health consequences and many deaths around the world each year contributed to alcohol drinking which is either a risk factor or causal factor for many diseases and injuries. According to the evidences from the studies conducted in different countries, frequent alcohol consumption and hazardous alcohol consumption could lead to adverse health consequences like sexually transmitted infections including HIV. Among men, alcohol-use disorder was one of the important contributors to the burden of alcohol-attributable deaths and DALYs. Myanmar was also experiencing alcohol consumption and its' health consequences.

2.7 Alcohol and sexual risk behaviors

Evidences had indicated that alcohol consumption is related to sexual risk behaviors which could lead to transmission of sexually transmitted infections including HIV. A meta-analysis on 30 experimental studies had found out that drinking alcohol to blood alcohol content about 0.07% directly affects sexual decision making (Scott-Sheldon et al., 2016). Many studies had documented the increased sexual risks such as unprotected sex, sex with multiple partners and sexual violence after alcohol consumption (Rehm, Shield, Joharchi, & Shuper, 2012; Williams et al., 2016; Woolf-King & Maisto, 2011).

According to a systematic review and meta-analysis of randomized controlled studies, blood alcohol content (BAC) was associated with likelihood of using a condom during intercourse. Larger alcohol intake and the subsequent level of BAC would lead to higher intentions to engage in unsafe sex. It was concluded that alcohol use is an independent risk factor for intentions to engage in unprotected sex (Rehm et al., 2012).

Similarly, association between alcohol and sexual risk behavior like forced sex was detected among migrant men and women in South Africa (Bello et al., 2017). Likewise, inconsistent condom use was found to be associated with use of alcohol in relation to sexual activity among university students (Choudhry et al., 2014). In a study of college females in US, if a young woman's first sexual intercourse involves alcohol, it is more likely to be unplanned and expose to risky partners (Livingston, Testa, Windle, & Bay-Cheng, 2015).

It could be summarized that alcohol drinking is associated with sexual risk behaviors such as unprotected sex, sex with multiple partners, sexual violence, etc. and especially widespread in certain settings and occasions. This association was detected in different population groups including university students, migrant men and women, and key populations like MSM, FSW, injecting drug users.

2.8 Situation of sexual risk behaviors among MSM

Transmissions of diseases are more likely to be infected among MSM due to their sexual risk behaviors like unprotected anal sex and multiple sexual partners. According to the previous studies, 40-70% of MSM had sex without using condom (Herrera et al., 2016; Li et al., 2017). Runhua L et.al reported the prevalence of condomless anal intercourse and their associated factors among MSM in China using respondent-driven sampling. Prevalence of CAI with male partners in the past six months was 43.7% and condomless vaginal intercourse was 21.6%. CAI was associated with earlier homosexual debut, suicidal inclinations, childhood sexual abuse and HIV testing in recent year (Li et al., 2017). In Myanmar, according to IBBS data, median age at first anal sex with male was found at 17 years of age. In addition, proportion of MSM respondents those who had first sexual partner with male was documented as 95% in Yangon and 84% in Mandalay. Then, the proportion of MSM who had anal sex with men within one year was detected as 20% in Yangon and 14% in Mandalay (National_AIDS_Program, 2019).

In a study conducted in Peru, condomless anal intercourse was associated with having multiple sexual partners. Similarly, having multiple sexual partners was very common and it may lead the risk of sexually transmitted infections. Previous studies documented

that six to ten sexual partners were found among MSM within previous year. In addition, 50-70% of MSM had multiple sexual partners. One of the studies stated that, there was sexual relationship with ten sexual partners within last one year (Chittamuru, Icard, Jemmott, & O'Leary, 2018; Garcia, Duong, Meyer, & Ward, 2016; Pérez, Wray, Celio, & Monti, 2018; Pines, Karris, & Little, 2017).

An internet-based cross sectional survey was conducted in Vietnam identified the prevalence of multiple and concurrent sexual partnerships among MSM. Among 1695 MSM surveyed, having multiple sexual partners was detected in 70% of them in the last six months and 58% of them reported concurrent partnership. MSM who were no longer a student, consumed alcohol before and/or during sex, used the internet to meet casual sex partners and had never participated in HIV intervention had higher risk to have multiple sexual partnerships (Garcia et al., 2016). A study in US examined the sexual concurrency among partners of MSM with recent HIV infection. Sexual concurrency was common among the participants. It was reported that partners more than 10 years younger than the participants, longer term partners and partners met online were more likely to have sexual concurrency (Pines et al., 2017).

Based on the previous evidences, across the different regions of the world, sexual risk behaviors like having multiple sexual partners and condomless anal intercourse were very common among men who have sex with men resulting in increased risk of HIV and STI transmission.

2.9 Men who have sex with men, alcohol drinking and sexual behavior

Similar to general population, there is an association between alcohol and sexual risk behaviors among men who have sex with men according to the previous studies (Herrera et al., 2016; Liu et al., 2016; Santos et al., 2018). Specifically, various sexual risk behaviors, such as intimate partner violence, condomless anal intercourse, were significantly associated with higher level of alcohol use or hazardous drinking. Around 15% of MSM in China reported hazardous and binge drinking which were associated with risk behaviors like having multiple partners, pay for sex and condomless insertive anal intercourse (Liu et al., 2016). A study in Peru had found out that 45% of MSM and TW had an alcohol use disorder (AUD) and higher incidence of condomless anal

intercourse was seen among participants with AUD (Herrera et al., 2016). Similarly in US, hazardous alcohol consumption among MSM was correlated with having more than five male partners(Santos et al., 2018).

Experience of sexual violence and its correlates among MSM were reported in a study in Mexico in which prevalence of sexual violence in the past year was reported as 40%. Childhood sexual abuse, adult experiences of homophobia, depression and hostility symptoms, and not living with a spouse or steady partner were associated with a higher number of experiences of sexual violence (Semple et al., 2017).

In general, men who have sex with men are at considerable risk of acquiring HIV and sexually transmitted infections due to their sexual risk behaviors. HIV prevalence among men who have sex with men was over 10% although prevalence of the general adult population was less than 1% in most regions of the world (Baral, Grosso, Holland, & Papworth, 2014; Sullivan, Jones, & Baral, 2014). Even though new HIV infection was notably decreasing in other groups, incidence and prevalence among men who have sex with men was rising (Baral et al., 2014).

In Myanmar, Integrated Biological and Behavioral Surveillance Survey conducted in Myanmar in 2015 found out that experience of being forced to have sex sometimes in the last 12 months ranged widely from 7% to 40% among the MSM in five study sites. About 70 to 94% of MSM respondents reported alcohol use in the last 12 months. Proportions of MSM who had sex under the influence of alcohol in the last 12 months varied from 35 to 46%. Naitonal MSM population was estimated as 252,000 for all types of MSM in 2015 (National_AIDS_Program, 2019).

In conclusion, higher level of alcohol use and sexual risk behaviors was identified among men who have sex with men and it could lead to considerable risk of acquiring HIV and other sexually transmitted infections. In Myanmar, over one-third of MSM had sex under the influence of alcohol in the last 12 months.

2.10 Screening tools

2.10.1 Alcohol

Alcohol consumption was mostly assessed in terms of frequency and quantities. There were many screening tools available for assessing alcohol consumption and drug use

behaviors. The Alcohol Use Disorders Identification Test (AUDIT) is developed by World Health Organization and included 10 questions on alcohol consumption. It aimed to assess alcohol consumption, drinking behaviors, and alcohol-related problems among adult and adolescents population. It was developed as a simple method of screening for excessive drinking to help practitioners to identify whether the person has hazardous drinking, harmful drinking or alcohol dependence. Both a clinician-administered version and a self-report version were provided. Approximate number of standard drinks in different alcohol beverages was also illustrated as a chart (World_Health_Organization, 2001). Hazardous or harmful alcohol use was defined as having a score of 8 or more. AUDIT-C is a short version of AUDIT that includes the first 3 questions.

Hazardous drinking is defined as "a pattern of alcohol consumption that increases the risk of harmful consequences for the user or others. Hazardous drinking patterns are of public health significance despite the absence of any current disorder in the individual user". Harmful use refers to "alcohol consumption that results in consequences to physical and mental health. Some would also consider social consequences among the harms caused by alcohol". Alcohol dependence is "a cluster of behavioural, cognitive, and physiological phenomena that may develop after repeated alcohol use" (World_Health_Organization, 2001).

AUDIT was the only screening test specifically designed for international use and could identify hazardous, harmful alcohol use and possible dependence. Out of ten questions, first three questions were under the domain of "hazardous alcohol use" which was focused on asking about the frequency of drinking, typical quantity and frequency of heavy drinking. Questions four to six were under the domain of "dependence symptoms" and asking about impaired control over drinking, increased salience of drinking, and morning drinking. Final four questions were about harmful alcohol use that included guilt after drinking, blackouts, alcohol-related injuries and others concerned about drinking (World_Health_Organization, 2001). Many previous studies among MSM had applied AUDIT or AUDIT-C to screen alcohol consumption (Lane et al., 2014; Muraguri et al., 2015; Nalá et al., 2015; Sandfort, Lane, Dolezal, & Reddy, 2015). In addition, studies had shown that reliability of AUDIT was documented as .95

and .81 (de Meneses-Gaya, Zuardi, Loureiro, & Crippa, 2009; Dybek et al., 2006). Similarly, validity of AUDIT was found as sensitivity of .67 and specificity of .96 (de Meneses-Gaya et al., 2009).

Michigan Alcohol Screening Test (MAST) is another simple, self-scoring test that includes 24 questions on alcohol consumption. It provided a rapid and simple screening for alcohol related problems and reliability and validity studies have been done. The test can be applied for both adolescents and adult population. After scoring the responses, problem drinking was defined as having a score of 5 or more (Selzer, 1971).

2.10.2 Substance

The Drug Abuse Screening Test (DAST) is a 28-item self-report scale that consists of questions comparable to those of the Michigan Alcoholism Screening Test (MAST). The DAST has been recognized as a sensitive screening instrument for the abuse of drugs other than alcohol. Drug abuse refers to either the use of over-the-counter drugs in excess or any non-medical use of drugs. After scoring the items according to the instruction, total cut-off score of 6 to 11 are regarded to be optimal to screen substance use disorders. Applying a cut-off score of 6 has provided excellent sensitivity and satisfactory validity. The Drug Abuse Screening Test (DAST-10) is a 10-item brief screening tool for assessing drug use, not including alcohol or tobacco use in the past 12 months that can be administered by a clinician or self-administered. According to the responses, degree of problems related to drug use can be categorized into no problem (0), low level (1-2), moderate level (3-5), substantial level (6-8) and severe level (9-10) (Skinner, 1982).

Alcohol, Smoking and Substance Involvement Screening Test (ASSIST) is a screening tool developed for WHO to detect and manage substance use and related problems among adolescents and adult population. It includes 8 questions focusing on 10 different substances: tobacco products, alcohol, cannabis, cocaine, amphetamine-type stimulants, sedatives and sleeping pills, hallucinogens, inhalants, opioids, and other drugs. The tool acquired information on lifetime use and use of substances over the last three months and associated problems. It aims to identify associated problems with substance use such as acute intoxication, regular use, dependent or ‘high risk’ use and injecting behaviour. Scoring can be done by adding scores of questions 2 to 7. Although

injecting drug use is an indicator of high risk, the response on question 8 is not included in the calculation. Total scores for each substance will be categorized into “low risk” for three or less, “moderate risk” for between 4 and 26, and “high risk” for 27 and higher.

The reliability of ASSIST was assessed in a test-retest studies among many countries and the results obtained from the studies documented that ASSIST had good reliability and the items included in ASSIST were easy to administer and understand by the respondents. Similarly, validity of ASSIST was also assessed in several regions of the world. The results from the studies demonstrated that the ASSIST had good, construct, and discriminant validity, including the development of cut-off scores (World_Health_Organization, 2010). Another alcohol screening tool for adult population aged older than 16 years is cut down, Annoyed, Guilty, Eye-opener (CAGE). It is a 4-item questionnaire for detecting alcohol problems (Ewing, 1984).

Among the different kind of screening tools for alcohol and substance use screening test, AUDIT and ASSIST will be used in the current study.

2.11 Theory

There were theories related to people’s behaviors such as social learning theory, the theory of reasoned action and the theory of planned behavior. Social learning theory was developed by Psychologist Albert Bandura that resulted from combining 1) cognitive learning theory, which posits that learning is influenced by psychological factors, and 2) behavioral learning theory, which assumes that learning is based on responses to environmental stimuli. It explained “human behavior in terms of continuous reciprocal interaction between cognitive, behavioral, and environmental influences”. It identified four requirements for learning: observation (environmental) of other people’s behaviors, retention (cognitive) as the ability to store the information from observation, reproduction (cognitive) as the actual performance of the behavior, and motivation to intimate the behavior. It has been applied extensively to the understanding of aggression, and psychological disorders, and is also the theoretical foundation for the technique of behavior modeling used in training programs. An online survey among undergraduate students applied the social learning theory. Four elements

of the theory performed the strongest in predicting the deviant cyber-sexual activities among the students (Klein & Cooper, 2019).

The Theory of Reasoned Action (TRA) was developed by Fishbein & Ajzen in 1975. It explained that a person's behavior is determined by their intention to perform the behavior and intention as a function of their attitude toward the behavior and subjective norms. It was stated that the best predictor of behavior is intention (belief that the behavior will lead to the intended outcome) which in turn is determined by three things: their attitude toward the specific behavior, their subjective norms, and their perceived behavioral control. In general, the more favorable the attitude and the subjective norms and the greater the perceived control, the stronger the person's intention to perform the behaviour.

The Theory of Planned Behavior (TPB) aimed to predict an individual's intention to engage in a behavior at a specific time and place. The theory was intended to explain all behaviors over which people have the ability to exert self-control and the key component to this model is behavioral intent. Behavioral intentions are influenced by the attitude about the likelihood of expected outcome resulted from the behavior, and the subjective evaluation of the risks and benefits of that outcome. The TPB has been used successfully to predict and explain a wide range of health behaviors and intentions including smoking, drinking, health services utilization, breastfeeding, and substance use. According to the TPB, behavioral achievement was depended on both motivation (intention) and ability (behavioral control). It distinguished between three types of beliefs - behavioral, normative, and control. The TPB is comprised of six constructs that collectively represent a person's actual control over the behavior: attitude, behavioral intention, subjective norms, social norms, perceived power, and perceived behavioral control.

Observing and learning other people's behavior was one of the factors that was identified in social learning theory. Similar to general population, MSM would also adapt their behavior from the friends as their immediate environment. Though all constructs included in the whole theory was not applied in the current study, only observation of behavior was applied by asking their reasons for alcohol consumption in connection to their friends.

2.12 Reviewing the papers

Literature review was done through the PubMed to explore the published papers within 10 years duration. The review was carried out by using different key words of the proposal such as "alcohol", "substance use", "sexual risk behaviors", and "MSM". Over 700,000 articles were turned out by using the key word "alcohol". After using the key words "alcohol" and "MSM", about 5,000 articles were identified. Then, 732 papers were seen after using the key words "alcohol" and "sexual risk behaviors". By using "alcohol" and "substance use", more than 47,00 papers were identified. With the key word "substance use", over 67,000 papers were found. Over 3,500 papers were seen with the key words "substance use" and "MSM". A total of 529 papers were found by using "substance use" and "sexual risk behaviors".

Example of reviewing papers related to sexual behaviors among MSM

Author/ Year Country	Samples	Design	Outcomes	Measurement	Findings
MC Herrera et al, 2016 Peru	N=312 MSM and 89 TW	Cohort study	CAI, AUD HIV/STI prevalence	AUDIT	91% were hazardous drinkers; Higher CAI was reported by participants with an AUD
Li et al., 2017 China	N=511 MSM; recruited by RDS	Cross-sectional	CAI, recent HIV testing	-	CAI was associated with early homosexual debut; Recent HIV infection was associated with engaging in CAI with male partners

Garcia et al., 2016 Vietnam	N= 1,695 MSM	Internet-based cross-sectional	Multiple and concurrent sexual partners	-	>two-third had multiple sexual partners; >10% had concurrent partners

Chapter 3

Methodology

3.1 Study design and study area

A cross-sectional study was conducted to identify the patterns of alcohol consumption, substance use and sexual risk behaviors among men who have sex with men (MSM) those aged more than 18 years. The study was conducted in Yangon and Mandalay, major cities of Myanmar where MSM population is higher than other regions.

Study setting

The Republic of the Union of Myanmar is a Southeast Asian nation of more than 100 ethnic groups, bordering India, Bangladesh, China, Laos and Thailand and located on the Bay of Bengal and Andaman Sea. Myanmar covers an area of (676,578) square kilometres with the total population of over 51.4 million according to the results of 2014 census. Administratively, the country is divided into Nay Pyi Taw Union Territory and (14) States and Regions. It consists of (70) Districts, (330) Townships, (84) Sub-townships, (398) Towns, (3063) Wards, (13,618) Village tracts and (64,134) Villages. Of all states and regions, Yangon Region has the largest population of 7.36 million, followed by Ayeyawady (6.18 million) and Mandalay (6.16 million). Population of Yangon and Mandalay regions contributed 26% of country's total population. Yangon region can be administratively divided into 4 districts and subdivided into 46 townships. Mandalay region can be administratively divided into 7 districts and subdivided into 30 townships (Department of Population & Population, 2015).

According to IBBS 2015, estimates of MSM population were 37307 in Yangon and 5546 in Mandalay that were 1.9% and 0.9% of adult male population over 15 years of age.

3.2 Study population

Population of the study was men who have sex with men (MSM) those aged more than 18 years.

Inclusion criteria

- The one who being born as male
- The one who identify himself as a man who have sex with man
- MSM who had engaged insertive or receptive anal sex or both
- MSM who have at least six months stay in Yangon and Mandalay
- MSM who gives the consent to provide information
- MSM aged more than 18 years

Exclusion criteria

- MSM who are not mentally sound according to the records from the center
- MSM who do not understand and communicate Myanmar Language

3.3 Sampling method

Purposive sampling was applied since the study population is special population which cannot be recruited using other probability sampling methods like simple random sampling. Sampling of the MSMs was made through Myanmar MSM network. Identification of the places for recruitment of the possible participants was made after discussion with the focal persons from the networks of MSM.

3.4 Sample size

According to IBBS 2015, estimated population of MSM at study townships was 42500 which can be considered as infinite population (National AIDS Program, 2019). Therefore, sample size is calculated by infinite population proportion formula. By considering the estimated proportion of MSM who are current drinkers is 20%, 95% confidence level and an error of 5%, minimum required sample size becomes 246 (Oo et al., 2015).

According to Cochran formula,

$n = Z^2pq / d^2$

Z^2 = standard normal deviate

p = proportion of MSM who consumed alcohol daily = 20%

d = margin of error = 5%

$n = (1.96)^2 * 0.2 * 0.8 / (0.05)^2$

n= 246

3.5 Data collection

Preparation for data collection

Firstly, a structured questionnaire was developed in English by reviewing the literature. Then, translation was done into Myanmar language. Then, back translation was carried out into English. The interviews were done by six interviewers including principal investigator and five more research assistants. The selected five research assistants were provided for one day training to reduce interviewer's bias during data collection. Training topics consisted of research objectives, research methodology and detailed information about questionnaires and ethics about conducting research. Principal investigator carried out thorough explanation about all the topics of training to the research assistants with related documents. At the end of the training, the research assistants can clarify the questions which they are not clear or they desire to know more information. After question sections, the understanding of the research assistants on the training was assessed by doing role-play section as an interviewer and interviewee to each other. Every interviewer had to practice role-play at least twice as interviewer with different interviewees in order to be familiar with the questionnaire and to minimize interviewer's bias. Their performance was observed and corrected by principal researcher during their practices.

Data collection procedure

Since the data collection period was just after the first wave of COVID-19 pandemic period in Myanmar, special precaution was taken to reduce the risk of transmission. When we made appointment with the participants at DIC, only 15-20 participants were

invited on one day. All the interviewers and participants wore the disposable surgical masks during the face-to-face interviews.

After receiving ethical approval, permissions from the Township Medical Officers of the selected townships was attained by applying the ethical certificate for this assessment. Then, advocacy meeting was carried out with all the relevant stakeholders at the study townships including representatives from MSM networks, focal persons from INGOs and NGOs working for MSM population, responsible health care providers, etc. Possible data collection sites were discussed and decided as "drop-in centres" of INGOs. Pre-test was conducted with 30 MSMs those who are more than 18 years of age at a site which differs from the study site.

At the venues where MSMs usually gather like drop-in-centers of International Non-governmental Organizations, beauty parlours, etc., eligible participants were contacted and invited to participate in the study through the network of MSM in Myanmar. After getting the informed consent, data collection was done by face-to-face interview. Strict adherence to ethical principles were ensured throughout the data collection period in order to maintain the confidentiality of the study participants.

3.6 Measurement tools

A structured questionnaire included six sections: 1) background socio-demographic characteristics (9 items), 2) information on family, friends and working environment (29 items), 3) Alcohol consumption (12 items), 4) Substance use (12 items), 5) sexual risk behaviors (54 items) and, 6) Alcohol, Smoking and Substance Involvement Screening Test, "ASSIST" (8 questions: question 1-7 consist of 10 items in each question and one item is included in question 8).

Background characteristics consists of

1. Age: Age of respondents in completed years at the time of interview
2. Current schooling: This variable will be categorized into currently attending school, dropout from the school, graduated and never schooling.

3. Education: Respondent's education attainment will be recorded as illiterate, read and write, primary school, middle school, high school, university and graduate.
4. Occupation: This variable reflects the work of respondents. It will be classified as manual/unskilled labour, private/government employee, NGO/INGO staff, own business and sex work.
5. Income: Income will be recorded as respondent's monthly own income in Myanmar Kyats.
6. Type of MSM will be described as Apwint or open type, Apone or hidden type and Tha Nge
7. Marital status: Respondent's marital status will be recorded at the time of interview.
8. Gender of respondent's partner: There will be three kinds of categories like male, female and transgender women.

Information on family, friends and working environment includes

1. Type of family: Respondent's family type will be identified as nuclear type or extended type.
2. Current living condition: Respondent's current living status will be classified as he/she is "living with parents", "either parents", "relatives", "friends", "staying at hostel" or "work place".
3. Acceptance of parents/guardians/siblings/friends: This variable will be identified the acceptance of parents/guardians/siblings/friends into the respondents as a MSM.
4. Discrimination or stigmatization as a MSM at workplace will be identified.

Alcohol, Smoking and Substance Involvement Screening Test, "ASSIST"

ASSIST was used as a screening tool and it included 8 questions focusing on 10 different substances: tobacco products, alcohol, cannabis, cocaine, amphetamine-type stimulants, sedatives and sleeping pills, hallucinogens, inhalants, opioids, and other drugs. The tool acquired information on lifetime use and use of substances over the last three months and associated problems. Scoring was done by adding scores of questions 2 to 7. Although injecting drug use is an indicator of high risk, the response on question

8 is not included in the calculation. Total scores for each substance was categorized into "low risk" for three or less, "moderate risk" for between 4 and 26, and "high risk" for 27 and higher (World Health Organization, 2010). The reliability of ASSIST was assessed in a test-retest studies among many countries and the results obtained from the studies documented that ASSIST had good reliability and the items included in ASSIST were easy to administer and understand by the respondents. Similarly, validity of ASSIST was also assessed in several regions of the world. The results from the studies demonstrated that the ASSIST had good, construct, and discriminant validity, including the development of cut-off scores (World Health Organization, 2010).

Sexual risk behaviors were identified by following risk behaviours:

1. Condomless anal intercourse: Respondent's experience of condomless anal intercourse
2. Multiple sexual partners: Respondent's experience of having multiple sexual partners

Reliability and validity of the measurement tools

Regarding reliability of ASSIST, the Cronbach's Alpha was calculated and resulted as 0.95 that showed high internal consistency. Construct and Content validity is ascertained by using the standard measurement tools which were validated by previous studies like ASSIST.

3.7 Data management and analysis

Principal investigator checked the data and the questionnaire were coded before entering data to the computer. After that, data entry was done by double entry process. Data entry was carried out with EpiData version 3.1 and data analysis was done with SPSS version 21. Exploratory data analysis was done to check the errors, consistencies and missing values. Descriptive statistics were shown according to the data obtained from the assessment. Categorical data was stated as frequency and percentage and

continuous data was shown in mean/median as appropriate. Proportions of MSM who consumed alcohol and proportion of drug use among MSM were shown as frequency and percentage. Likewise, sexual risk behavior of MSM were stated as frequency and percentage. Chi-square test was applied to identify the relationship between categorical variables.

Scoring was done by adding scores of questions 2 to 7 according to the instruction shown in "ASSIST". Then, total scores for each substance were categorized into "low risk" for three or less, "moderate risk" for between 4 and 26, and "high risk" for 27 and higher.

3.8 Ethical consideration

The proposal was submitted to Institutional Review Board, Department of Medical Research, Myanmar. Permissions from the Township Medical Officer/focal officials of the selected townships was attained by applying the received ethical certificate. In addition, informed consents were taken from the participants after thorough explanation about the study including objectives of the study. During data collection, the decision for participation of the respondents must be entirely voluntary. Participants had rights to withdraw at any time during data collection without any penalty. Confidentiality and anonymity of the information were strictly ensured. All answer sheets and data reports were kept in locked cabinet.

3.9 Expected benefits of the study and future research

The information obtained from the study will provide baseline information on alcohol consumption, substance use and sexual risk behaviors among MSMs. These information will become input for health care program targeting MSMs such as HIV prevention and control program, and prevention and control of substance use. The information obtained from the study will be useful for planning future research to identify determinants and insights of these risks behaviors.

Chapter 4

Findings

4.1 Background characteristics of the participants

A total of 256 MSM included in the study whereas 151 participants were resided at Yangon and 105 participants were residents from Mandalay respectively. Mean age of MSM was 27.33±7.7 years and ranged from 18 to 57 years (not shown in the table). Tables were presented according to the age group that was categorized as 15-24 years as young MSM and ≥25 years as adult MSM. As described in Table (1), 39.1% of 15-24 years age group and 58.9% of ≥25 years age group were "apwint" (open). Regarding their education status, 52.7% of younger age group and 39% of older age group had attended up to high school level. Over 46% of young MSM and over 66% of adult MSM have regular income earning job. Median monthly income was 200,000 MMK in both groups. Over 33% of young MSM were private/government staff while over 35% of adult MSM were running their own business. Around one-third of MSM from both groups (31.8% and 34.9%) were married.

Table 1 Socio-demographic characteristics of MSM

Characteristics	**Age group (n=256)**	
	15-24 years n(%)	**≥25 years n(%)**
Type of MSM		
Apwint (open)	43 (39.1)	86 (58.9)
Apone (hidden)	27 (24.5)	41 (28.1)
Thange (partner of apwint/apone)	40 (36.4)	19 (13.0)
Education		
Read & write	3 (2.7)	4 (2.7)
Primary school	14 (12.7)	14 (9.6)
Middle school	28 (25.5)	39 (26.7)
High school	58 (52.7)	57 (39.0)
Graduate/University	7 (6.4)	32 (31.9)
Have income earning job		

No	14 (12.7)	6 (4.1)
Yes, always	51 (46.4)	97 (66.4)
Yes, not regular	45 (40.9)	43 (29.5)
Monthly income (Kyats)		
Median (IQR)	200,000 (166,000)	200,000 (187,500)
Range	15,000 – 900,000	15,000 – 2,000,000
Occupation		
Manual labour	31 (32.3)	18 (12.9)
Private/government staff	32 (33.3)	27 (19.3)
NGO/INGO staff	8 (8.3)	31 (22.1)
Own business	16 (16.7)	50 (35.7)
Sex work	6 (6.3)	10 (7.1)
Others	3 (3.1)	4 (2.9)
Marital status		
Not married	67 (60.9)	72 (49.3)
Married	35 (31.8)	51 (34.9)
Divorced	8 (7.3)	23 (15.8)

4.2 Information on families, friends and working environment

Table (2) describes the information regarding families of MSM. Over 45% of young MSM and 47.9% of adult MSM had nuclear type of family. Two-fifth (40.0%) of parents/guardians of young MSM and over 63% of parents/guardians adult MSM accepted them as MSM. Over 45% of young MSM and 61% of adult MSM were accepted by their siblings as MSM.

Table 2 Information on families of MSM from Yangon and Mandalay

Characteristics	**Age group (n=256)**	
	15-24 years n(%)	**≥25 years n(%)**
Type of family		
Nuclear	50 (45.5)	70 (47.9)

Extended	35 (31.8)	39 (26.7)
Not relevant	25 (22.7)	37 (25.3)
Parents/Guardians accepted as MSM		
Not accepted	34 (30.9)	33 (22.6)
Accepted	44 (40.0)	93 (63.7)
Don't know	32 (29.1)	20 (13.7)
Reason for no acceptance*		
Felt shameful	29 (85.3)	29 (87.9)
Want him to be manly	5 (14.7)	6 (18.2)
Siblings accepted as MSM		
Not accepted	22 (20.0)	31 (21.2)
Accepted	50 (45.5)	89 (61.0)
Don't know	32 (29.1)	20 (13.7)
No siblings	6 (5.5)	6 (4.1)
Reason for no acceptance*		
Felt shameful	18 (81.8)	28 (90.3)
Want him to be manly	3 (13.6)	4 (12.9)

*Multiple responses

Information about the friends of MSM is shown in Table (3). Almost all of them from both groups have close friends and, over 90% of young MSM and 96.5% of adult MSM were accepted by their close friends. Nearly 79% and 94% of MSM from the two groups have MSM among their close friends. Within three months, 82.4% and 88.2% of MSM were spending their time with close friends and common activities they did together were cooking/eating together (46.1%, 54.3%), going picnic (28.1%, 33.6%), going shopping (24.7%, 30.7%) and attract sexual partners (23.6%, 28.3%). Around half of them (55.1%, 49.2%) had experience of going night out with their close friends within three months.

Table 3 Information about friends of MSM from Yangon and Mandalay

Characteristics	**Age group (n=256)**	
	15-24 years n(%)	**≥25 years n(%)**
Having close friends		
No	2 (1.8)	2 (1.4)
Yes	108 (98.2)	144 (98.6)
Close friends accepted as MSM	(n=108)	(n=144)
Not accepted	4 (3.7)	0 (0.0)
Accepted	98 (90.7)	139 (96.5)
Don't know	6 (5.6)	5 (3.5)
Having MSM friends among close friends	(n=108)	(n=144)
No		
Yes	22 (20.4)	9 (6.3)
Don't know	85 (78.7)	135 (93.8)
	1 (0.9)	0 (0.0)
Spending the time with close friends within three months		
No	19 (17.6)	17 (11.8)
Yes	89 (82.4)	127 (88.2)
Activities with close friends within three months*	(n=89)	(n=127)
Cooking/eating together	41 (46.1)	69 (54.3)
Going shopping	22 (24.7)	39 (30.7)
Attract sexual partners	21 (23.6)	36 (28.3)
Going picnic	25 (28.1)	30 (33.6)
Religious event	12 (13.5)	22 (17.3)
Going to restaurants	9 (10.1)	9 (7.1)
Going to night club	6 (6.7)	11 (8.7)
Experience of going night out with close friends within three months	(n=89)	(n=126)
No	40 (44.9)	64 (50.8)

Yes	49 (55.1)	62 (49.2)
Places visited together with close friends*	(n=49)	(n=62)
MSM hotspot		
Restaurants/Bar	26 (53.1)	43 (69.4)
Tea shop	17 (34.7)	22 (35.5)
Night club	10 (20.4)	17 (27.4)
Karaoke	12 (24.5)	11 (17.7)
	7 (14.3)	10 (16.1)

*Multiple responses

Information about workplace of MSM is described in Table (4). Over 60% and 81.2% of MSM disclosed their status at the workplace and almost all young MSM (95.9%) and all adult MSM were accepted by their colleagues. Around 90% of them mentioned that they did not have experience of being bullied and being stigmatized/discriminated at the work place.

Table 4 Information about workplace of MSM from Yangon and Mandalay

Characteristics	**Age group**	
	15-24 years n(%)	**≥25 years n(%)**
Disclosed as a MSM at work place	(n=81)	(n=117)
No	32 (39.5)	22 (18.8)
Yes	49 (60.5)	95 (81.2)
Acceptance of colleagues as a MSM	(n=49)	(n=95)
No	2 (4.1)	0 (0.0)
Yes	47 (95.9)	95 (100.0)
Experience of being bullied at work place as a MSM	(n=49)	(n=95)
No	44 (89.8)	87 (91.6)
Yes	5 (10.2)	8 (8.4)

Experience of being discriminated at work place as a MSM	(n=49)	(n=95)
No	44 (89.8)	84 (88.4)
Yes	5 (10.2)	11 (11.6)
Experience of being dismissed from work as a MSM (n=144)	(n=49)	(n=95)
No	47 (95.9)	86 (90.5)
Yes	2 (4.1)	9 (9.5)

4.3 Alcohol consumption behavior

Alcohol consumption behavior of MSM is shown in Table (5). About 61% of MSM from both groups had consumed alcohol within one month and about 68% consumed alcohol within three months. On the other hand, 85.5% of young MSM and 89.7% of adult MSM had consumed alcohol within their lifetime.

Table 5 Alcohol consumption behavior according to the age group of MSM from Yangon and Mandalay

Characteristics	**Age group**	
	15-24 years n(%)	**≥25 years n(%)**
Alcohol drinking in one month	(n=94)	(n=131)
No	36 (38.3)	49 (37.4)
Yes	58 (61.7)	82 (62.6)
Alcohol drinking in three months	(n=94)	(n=131)
No	31 (33.0)	42 (32.1)
Yes	63 (67.0)	89 (67.9)
Alcohol drinking in six months	(n=94)	(n=131)

No	25 (26.6)	36 (27.5)
Yes	69 (73.4)	95 (72.5)
Alcohol drinking in one year	(n=94)	(n=131)
No	15 (16.0)	27 (20.6)
Yes	79 (84.0)	104 (79.4)
Alcohol drinking in life time	(n=110)	(n=146)
No	16 (14.5)	15 (10.3)
Yes	94 (85.5)	131 (89.7)

As shown in Table (6), mean age at first time of alcohol consumption was 16.8 ± 2.1 years for young MSM group and 20.5 ± 4.5 years among adult MSM group. Beer was the commonest type consumed by MSM (62.8% and 61.1%) which was followed by whisky (11.7% and 13.0%). Mean amount of alcohol consumed by MSM at the first time in standard drink were 3.7 ± 3.2 and 3.5 ± 3.3. Common reasons were "friends gathering" (43.6%, 37.4%), "feel happy" (24.5%, 26.0%) and "friends are drinking" (14.9%, 22.1%).

Table 6 Alcohol consumption behaviour at first time drinking according to age group of MSM from Yangon and Mandalay

Characteristics	**Age group**	
	15-24 years n(%)	**≥25 years n(%)**
Age at first time alcohol drinking	(n=94)	(n=131)
Mean ± SD	16.8 ± 2.1	20.5 ± 4.5
Min - Max	10 - 23	13 – 40
Type of alcohol at first time		
Beer	59 (62.8)	80 (61.1)
Wine	3 (3.2)	10 (7.6)
Whisky	11 (11.7)	17 (13.0)
Vodka	1 (1.1)	0 (0.0)
Rum	6 (6.4)	5 (3.8)

Tequila	1 (1.1)	0 (0.0)
Palm juice	10 (10.6)	12 (9.2)
Local alcohol	4 (4.3)	8 (6.1)
Alcohol amount in standard drink at 1st time		
Mean ± SD	3.7 ± 3.2	3.5 ± 3.3
Min - Max	1.2 – 18.0	1.0 – 18.0
With whom at first time of alcohol drinking*		
Friends	60 (63.8)	67 (51.1)
MSM friends	42 (44.7)	76 (58.0)
Colleagues	7 (7.4)	8 (6.1)
Permanent/non-permanent sexual partner	1 (1.1)	5 (3.9)
Parents/relatives	2 (2.1)	3 (2.3)
Reason at first time of alcohol drinking*		
Friends' gathering	41 (43.6)	49 (37.4)
Feel happy	23 (24.5)	34 (26.0)
Friends are drinking	14 (14.9)	29 (22.1)
Special occasion	14 (14.9)	22 (16.8)
Want to test	12 (12.8)	15 (11.5)
Feel unhappy/stressful	11 (11.7)	12 (9.2)
To attract sexual partner	2 (2.1)	9 (6.9)

Table (7) shows the beer consumption by age groups of MSM at different time period. Over 43% of MSM and over 50% of MSM from both groups consumed beer within one and three months. Nearly 79% from young MSM group and over 83% from adult MSM group consumed beer within life time.

Table 7 Beer consumption at different time period according to the age groups of MSM from Yangon and Mandalay

Characteristics	**Age group**	
	18-24 years (n=94), n(%)	**≥25 years (n=131), n(%)**

Beer consumption within one month		
No	53 (56.4)	74 (56.5)
Yes	41 (43.6)	57 (43.5)
Beer consumption within three months		
No	45 (47.9)	64 (48.9)
Yes	49 (52.1)	67 (51.1)
Beer consumption within six months		
No	39 (41.5)	50 (38.2)
Yes	55 (58.5)	81 (61.8)
Beer consumption within one year		
No	30 (31.9)	45 (34.4)
Yes	64 (68.1)	86 (65.6)
Beer consumption in life time		
No	20 (21.3)	22 (16.8)
Yes	74 (78.7)	109 (83.2)

Table (8) describes wine consumption at different time period by age groups of MSM. Over 5% of MSM from both groups consumed beer within one month. Within their life time, 8.5% of young MSM and 16.8% of adult MSM consumed wine.

Table 8 Wine consumption at different time period according to the age groups of MSM from Yangon and Mandalay

Characteristics	**Age group**	
	18-24 years (n=94), n(%)	**≥25 years (n=131), n(%)**
Wine consumption within one month		
No	89 (94.7)	124 (94.7)
Yes	5 (5.3)	7 (5.3)
Wine consumption within three months		
No	88 (93.6)	126 (96.2)
Yes	6 (6.4)	5 (3.8)
Wine consumption within six months		

No	89 (94.7)	122 (93.1)
Yes	5 (5.3)	9 (6.9)
Wine consumption within one year		
No	90 (95.7)	120 (91.6)
Yes	4 (4.3)	11 (8.4)
Wine consumption in life time		
No	86 (91.5)	109 (83.2)
Yes	8 (8.5)	22 (16.8)

Whisky consumption at different time period by age groups of MSM is shown in Table (9). Within one month, 16% of young MSM and 11% of adult MSM consumed whisky and around 15% of MSM from both groups consumed whisky within three months. Around 25% of MSM from both groups consumed whisky in life time.

Table 9 Whisky consumption at different time period according to the age groups of MSM from Yangon and Mandalay

Characteristics	**Age group**	
	15-24 years (n=94), n(%)	**≥25 years (n=131), n(%)**
Whisky consumption within one month		
No	79 (84.0)	116 (88.5)
Yes	15 (16.0)	15 (11.5)
Whisky consumption within three months		
No	80 (85.1)	112 (85.5)
Yes	14 (14.9)	19 (14.5)
Whisky consumption within six months		
No	76 (80.9)	113 (86.3)
Yes	18 (19.1)	18 (13.7)
Whisky consumption within one year		
No	74 (78.7)	112 (85.5)
Yes	20 (21.3)	19 (14.5)
Whisky consumption in life time		

No	70 (74.5)	99 (75.6)
Yes	24 (25.5)	32 (24.4)

Table (10) shows rum consumption at different time period by age groups of MSM. In their life time, around 10% of MSM from both groups consumed rum. At other time periods, 5-8% of young MSM and 1-3% of adult MSM consumed rum.

Table 10 Rum consumption at different time period by age groups of MSM from Yangon and Mandalay

Characteristics	**Age group**	
	18-24 years (n=94), n(%)	**≥25 years (n=131), n(%)**
Rum consumption within one month		
No	87 (92.6)	127 (96.9)
Yes	7 (7.4)	4 (3.1)
Rum consumption within three months		
No	88 (93.6)	128 (97.7)
Yes	6 (6.4)	3 (2.3)
Rum consumption within six months		
No	89 (94.7)	130 (99.2)
Yes	5 (5.3)	1 (0.8)
Rum consumption within one year		
No	86 (91.5)	128 (97.7)
Yes	8 (8.5)	3 (2.3)
Rum consumption in life time		
No	83 (88.3)	119 (90.8)
Yes	11 (11.7)	12 (9.2)

Palm juice consumption at different time period by age groups of MSM is described in Table (11). Within one month, nearly 13% of young MSM and 20% of adult MSM consumed palm juice. At other time periods, 1-4% of young MSM and around 7% of MSM from adult group consumed palm juice.

Table 11 Palm juice consumption at different time period according to the age groups of MSM from Yangon and Mandalay

Characteristics	**Age group**	
	18-24 years (n=94), n(%)	**≥25 years (n=131), n(%)**
Palm juice consumption within one month		
No	92 (97.9)	123 (92.9)
Yes	2 (2.1)	8 (6.1)
Palm juice consumption within three months		
No	93 (98.9)	122 (93.1)
Yes	1 (1.1)	9 (6.9)
Palm juice consumption within six months		
No	91 (96.8)	122 (93.1)
Yes	3 (3.2)	9 (6.9)
Palm juice consumption within one year		
No	90 (95.7)	121 (92.4)
Yes	4 (4.3)	10 (7.6)
Palm juice consumption in life time		
No	82 (87.2)	105 (80.2)
Yes	12 (12.8)	26 (19.8)

As shown in Table (12), about 1-6% of MSM from both groups consumed local alcohol at different time periods.

Table 12 Local alcohol consumption at different time period by age groups of MSM from Yangon and Mandalay

Characteristics	**Age group**	
	18-24 years (n=94), n(%)	**≥25 years (n=131), n(%)**
Local alcohol consumption within one month		
No	92 (97.9)	129 (98.5)
Yes	2 (2.1)	2 (1.5)

Local alcohol consumption within three months		
No	91 (96.8)	129 (98.5)
Yes	3 (3.2)	2 (1.5)
Local alcohol consumption within six months		
No	93 (98.9)	130 (99.2)
Yes	1 (1.1)	1 (0.8)
Local alcohol consumption within one year		
No	92 (97.9)	130 (99.2)
Yes	2 (2.1)	1 (0.8)
Local alcohol consumption in life time		
No	90 (95.7)	123 (93.9)
Yes	4 (4.3)	8 (6.1)

As shown in Table (13), within one month, an average of 5.4 ± 3.7 and 4.8 ± 3.3 standard drink of alcohol per one episode was consumed by young and adult MSM respectively. Around 4-5 standard drinks were consumed in different time periods. Mean ethanol concentration ranged from 42 to 52 grams at different time period.

Table 13 Amount of alcohol consumed in standard drink and ethanol concentration at different time period according to age group of MSM from Yangon and Mandalay

	Age group	
Amount of alcohol consumed in standard drink	**18-24 years n(%)**	**≥25 years n(%)**
Within one month	(n=58)	(n=82)
Mean ± SD	5.4 ± 3.7	4.8 ± 3.3
Min – Max	1.3 – 16.0	0.5 – 18.0
Within three months	(n=63)	(n=89)
Mean ± SD	5.2 ± 3.6	4.8 ± 3.3
Min – Max	1.3 – 16.0	0.5 – 18.0

Within six months	(n=69)	(n=95)
Mean ± SD	4.8 ± 3.2	4.6 ± 3.2
Min – Max	1.3 – 16.0	0.5 – 18.0
Within one year	(n=78)	(n=105)
Mean ± SD	4.5 ± 3.2	4.6 ± 3.3
Min – Max	0.6 – 16.0	0.5 – 18.0
Within life time	(n=94)	(n=131)
Mean ± SD	4.4 ± 3.1	4.2 ± 3.2
Min – Max	1.3 – 16.0	0.5 – 18.0
Amount of alcohol (ethanol concentration in gram)	**Age group**	
	18-24 years n(%)	**≥25 years n(%)**
Within one month	(n=58)	(n=82)
Mean ± SD	54.0 ± 37.0	48.0 ± 33.0
Min – Max	13.0 – 160.0	5.0 – 180.0
Within three months	(n=63)	(n=89)
Mean ± SD	52.0 ± 36.0	48.0 ± 33.0
Min – Max	13.0 – 160.0	5.0 – 180.0
Within six months	(n=69)	(n=95)
Mean ± SD	48.0 ± 32.0	46.0 ± 32.0
Min – Max	13.0 – 160.0	5.0 – 180.0
Within one year	(n=78)	(n=105)
Mean ± SD	45.0 ± 32.0	46.0 ± 33.0
Min – Max	6.0 – 160.0	5.0 – 180.0
Within life time	(n=94)	(n=131)
Mean ± SD	44.0 ± 31.0	42.0 ± 32.0
Min – Max	13.0 – 160.0	5.0 – 180.0

Table (14) shows the pattern of different type of alcohol consumption within one month in terms of amount, frequency, with whom they consumed alcohol together, time of consumption and reasons. Regarding beer consumption, mean amount they consumed

was 4.3±2.8 and 4.6 ± 2.9 standard drinks (ethanol concentration of 43 and 46 grams), around 46.3% of young MSM consumed 2-4 times per month and 39% of adult MSM consumed 1-3 times per week. Over half of young MSM consumed beer together with friends while 44% of adult MSM consumed together with their MSM friends. Majority of both MSM consumed beer in the evening or at night (92.7%, 94.9%). Nearly 40% of young MSM and nearly 34% of adult MMS consumed beer with the reason of friends' gathering.

Table 14 Pattern of different types of alcohol consumption by age group of MSM within one month

	Age group	
	18-24 years	**≥25 years**
Amount of alcohol use		
Beer	(n=41)	(n=59)
Mean ± SD	4.3 ± 2.8	4.6 ± 2.9
Min – Max	1.3 – 13.0	1.3 – 15.6
Wine	(n=5)	(n=7)
Mean ± SD	6.7 ± 5.6	4.0 ± 3.1
Min – Max	13.0 – 15.4	0.5 – 7.8
Whisky	(n=15)	(n=15)
Mean ± SD	6.8 ± 2.8	7.1 ± 3.9
Min – Max	2.5 – 10.4	2.5 – 15.6
Rum	(n=7)	(n=4)
Mean ± SD	6.2 ± 2.8	3.5 ± 1.3
Min – Max	2.6 – 10.0	2.0 – 5.2
Palm juice	(n=2)	(n=7)
Mean ± SD	5.5 ± 5.0	4.6 ± 2.8
Min – Max	2.0 – 9.1	1.5 – 9.0
Frequency of alcohol use		
Beer	(n=41)	(n=59)
1/month	8 (19.5)	17 (28.8)
2-4/month	19 (46.3)	19 (32.2)
1-3/week	12 (29.2)	23 (39.0)

>3/week	2 (4.9)	0 (0.0)
Wine	(n=5)	(n=7)
1/month	2 (40.0)	1 (14.3)
2-4/month	1 (20.0)	2 (28.6)
1-3/week	2 (40.0)	4 (57.1)
Whisky	(n=15)	(n=15)
1/month	0 (0.0)	1 (6.7)
2-4/month	4 (26.7)	5 (33.3)
1-3/week	9 (60.0)	9 (60.0)
>3/week	2 (13.3)	0 (0.0)
Rum	(n=7)	(n=4)
1/month	1 (14.3)	1 (25.0)
2-4/month	2 (28.6)	0 (0.0)
1-3/week	4 (57.2)	3 (75.0)
Palm juice	(n=2)	(n=7)
1/month	1 (50.0)	2 (28.6)
2-4/month	0 (0.0)	2 (28.6)
1-3/week	0 (0.0)	3 (42.9)
>3/week	1 (50.0)	0 (0.0)
With whom consume alcohol together		
Beer	(n=41)	(n=59)
Friends	21 (51.3)	23 (38.9)
MSM friends	14 (34.1)	26 (44.1)
Sexual partner	2 (4.8)	5 (8.5)
Alone	4 (9.8)	5 (8.5)
Wine	(n=5)	(n=7)
Friends	1 (20.0)	3 (42.9)
MSM friends	4 (80.0)	3 (42.9)
Alone	0 (0.0)	1 (14.3)
Whisky	(n=15)	(n=15)
Friends	8 (53.3)	6 (40.0)

MSM friends	7 (46.7)	6 (40.0)
Sexual partners	0 (0.0)	2 (13.3)
Alone	0 (0.0)	1 (6.7)
Rum	(n=7)	(n=4)
Friends	4 (57.2)	1 (25.0)
MSM friends	2 (28.5)	2 (50.0)
Alone	1 (14.3)	1 (25.0)
Palm juice	(n=2)	(n=7)
Friends	1 (50.0)	1 (14.3)
MSM friends	1 (50.0)	3 (42.9)
Sexual partners	0 (0.0)	1 (14.3)
Alone	0 (0.0)	2 (28.6)
Timing of alcohol consumption		
Beer	(n=41)	(n=59)
Morning/afternoon	1 (2.4)	2 (3.4)
Evening/night	38 (92.7)	56 (94.9)
Whole day	2 (4.9)	1 (1.7)
Wine	(n=5)	(n=7)
Morning/afternoon	1 (20.0)	3 (42.9)
Evening/night	4 (80.0)	4 (57.1)
Whisky	(n=15)	(n=15)
Morning/afternoon	2 (13.3)	0 (0.0)
Evening/night	13 (86.7)	13 (86.7)
Whole day	0 (0.0)	2 (13.3)
Whisky	(n=7)	(n=4)
Evening/night	7 (100.0)	4 (100.0)
Palm juice	(n=2)	(n=7)
Evening/night	2 (100.0)	7 (100.0)
Reason of alcohol consumption		
Beer	(n=41)	(n=59)
Gathering	16 (39.0)	20 (33.9)

Special occasion	0 (0.0)	2 (3.4)
Feel unhappy	7 (17.1)	7 (11.9)
Feel happy	5 (12.2)	15 (25.4)
Want to use	10 (24.4)	14 (23.8)
Attract sexual partner	3 (7.3)	1 (1.7)
Wine	(n=5)	(n=7)
Gathering	1 (20.0)	3 (42.9)
Feel unhappy	1 (20.0)	0 (0.0)
Feel happy	2 (40.0)	3 (42.9)
Want to use	1 (20.0)	1 (14.2)
Whisky	(n=15)	(n=15)
Gathering	3 (20.0)	6 (40.0)
Feel unhappy	3 (20.0)	1 (6.7)
Feel happy	2 (13.3)	2 (13.3)
Want to use	5 (33.3)	6 (40.0)
Attract sexual partner	2 (13.3)	0 (0.0)
Rum	(n=7)	(n=4)
Gathering	3 (42.9)	0 (0.0)
Special occasion	1 (14.3)	0 (0.0)
Feel unhappy	1 (14.3)	1 (25.0)
Feel happy	1 (14.3)	2 (50.0)
Want to use	1 (14.3)	1 (25.0)
Palm juice	(n=2)	(n=7)
Gathering	0 (0.0)	1 (14.3)
Feel happy	0 (0.0)	2 (28.6)
Want to use	2 (100.0)	3 (42.9)
Attract sexual partner	0 (0.0)	1 (14.3)

The pattern of different type of alcohol consumption within three months in terms of amount, frequency, with whom they consumed alcohol together, time of consumption and reasons is shown in Table (15). Regarding beer consumption, mean amount they consumed was 4.1±2.5 and 4.5 ± 3.0 standard drinks (ethanol concentration of 41 and

45 grams), highest proportions of MSM from both groups (42.8%, 36.8%) consumed 1-3 times per week. Over 57.2% of young MSM and 41.2% of adult MSM consumed beer together with their friends. Majority of both MSM consumed beer in the evening or at night (96%, 94.2%). Nearly 34% of young MSM and nearly 38% of adult MMS consumed beer with the reason of friends' gathering.

Table 15 Pattern of different types of alcohol consumption by age group of MSM within three months

	Age group	
	18-24 years	**≥25 years**
Amount of alcohol use		
Beer	(n=49)	(n=68)
Mean ± SD	4.1 ± 2.5	4.5 ± 3.0
Min – Max	1.3 – 13.0	0.5 – 15.6
Wine	(n=6)	(n=5)
Mean ± SD	6.6 ± 5.2	4.1 ± 3.4
Min – Max	1.3 – 15.4	0.5 – 7.7
Whisky	(n=14)	(n=19)
Mean ± SD	6.5 ± 2.9	6.8 ± 4.1
Min – Max	2.5 – 10.0	1.9 – 15.6
Rum	(n=6)	(n=3)
Mean ± SD	4.2 ± 2.0	4.3 ± 1.4
Min – Max	2.6 – 8.0	3.0 – 5.9
Palm juice	(n=1)	(n=9)
Mean ± SD	Not applicable	4.7 ± 2.6
Min – Max		1.5 – 9.0
Frequency of alcohol use		
Beer	(n=49)	(n=68)
1/month	14 (28.6)	24 (35.3)
2-4/month	12 (24.5)	19 (27.9)
1-3/week	21 (42.8)	25 (36.8)
>3/week	2 (4.1)	0 (0.0)

Wine	(n=6)	(n=5)
1/month	2 (33.4)	2 (40.0)
2-4/month	3 (50.0)	0 (0.0)
1-3/week	1 (16.7)	3 (60.0)
Whisky	(n=14)	(n=19)
1/month	1 (7.1)	4 (21.1)
2-4/month	2 (14.3)	6 (31.6)
1-3/week	9 (64.3)	9 (47.3)
>3/week	2 (14.3)	0 (0.0)
Rum	(n=6)	(n=3)
1/month	1 (16.7)	0 (0.0)
2-4/month	2 (33.3)	1 (33.3)
1-3/week	3 (50.0)	2 (66.7)
Palm juice	(n=1)	(n=9)
1/month	1 (100.0)	4 (44.4)
2-4/month	0 (0.0)	1 (11.1)
1-3/week	0 (0.0)	4 (44.4)
With whom consume alcohol together		
Beer	(n=49)	(n=68)
Friends	28 (57.2)	28 (41.2)
MSM friends	17 (34.7)	27 (39.7)
Sexual partner	1 (2.0)	7 (10.3)
Alone	3 (6.1)	6 (8.8)
Wine	(n=6)	(n=5)
Friends	2 (33.4)	2 (40.0)
MSM friends	4 (66.7)	2 (40.0)
Alone	0 (0.0)	1 (20.0)
Whisky	(n=14)	(n=19)
Friends	7 (50)	7 (36.9)
MSM friends	6 (42.9)	8 (42.1)
Sexual partners	0 (0.0)	3 (15.8)

Alone	1 (7.1)	1 (5.3)
Rum	(n=6)	(n=3)
Friends	4 (66.7)	1 (33.3)
MSM friends	1 (16.7)	1 (33.3)
Alone	1 (16.7)	1 (33.3)
Palm juice	(n=1)	(n=9)
Friends	0 (0.0)	2 (22.2)
MSM friends	1 (100.0)	4 (44.4)
Sexual partners	0 (0.0)	1 (11.1)
Alone	0 (0.0)	2 (22.2)
Timing of alcohol consumption		
Beer	(n=49)	(n=68)
Morning/afternoon	1 (2.0)	3 (4.4)
Evening/night	47 (96.0)	64 (94.2)
Whole day	1 (2.0)	1 (1.4)
Wine	(n=6)	(n=5)
Evening/night	6 (100.0)	5 (100.0)
Whisky	(n=14)	(n=19)
Morning/afternoon	1 (7.1)	0 (0.0)
Evening/night	13 (92.9)	17 (89.5)
Whole day	0 (0.0)	2 (10.5)
Rum	(n=6)	(n=3)
Evening/night	6 (100.0)	3 (100.0)
Palm juice	(n=1)	(n=9)
Morning/afternoon	1 (100.0)	3 (33.3)
Evening/night	0 (0.0)	6 (66.7)
Reason of alcohol consumption		
Beer	(n=49)	(n=68)
Gathering	17 (34.1)	26 (38.2)
Special occasion	1 (2.0)	1 (1.5)
Feel unhappy	7 (14.3)	6 (8.8)

Feel happy	9 (18.4)	15 (22.1)
Want to use	12 (24.4)	17 (25.0)
Attract sexual partner	3 (6.1)	3 (4.4)
Wine	(n=6)	(n=5)
Gathering	1 (16.7)	1 (20.0)
Social occasion	0 (0.0)	1 (20.0)
Feel unhappy	1 (16.7)	0 (0.0)
Feel happy	3 (50.0)	1 (20.0)
Want to use	1 (16.7)	1 (20.0)
Attract sexual partner	0 (0.0)	1 (20.0)
Whisky	(n=14)	(n=19)
Gathering	6 (42.9)	8 (42.1)
Special occasion	0 (0.0)	1 (5.3)
Feel unhappy	1 (7.1)	0 (0.0)
Feel happy	1 (7.1)	1 (5.3)
Want to use	4 (28.5)	9 (47.4)
Attract sexual partner	2 (14.3)	0 (0.0)
Rum	(n=6)	(n=3)
Gathering	4 (66.7)	0 (0.0)
Feel unhappy	1 (16.7)	1 (33.3)
Feel happy	0 (0.0)	2 (66.7)
Want to use	1 (16.7)	0 (0.0)
Palm juice	(n=1)	(n=9)
Gathering	0 (0.0)	2 (22.2)
Special occasion	1 (100.0)	0 (0.0)
Feel unhappy	0 (0.0)	1 (11.1)
Feel happy	0 (0.0)	3 (33.3)
Want to use	0 (0.0)	3 (33.3)

Table (16) shows the pattern of different type of alcohol consumption within six months in terms of amount, frequency, with whom they consumed alcohol together, time of consumption and reasons. Regarding beer consumption, mean amount they consumed

was 4.1±2.7 and 4.4 ± 2.9 standard drinks (ethanol concentration of 41 and 44 grams), Over 42% of young MSM consumed 1-3 times per week and 38% of adult MSM consumed 1 time per month. Over half of young MSM consumed beer together with their friends while 44.4% of adult MSM consumed together with their MSM friends. Majority of both MSM consumed beer in the evening or at night (96.3%, 98.8%). Nearly 30% of young MSM and 37% of adult MMS consumed beer with the reason of friends' gathering.

Table 16 Pattern of different types of alcohol consumption by age group of MSM within six months

	Age group	
	18-24 years	**≥25 years**
Amount of alcohol use		
Beer	(n=54)	(n=81)
Mean ± SD	4.1 ± 2.7	4.4 ± 2.9
Min – Max	1.3 – 13.0	0.5 – 15.6
Wine	(n=5)	(n=9)
Mean ± SD	6.3 ± 3.7	4.1 ± 2.8
Min – Max	1.3 – 10.0	0.5 – 7.7
Whisky	(n=18)	(n=18)
Mean ± SD	6.3 ± 3.1	6.5 ± 4.1
Min – Max	2.5 – 10.1	1.9 – 15.6
Rum	(n=5)	(n=1)
Mean ± SD	5.7 ± 3.2	Not applicable
Min – Max	2.6 – 10.4	
Palm juice	(n=3)	(n=9)
Mean ± SD	4.9 ± 3.6	4.6 ± 2.5
Min – Max	2.6 – 9.1	1.5 – 8.0
Frequency of alcohol use		
Beer	(n=54)	(n=81)
1/month	19 (35.2)	31 (38.2)
2-4/month	10 (18.5)	23 (28.4)
1-3/week	23 (42.6)	27 (33.3)

>3/week	2 (3.7)	0 (0.0)
Wine	(n=5)	(n=9)
1/month	2 (40.0)	4 (44.4)
2-4/month	1 (20.0)	1 (11.1)
1-3/week	2 (40.0)	4 (44.4)
Whisky	(n=18)	(n=18)
1/month	3 (16.7)	4 (22.2)
2-4/month	1 (5.6)	6 (33.3)
1-3/week	13 (72.2)	8 (44.5)
>3/week	1 (5.6)	0 (0.0)
Rum	(n=5)	(n=1)
2-4/month	1 (20.0)	0 (0.0)
1-3/week	4 (80.0)	1 (100.0)
Palm juice	(n=3)	(n=9)
1/month	2 (66.7)	2 (22.2)
2-4/month	0 (0.0)	4 (44.4)
1-3/week	1 (33.3)	3 (33.3)
With whom consume alcohol together		
Beer	(n=54)	(n=81)
Friends	29 (53.7)	34 (42.0)
MSM friends	21 (38.9)	36 (44.4)
Sexual partner	2 (3.7)	5 (6.1)
Alone	2 (3.7)	6 (7.7)
Wine	(n=5)	(n=9)
Friends	1 (20.0)	3 (33.3)
MSM friends	4 (80.0)	5 (55.6)
Alone	0 (0.0)	1 (11.1)
Whisky	(n=18)	(n=18)
Friends	11 (61.1)	9 (50.0)
MSM friends	7 (38.9)	8 (44.4)
Sexual partners	0 (0.0)	1 (5.6)

Rum	(n=5)	(n=1)
Friends	4 (80.0)	0 (0.0)
MSM friends	1 (20.0)	0 (0.0)
Alone	0 (0.0)	1 (100.0)
Palm juice	(n=3)	(n=9)
Friends	1 (33.3)	4 (44.4)
MSM friends	2 (66.7)	4 (44.4)
Alone	0 (0.0)	1 (11.1)
Timing of alcohol consumption		
Beer	(n=54)	(n=81)
Morning/afternoon	1 (1.9)	0 (0.0)
Evening/night	52 (96.3)	80 (98.8)
Whole day	1 (1.9)	1 (1.2)
Wine	(n=5)	(n=9)
Morning/afternoon	0 (0.0)	1 (11.1)
Evening/night	5 (100.0)	8 (88.9)
Whisky	(n=18)	(n=18)
Morning/afternoon	1 (5.6)	0 (0.0)
Evening/night	17 (94.5)	17 (94.5)
Whole day	0 (0.0)	1 (5.6)
Rum	(n=5)	(n=1)
Evening/night	5 (100.0)	1 (100.0)
Palm juice	(n=3)	(n=9)
Evening/night	3 (100.0)	9 (100.0)
Reason of alcohol consumption		
Beer	(n=54)	(n=81)
Gathering	16 (29.6)	30 (37.0)
Special occasion	0 (0.0)	4 (4.9)
Feel unhappy	7 (13.3)	4 (4.9)
Feel happy	13 (24.1)	22 (27.2)
Want to use	14 (26.0)	18 (22.2)

Attract sexual partner	4 (7.4)	3 (3.7)
Wine	(n=5)	(n=9)
Gathering	0 (0.0)	4 (44.4)
Social occasion	1 (20.0)	0 (0.0)
Feel happy	3 (60.0)	3 (33.3)
Want to use	1 (20.0)	2 (22.2)
Whisky	(n=18)	(n=18)
Gathering	5 (27.8)	7 (38.9)
Feel unhappy	3 (16.7)	0 (0.0)
Feel happy	2 (11.1)	2 (11.1)
Want to use	6 (33.3)	9 (50.0)
Attract sexual partner	2 (11.1)	0 (0.0)
Rum	(n=5)	(n=1)
Gathering	3 (60.0)	0 (0.0)
Feel unhappy	1 (20.0)	0 (0.0)
Feel happy	0 (0.0)	1 (100.0)
Want to use	1 (20.0)	0 (0.0)
Palm juice	(n=3)	(n=9)
Gathering	1 (33.3)	1 (11.1)
Feel happy	0 (0.0)	4 (44.4)
Want to use	2 (66.7)	4 (44.4)

Table (17) shows the pattern of different type of alcohol consumption within one year. Amount, frequency, with whom they consumed alcohol together, time of consumption and reasons of alcohol consumption were included.

Table 17 Pattern of different types of alcohol consumption by age group of MSM within one year

	Age group	
	18-24 years	**≥25 years**
Amount of alcohol use		
Beer	(n=64)	(n=86)
Mean ± SD	3.8 ± 2.5	4.5 ± 3.0
Min – Max	0.5 – 13.0	0.5 – 15.6
Wine	(n=4)	(n=12)
Mean ± SD	3.8 ± 3.6	3.6 ± 3.4
Min – Max	1.3 – 9.1	0.5 – 7.7
Whisky	(n=20)	(n=19)
Mean ± SD	6.0 ± 2.6	6.2 ± 4.2
Min – Max	2.5 – 10.0	1.2 – 15.6
Rum	(n=8)	(n=3)
Mean ± SD	4.6 ± 2.1	3.2 ± 0.7
Min – Max	2.6 – 8.0	2.6 – 4.0
Palm juice	(n=4)	(n=10)
Mean ± SD	4.1 ± 3.5	3.9 ± 2.4
Min – Max	0.6 – 9.1	1.5 – 8.0
Frequency of alcohol use		
Beer	(n=64)	(n=86)
1/month	26 (40.6)	31 (36.0)
2-4/month	11 (17.2)	24 (27.9)
1-3/week	25 (39.1)	31 (36.0)
>3/week	2 (3.1)	0 (0.0)
Wine	(n=4)	(n=12)
1/month	1 (25.0)	5 (41.6)
2-4/month	1 (25.0)	3 (25.0)
1-3/week	2 (50.0)	4 (33.4)
Whisky	(n=20)	(n=19)
1/month	4 (20.0)	6 (3.6)

2-4/month	2 (10.0)	5 (26.3)
1-3/week	13 (65.0)	7 (36.8)
>3/week	1 (5.0)	1 (5.3)
Rum	(n=8)	(n=3)
1/month	3 (37.5)	0 (0.0)
2-4/month	1 (12.5)	0 (0.0)
1-3/week	4 (50.0)	3 (100.0)
Palm juice	(n=4)	(n=10)
1/month	2 (50.0)	4 (40.0)
2-4/month	0 (0.0)	3 (30.0)
1-3/week	2 (50.0)	3 (30.0)
With whom consume alcohol together		
Beer	(n=64)	(n=86)
Friends	33 (51.6)	34 (39.6)
MSM friends	25 (39.1)	43 (50.0)
Sexual partner	3 (4.7)	3 (3.5)
Alone	3 (4.7)	6 (7.0)
Wine	(n=4)	(n=12)
Friends	1 (25.0)	6 (50.0)
MSM friends	3 (75.0)	5 (41.7)
Sexual partner	0 (0.0)	1 (8.3)
Whisky	(n=20)	(n=19)
Friends	13 (65.0)	6 (36.9)
MSM friends	7 (35.0)	9 (47.4)
Sexual partners	0 (0.0)	1 (5.3)
Alone	0 (0.0)	2 (10.6)
Rum	(n=8)	(n=3)
Friends	6 (75.0)	2 (66.6)
MSM friends	1 (12.5)	0 (0.0)
Alone	1 (12.5)	1 (33.3)
Palm juice	(n=4)	(n=10)

Friends	1 (25.0)	2 (20.0)
MSM friends	1 (25.0)	0 (0.0)
Sexual partners	2 (50.0)	7 (70.0)
Alone	0 (0.0)	1 (10.0)
Timing of alcohol consumption		
Beer	(n=64)	(n=86)
Morning/afternoon	2 (3.1)	2 (2.3)
Evening/night	61 (95.3)	83 (96.5)
Whole day	1 (1.6)	1 (1.2)
Wine	(n=4)	(n=12)
Evening/night	4 (100.0)	12 (100.0)
Whisky	(n=20)	(n=19)
Morning/afternoon	2 (10.0)	0 (0.0)
Evening/night	18 (90.0)	18 (94.7)
Whole day	0 (0.0)	1 (5.3)
Rum	(n=8)	(n=3)
Evening/night	8 (100.0)	1 (100.0)
Palm juice	(n=4)	(n=10)
Morning/afternoon	0 (0.0)	3 (30.0)
Evening/night	4 (100.0)	7 (70.0)
Reason of alcohol consumption		
Beer	(n=64)	(n=86)
Gathering	23 (35.9)	33 (38.4)
Special occasion	1 (1.6)	4 (4.7)
Feel unhappy	9 (14.1)	5 (5.8)
Feel happy	13 (20.3)	18 (20.9)
Want to use	15 (23.4)	24 (27.9)
Attract sexual partner	3 (4.7)	2 (2.3)
Wine	(n=4)	(n=12)
Gathering	0 (0.0)	6 (50.0)
Social occasion	1 (25.0)	1 (8.3)

Feel happy	2 (50.0)	3 (25.0)
Want to use	1 (25.0)	2 (16.6)
Whisky	(n=20)	(n=19)
Gathering	4 (20.0)	8 (42.1)
Special occasion	0 (0.0)	1 (5.3)
Feel unhappy	3 (15.0)	0 (0.0)
Feel happy	3 (15.0)	2 (10.5)
Want to use	5 (40.0)	8 (42.2)
Attract sexual partner	2 (10.0)	0 (0.0)
Rum	(n=8)	(n=3)
Gathering	4 (50.0)	1 (33.3)
Feel unhappy	2 (25.0)	0 (0.0)
Feel happy	1 (12.5)	2 (66.7)
Want to use	1 (12.5)	0 (0.0)
Palm juice	(n=4)	(n=10)
Gathering	1 (25.0)	1 (10.0)
Feel happy	0 (0.0)	5 (50.0)
Want to use	3 (75.0)	4 (40.0)

Binge drinking at different time period according to the age groups of MSM is described in Table (18). Within one month, around half of MSM from both groups had experienced of binge drinking. Similarly, nearly 43% of MSM and over one-third of MSM from both groups had binge drinking within three months and in their life time respectively.

Table 18 Binge drinking at different time period according to the age groups of MSM from Yangon and Mandalay

Binge drinking	**Age group**		**p value**
	15-24 years n(%)	**≥25 years n(%)**	
Within one month	(n=58)	(n=82)	0.7
Non-binge drinking	29 (50.0)	43 (52.4)	

Binge drinking	29 (50.0)	39 (47.6)	
Within three months	(n=63)	(n=89)	0.9
Non-binge drinking	36 (57.1)	50 (56.2)	
Binge drinking	27 (42.9)	39 (42.8)	
Within six months	(n=69)	(n=95)	0.4
Non-binge drinking	43 (62.3)	54 (56.8)	
Binge drinking	26 (37.7)	41 (43.2)	
Within one year	(n=78)	(n=105)	0.7
Non-binge drinking	47 (60.3)	61 (58.1)	
Binge drinking	31 (39.7)	44 (41.9)	
Lifetime	(n=94)	(n=131)	0.9
Non-binge drinking	60 (62.8)	84 (64.1)	
Binge drinking	34 (36.2)	47 (35.9)	

According to Table (19), binge drinking was associated with type of MSM. At different time periods, higher proportions of Thange (partner of MSM) had experienced of binge drinking than apwint (open type) and apone (hidden type) and the association was statistically significant ($p<0.05$).

Table 19 Binge drinking according to the type of MSM at different time period among MSM from Yangon and Mandalay

	Type of MSM			p-value
	Apwint (Open) n (%)	Apone (Hidden) n (%)	Thange (Partner) n (%)	
Within one month	(n=53)	(n=46)	(n=41)	0.0001
Non-binge drinking	35 (66.0)	27 (58.7)	10 (24.4)	
Binge drinking	18 (34.0)	19 (41.3)	31 (75.6)	
Within three months	(n=58)	(n=51)	(n=43)	0.01
Non-binge drinking	37 (63.8)	33 (64.7)	16 (37.2)	
Binge drinking	21 (36.2)	18 (35.3)	27 (62.8)	

Within six months	(n=70)	(n=50)	(n=44)	0.04
Non-binge drinking	45 (64.3)	33 (66.0)	19 (43.2)	
Binge drinking	25 (35.7)	17 (34.0)	25 (56.8)	
Within one year	(n=82)	(n=53)	(n=48)	0.01
Non-binge drinking	55 (67.1)	33 (62.3)	20 (41.7)	
Binge drinking	27 (32.9)	20 (37.7)	28 (58.3)	
Lifetime	(n=107)	(n=63)	(n=55)	0.003
Non-binge drinking	77 (72.0)	42 (66.7)	25 (45.5)	
Binge drinking	30 (28.0)	21 (33.3)	30 (54.5)	

4.4 Substance use among MSM

Table (20) describes substance use at different time periods according to age group of MSM. Over 47% of young MSM and nearly one third of adult MSM used any kind of substance in their life time. On the other hand, nearly 13-19% of young MSM and 5-8% of adult MSM used any kind of substance at other time periods.

Table 20 Substance use at different time periods according to the age group of MSM from Yangon and Mandalay

Characteristics	**Age group**	
	18-24 years n=110, n(%)	**≥25 years n=146, n(%)**
Used any kind of substance in one month		
No	95 (86.4)	138 (94.5)
Yes	15 (13.6)	8 (5.5)
Used any kind of substance in three months		
No	96 (87.3)	136 (93.2)
Yes	14 (12.7)	10 (6.8)
Used any kind of substance in six months		
No	94 (85.5)	135 (92.5)
Yes	16 (14.5)	11 (7.5)
Used any kind of substance in one year		
No	89 (80.9)	134 (91.8)
Yes	21 (19.1)	12 (8.2)
Used any kind of substance in life time		
No	58 (52.7)	101 (69.2)
Yes	52 (47.3)	45 (30.8)

As shown in Table (21), mean age at first time of substance use was 17.5 ± 2.8 years for young MSM group and 22.5 ± 5.2 years among adult MSM group. Tobacco was the commonest type used by MSM (38.5% and 46.7%) which was followed by methamphetamine (36.5% and 33.3%) and marijuana (17.3% and 8.9%). In addition, nearly 58% from both group of MSM used substance with their friends. The most

common reason they cited for first time use of substance was “want to test” in young MSM (69.2%) and adult MSM (55.6%).

Table 21 First time use of substance according to the age group of MSM from Yangon and Mandalay

Characteristics	**Age group**	
	18-24 years n(%)	**≥25 years n(%)**
Age at first use of substance	(n=52)	(n=45)
Mean ± SD	17.5 ± 2.8	22.5 ± 5.2
Min - Max	10.0 – 24.0	13.0 – 40.0
Type of substance used at the first time*	(n=52)	(n=45)
Tobacco	20 (38.5)	21 (46.7)
Methamphetamine	19 (36.5)	15 (33.3)
Marijuana	9 (17.3)	4 (8.9)
Ice	2 (3.8)	2 (4.4)
Heroin	1 (1.9)	2 (4.4)
With whom at first time of substance use*	(n=52)	(n=45)
Friends	30 (57.7)	26 (57.8)
MSM friends	10 (19.2)	12 (26.7)
Colleagues from work	2 (3.8)	1 (2.2)
Permanent/non-permanent sexual partners	2 (3.8)	6 (13.4)
Alone	6 (11.5)	2 (4.4)
Reason for first time use*	(n=52)	(n=45)
Want to test	36 (69.2)	25 (55.6)
Friends are using	11 (21.2)	15 (33.3)
Friends’ gathering	5 (9.6)	5 (11.1)
Feel unhappy/stressful	5 (9.6)	1 (2.2)
To attract sexual partner	3 (5.8)	2 (4.4)
Special occasion	1 (1.9)	2 (4.4)
Feel happy	0 (0.0)	2 (4.4)

*Multiple responses

Table (22) shows amphetamine use by age groups of MSM at different time period. About 20% of MSM from young age group and about 17% of MSM from adult age group used methamphetamine within one and three months. On the other hand, nearly half from young MSM group and over one third from adult MSM group used amphetamine within life time.

Table 22 Methamphetamine use at different time period by the age groups of MSM from Yangon and Mandalay

	Age group	
	18-24 years	**≥25 years**
Methamphetamine use	**n=52, n(%)**	**n=45, n(%)**
Within one month		
No	42 (80.8)	38 (84.4)
Yes	10 (19.2)	7 (15.6)
Within three months		
No	41 (78.8)	37 (82.2)
Yes	11 (21.2)	8 (17.8)
Within six months		
No	41 (78.8)	38 (34.4)
Yes	11 (21.2)	7 (15.6)
Within one year		
No	37 (71.2)	38 (84.4)
Yes	15 (28.8)	7 (15.6)
Within life time		
No	27 (51.9)	29 (64.4)
Yes	25 (48.1)	16 (35.6)

As shown in Table (23), nearly one fourth of young MSM and 11.1% of adult MSM used marijuana in their life time. Likewise, nearly 10% of MSM from young age group and 2-4% of MSM from adult age group used marijuana at other time periods.

Table 23 Marijuana use at different time period by the age groups of MSM from Yangon and Mandalay

	Age group	
	18-24 years	**≥25 years**
Marijuana use	**n=52, n(%)**	**n=45, n(%)**
Within one month		
No	47 (90.4)	44 (97.8)
Yes	5 (9.6)	1 (2.2)
Within three months		
No	47 (90.4)	44 (97.8)
Yes	5 (9.6)	1 (2.2)
Within six months		
No	47 (90.4)	43 (95.6)
Yes	5 (9.6)	2 (4.4)
Within one year		
No	46 (88.5)	44 (97.8)
Yes	6 (11.5)	1 (2.2)
Within life time		
No	40 (76.9)	40 (88.9)
Yes	12 (23.1)	5 (11.1)

Table (24) describes using ice by age groups of MSM at different time period. Nearly 4-6% of young MSM and about 2-5% of adult MSM had experience of using ice within six months and one year respectively. In their life time, 9.6% of young MSM and 6.7% of adult MSM used ice.

Table 24 Ice use at different time period by the age groups of MSM from Yangon and Mandalay

	Age group	
	18-24 years	**≥25 years**
Ice use	**n=52, n(%)**	**n=45, n(%)**
Within one month		
No	51 (98.1)	45 (100.0)

Yes	1 (1.9)	0 (0.0)
Within three months		
No	51 (98.1)	44 (97.8)
Yes	1 (1.9)	1 (2.2)
Within six months		
No	50 (96.2)	44 (97.8)
Yes	2 (3.8)	1 (2.2)
Within one year		
No	49 (94.2)	42 (95.5)
Yes	3 (5.8)	2 (4.5)
Within life time		
No	47 (90.4)	42 (93.3)
Yes	5 (9.6)	3 (6.7)

Table (25) descries the pattern of different types of substance use within one month in terms of amount, frequency, with whom they drink together, time of consumption and reasons. Regarding methamphetamine use, mean amount they use was 219.0 ± 147.1 mg among young MSM and 218.5 ± 242.4 mg among adult MSM. Additionally, 60% of young MSM and nearly 30% of adult MSM used methamphetamine 5-7 times per week. Nearly 43% of adult MSM used methamphetamine with their MSM friends while 60% of young MSM use methamphetamine alone. Similarly, 60% of MSM from young age group used marijuana with their friends. Most of both MSM used methamphetamine in the evening or at night (70%%, 85.7%). Nearly one third of young MSM and 57.2% of adult MSM use methamphetamine with the reason of "Want to use".

Table 25 Pattern of substance use at different time periods according to the age group of MSM within one month

	Age group	
	18-24 years	**≥25 years**
Amount of substance use		
Methamphetamine (n=17)	(n=10)	(n=7)

Mean ± SD (mg)	219.0 ± 147.1	218.5 ± 242.4
Min - Max	15.0 – 500.0	30.0 – 750.0
Marijuana (n=6)	(n=5)	(n=1)
Mean ± SD (puff)	7.4 ± 7.1	Not applicable
Min - Max	1.0 – 15.0	
Frequency of substance use		
Methamphetamine	(n=10)	(n=7)
1-2 times	0 (0.0)	2 (28.6)
1-3/month	2 (20.0)	1 (14.3)
1-4/week	2 (20.0)	2 (28.6)
5-7/week	6 (60.0)	2 (28.6)
Marijuana	(n=5)	(n=1)
1-2 times	4 (80.0)	0 (0.0)
5-7/week	1 (20.0)	1 (100.0)
With whom use substance together		
Methamphetamine		
Friends	1 (10.0)	3 (42.9)
MSM friends	3 (30.0)	3 (42.9)
Sexual partner	0 (0.0)	0 (0.0)
Alone	6 (60.0)	1 (14.3)
Marijuana	(n=5)	(n=1)
Friends	3 (60.0)	0 (0.0)
MSM friends	1 (20.0)	0 (0.0)
Sexual partner	0 (0.0)	0 (0.0)
Alone	1 (20.0)	1 (100.0)
Timing of substance use		
Methamphetamine		
Morning/afternoon	2 (20.0)	0 (0.0)
Evening/night	7 (70.0)	6 (85.7)
Whole day	1 (10.0)	1 (14.1)
Marijuana	(n=5)	(n=1)

Morning/afternoon	2 (40.0)	0 (0.0)
Evening/night	2 (40.0)	0 (0.0)
Whole day	1 (20.0)	1 (100.0)
Reason of substance use		
Methamphetamine		
Gathering	0 (0.0)	1 (14.3)
Feel unhappy	3 (30.0)	2 (28.6)
Feel happy	1 (10.0)	0 (0.0)
Want to use	6 (60.0)	4 (57.2)
Marijuana	(n=5)	(n=1)
Feel unhappy	2 (40.0)	1 (100.0)
Want to use	3 (60.0)	0 (0.0)

Table (26) describes the pattern of different types of substance use within three months. The mean amount of methamphetamine use among young MSM and adult MSM were 199.0 ± 146.9 mg and 206.2 ± 225.8 mg respectively. Regarding methamphetamine use, 72.7% from young age group of MSM used methamphetamine 5 to 7 times per week. Among young MSM, 72.7% of them used methamphetamine alone. On the other hand, half of adult MSM used methamphetamine used with their MSM friends. Most of both MSM used methamphetamine in the evening or at night (63.7%, 87.5%). Over half of young MSM and more than one third of adult MSM used methamphetamine with the reason of "Want to use".

Table 26 Pattern of substance use at different time periods according to the age group of MSM within three months

	Age group	
	18-24 years	**≥25 years**
Amount of substance use		
Methamphetamine	(n=11)	(n=8)
Mean ± SD (mg)	199.0 ± 146.9	206.2 ± 225.8
Min - Max	15.0 – 500.0	75.0 – 750.0

Marijuana	(n=4)	(n=1)
Mean ± SD (puff)	17.0 ± 17.0	Not applicable
Min - Max	1.0 – 35.0	
Frequency of substance use		
Methamphetamine	(n=11)	(n=8)
1-2 times	0 (0.0)	2 (25.0)
1-3/month	1 (9.1)	2 (25.0)
1-4/week	2 (18.2)	2 (25.0)
5-7/week	8 (72.7)	2 (25.0)
Marijuana	(n=4)	(n=1)
1-2 times	1 (25.0)	0 (0.0)
1-3/month	1 (25.0)	0 (0.0)
5-7/week	2 (50.0)	1 (100.0)
With whom use substance together		
Methamphetamine		
Friends	1 (9.1)	3 (37.5)
MSM friends	2 (18.2)	4 (50.0)
Alone	8 (72.7)	1 (12.5)
Marijuana	(n=4)	(n=1)
Friends	2 (50.0)	0 (0.0)
MSM friends	1 (25.0)	0 (0.0)
Alone	1 (25.0)	1 (100.0)
Timing of substance use		
Methamphetamine		
Morning/afternoon	2 (18.2)	0 (0.0)
Evening/night	7 (63.7)	7 (87.5)
Whole day	2 (18.2)	1 (12.5)
Marijuana	(n=4)	(n=1)
Evening/night	1 (25.0)	0 (0.0)
Whole day	3 (75.0)	1 (100.0)
Reason of substance use		

Methamphetamine		
Gathering	0 (0.0)	2 (25.0)
Feel unhappy	4 (36.4)	1 (12.5)
Feel happy	1 (9.1)	0 (0.0)
Want to use	6 (54.5)	5 (62.5)
Marijuana	(n=4)	(n=1)
Feel unhappy	0 (0.0)	1 (100.0)
Want to use	4 (100.0)	0 (0.0)

The pattern of different types of substance use within six months is shown in Table (27). The mean amount of methamphetamine use among young MSM and adult MSM were 219.0 ± 143.5 mg and 214.2 ± 242.7 mg respectively. Nearly 64% from young age group of MSM used methamphetamine 5 to 7 times per week. In addition, 42.9% of adult MSM used methamphetamine 1 to 2 times within six months. Among young MSM, 54.5% of them used methamphetamine alone. On the other hand, 42.9% of adult MSM used methamphetamine with either their friends or MSM friends. About 73% of MSM from both age groups used methamphetamine in the evening or at night. Similarly, about 45% of young MSM and 71.5% of adult MSM used methamphetamine with the reason of "Want to use".

Table 27 Pattern of substance use at different time periods according to the age group of MSM within six months

	Age group	
	18-24 years	**≥25 years**
Amount of substance use		
Methamphetamine	(n=11)	(n=7)
Mean ± SD (mg)	219.0 ± 143.5	214.2 ± 242.7
Min - Max	15.0 – 500.0	75.0 – 750.0
Marijuana	(n=5)	(n=2)
Mean ± SD (puff)	13.8 ± 13.5	Not applicable
Min - Max	1.0 – 35.0	

Frequency of substance use		
Methamphetamine	(n=11)	(n=7)
1-2 times	1 (9.1)	3 (42.9)
1-3/month	1 (9.1)	0 (0.0)
1-4/week	2 (18.2)	2 (28.6)
5-7/week	7 (63.6)	2 (28.6)
Marijuana	(n=5)	(n=2)
1-2 times	3 (60.0)	1 (50.0)
5-7/week	2 (40.0)	1 (50.0)
With whom use substance together		
Methamphetamine	(n=11)	(n=7)
Friends	2 (18.2)	3 (42.9)
MSM friends	3 (27.3)	3 (42.9)
Alone	6 (54.5)	1 (14.3)
Marijuana	(n=5)	(n=2)
Friends	3 (60.0)	1 (50.0)
MSM friends	1 (20.0)	0 (0.0)
Alone	1 (20.0)	1 (50.0)
Timing of substance use		
Methamphetamine	(n=11)	(n=7)
Morning/afternoon	2 (18.2)	1 (14.3)
Evening/night	8 (72.8)	5 (71.5)
Whole day	1 (9.1)	1 (14.3)
Marijuana	(n=5)	(n=2)
Morning/afternoon	2 (40.0)	1 (50.0)
Evening/night	1 (20.0)	0 (0.0)
Whole day	2 (40.0)	1 (50.0)
Reason of substance use		
Methamphetamine	(n=11)	(n=7)
Gathering	1 (9.1)	1 (14.3)
Feel unhappy	5 (45.5)	1 (14.3)

Want to use	5 (45.5)	5 (71.5)
Marijuana	(n=5)	(n=2)
Gathering	0 (0.0)	1 (50.0)
Feel unhappy	2 (40.0)	1 (50.0)
Want to use	3 (60.0)	0 (0.0)

Table (28) shows the pattern of different types of substance use within one year. The mean amount of methamphetamine use among young MSM and adult MSM were 188.6 ± 132.6 mg and 214.2 ± 242.7 mg respectively. Over 53% from young age group of MSM used methamphetamine 5 to 7 times per week. Additionally, 42.9% of adult MSM used methamphetamine 1 to 2 times within six months. Among young MSM, 53.3% of them used methamphetamine alone. On the other hand, 28.6% of adult MSM used methamphetamine with either their friends or MSM friends. One third of young MSM and 71.4% of adult MSM used methamphetamine in the evening or at night. Moreover, 46.7% of young MSM and 71.4% of adult MSM used methamphetamine with the reason of "Want to use".

Table 28 Pattern of substance use at different time periods according to the age group of MSM within one year

	Age group	
	18-24 years	**≥25 years**
Amount of substance use		
Methamphetamine	(n=15)	(n=7)
Mean ± SD (mg)	188.6 ± 132.6	214.2 ± 242.7
Min - Max	15.0 – 500.0	75.0 – 750.0
Marijuana	(n=6)	(n=1)
Mean ± SD (puff)	25.2 ± 28.7	Not applicable
Min - Max	1.0 -75.0	
Ice	(n=3)	(n=2)
Mean ± SD	240.0 ± 196.9	Not applicable
Min - Max	20.0 – 400.0	

Frequency of substance use		
Methamphetamine	(n=15)	(n=7)
1-2 times	3 (20.0)	3 (42.9)
1-3/month	2 (13.3)	0 (0.0)
1-4/week	2 (13.3)	2 (28.6)
5-7/week	8 (53.4)	2 (28.6)
Marijuana	(n=6)	(n=1)
1-2 times	2 (33.3)	1 (100.0)
1-3/month	1 (16.7)	0 (0.0)
5-7/week	3 (50.0)	0 (0.0)
Ice	(n=3)	(n=2)
1-2 times	1 (33.3)	1 (50.0)
1-3/month	1 (33.3)	0 (0.0)
5-7/week	1 (33.3)	1 (50.0)
With whom use substance together		
Methamphetamine	(n=15)	(n=7)
Friends	4 (26.1)	4 (57.2)
MSM friends	3 (20.0)	2 (28.6)
Alone	8 (53.3)	1 (14.3)
Marijuana	(n=6)	(n=1)
Friends	4 (66.7)	0 (0.0)
MSM friends	1 (16.7)	1 (100.0)
Alone	1 (16.7)	0 (0.0)
Ice	(n=3)	(n=2)
Friends	1 (33.3)	1 (50.0)
Sexual partner	1 (33.3)	0 (0.0)
Alone	1 (33.3)	1 (50.0)
Timing of substance use		
Methamphetamine	(n=15)	(n=7)
Morning/afternoon	3 (20.0)	1 (14.3)
Evening/night	10 (66.6)	5 (71.4)

Whole day	2 (13.4)	1 (14.3)
Marijuana	(n=6)	(n=1)
Morning/afternoon	1 (16.7)	0 (0.0)
Evening/night	2 (33.3)	1 (100.0)
Whole day	3 (50.0)	0 (0.0)
Ice	(n=3)	(n=2)
Morning/afternoon	1 (33.3)	1 (50.0)
Evening/night	2 (66.7)	0 (0.0)
Whole day	0 (0.0)	1 (50.0)
Reason of substance use		
Methamphetamine	(n=15)	(n=7)
Gathering	2 (13.3)	1 (14.3)
Feel unhappy	5 (33.3)	1 (14.3)
Feel happy	1 (6.7)	0 (0.0)
Want to use	7 (46.7)	5 (71.4)
Marijuana	(n=6)	(n=1)
Feel unhappy	1 (16.7)	0 (0.0)
Want to use	5 (83.4)	1 (100.0)
Ice	(n=3)	(n=2)
Want to use	3 (100.0)	2 (100.0)

The pattern of different types of substance use according to age group in their life time is described in Table (29). The mean amount of methamphetamine use among young MSM and adult MSM were 153.7 ± 124.3 mg and 162.1 ± 169.1 mg respectively. About 40% young MSM and 56.3% of adult MSM used methamphetamine 1 to 2 times per week in their life time. About half of MSM from both age group used methamphetamine with their friends. Nearly 70% of young MSM and 75% of adult MSM used methamphetamine in the evening or at night. Moreover, the common reason they cited was “Want to use”.

Table 29 Pattern of substance use at different time periods according to the age group of MSM within lifetime

	Age group	
	18-24 years	**≥25 years**
Amount of substance use		
Methamphetamine	(n=25)	(n=16)
Mean ± SD (mg)	153.7 ± 124.3	162.1 ± 169.1
Min - Max	10.0 – 500.0	15.0 -750.0
Marijuana	(n=12)	(n=5)
Mean ± SD (puff)	22.0 ± 27.0	6.8 ± 7.4
Min - Max	1.0 – 75.0	1.0 – 15.0
Ice	(n=5)	(n=3)
Mean ± SD	163.0 ± 175.0	266.6 ± 115.4
Min - Max	20.0 – 400.0	200.0 – 400.0
Frequency of substance use		
Methamphetamine	(n=25)	(n=16)
1-2 times	10 (40.0)	9 (56.3)
1-3/month	4 (16.0)	2 (12.5)
1-4/week	2 (8.0)	2 (12.5)
5-7/week	9 (36.0)	3 (18.8)
Marijuana	(n=12)	(n=5)
1-2 times	7 (58.3)	3 (60.0)
1-3/month	2 (16.7)	1 (20.0)
5-7/week	3 (25.0)	1 (20.0)
Ice	(n=5)	(n=3)
1-2 times	3 (60.0)	1 (33.3)
1-3/month	1 (20.0)	0 (0.0)
5-7/week	1 (20.0)	2 (66.7)
With whom use substance together		
Methamphetamine	(n=25)	(n=16)
Friends	12 (48.0)	8 (50.0)

MSM friends	7 (28.0)	5 (31.3)
Sexual partners	0 (0.0)	2 (12.6)
Alone	6 (24.0)	1 (6.3)
Marijuana	(n=12)	(n=5)
Friends	9 (75.0)	3 (60.0)
MSM friends	2 (16.7)	1 (20.0)
Alone	1 (8.3)	1 (20.0)
Ice	(n=5)	(n=3)
Friends	1 (20.0)	1 (33.3)
MSM friends	3 (60.0)	0 (0.0)
Sexual partner	0 (0.0)	1 (33.3)
Alone	1 (20.0)	1 (33.3)
Timing of substance use		
Methamphetamine	(n=25)	(n=16)
Morning/afternoon	4 (16.0)	1 (6.2)
Evening/night	17 (68.0)	12 (75.0)
Whole day	4 (16.0)	3 (18.8)
Marijuana	(n=12)	(n=5)
Morning/afternoon	2 (16.7)	2 (40.0)
Evening/night	6 (50.0)	1 (20.0)
Whole day	4 (33.3)	2 (40.0)
Ice	(n=5)	(n=3)
Morning/afternoon	1 (20.0)	1 (33.3)
Evening/night	3 (60.0)	1 (33.3)
Whole day	1 (20.0)	1 (33.3)
Reason of substance use		
Methamphetamine	(n=25)	(n=16)
Gathering	4 (16.0)	3 (18.8)
Special occasion	2 (8.0)	0 (0.0)
Feel unhappy	4 (16.0)	1 (6.3)
Feel happy	1 (4.0)	2 (12.5)

Want to use	14 (56.0)	10 (56.3)
Marijuana	(n=12)	(n=5)
Gathering	1 (8.3)	2 (40.0)
Special occasion	1 (8.3)	0 (0.0)
Feel unhappy	2 (16.7)	1 (20.0)
Want to use	8 (66.7)	2 (40.0)
Ice	(n=5)	(n=3)
Gathering	1 (20.0)	1 (33.3)
Special occasion	1 (20.0)	0 (0.0)
Want to use	3 (60.0)	2 (66.7)

4.5 The Alcohol, Smoking and Substance Involvement Screening Test (ASSIST)

Different levels of risk from substance use according to age groups of MSM is shown in Table (30). For both age group among substance users, majority of MSM (89% to 95%) had moderate risk from tobacco use. Similarly, most of MSM from both age group (90.9% to 87.5%) had moderate risk from amphetamine use. On the other hand, 76.2% of young MSM and 65.2% of adult MSM had low risk from alcohol consumption.

Table 30 Different levels of risk according to type of substance use and age group of MSM

	Age group	
	18-24 years	**≥25 years**
	n (%)	**n (%)**
Tobacco	(n=20)	(n=18)
Low risk	0 (0.0)	2 (11.1)
Moderate risk	19 (95.0)	16 (88.9)
High risk	1 (5.0)	0 (0.0)
Alcohol	(n=63)	(n=89)
Low risk	48 (76.2)	58 (65.2)
Moderate risk	14 (22.2)	29 (32.6)
High risk	1 (1.6)	2 (2.2)
Marijuana	(n=4)	(n=1)
Low risk	1 (25.0)	0 (0.0)
Moderate risk	2 (50.0)	0 (0.0)
High risk	1 (25.0)	1 (100.0)
Methamphetamine	(n=11)	(n=8)
Low risk	0 (0.0)	1 (12.5)
Moderate risk	10 (90.9)	7 (87.5)
High risk	1 (9.1)	0 (0.0)

4.6 Sexual behaviors among MSM

All MSM in the study have experienced sexual intercourse with men in their lifetime. Mean age of first sex among them was 17.3 ± 3.1 and ranged from 11 to 27 years (data not shown in table). As shown in Table (31), proportions of MSM who had sex with men were around 67% in both groups at one month and over 75% in both groups at three months. In addition, 84.5% of young MSM and 91.8% of adult MSM had sex within one year.

Table 31 Proportions of MSM who had sex at different time periods according to the age group of MSM

	Age group	
	18-24 years n=110, n(%)	**≥25 years n=146, n(%)**
Sex within one month		
No	36 (32.7)	49 (33.6)
Yes	74 (67.3)	97 (66.4)
Within three months		
No	27 (24.5)	30 (20.5)
Yes	83 (75.5)	116 (79.5)
Within six months		
No	28 (25.5)	18 (12.3)
Yes	82 (74.5)	128 (87.7)
Within one year		
No	17 (15.5)	12 (8.2)
Yes	93 (84.5)	134 (91.8)

Table (32) shows the number of sexual partners in different time period according to age group of MSM. Having more than one sexual partner was seen in both age groups at all time periods. Within one month, 47.3% of young MSM and 63.9% of adult MSM had more than one sexual partner. Over 62% of MSM and over 70% of MSM from both groups had more than one sexual partner within three months and six months respectively. Within life time, 85.5% and 96.6% of MSM had more than one partner.

Table 32 Number of sexual partners in different time period according to the age group of MSM

	Age group	
	18-24 years n(%)	**≥25 years n(%)**
No. of sexual partners within one month	(n=74)	(n=97)
One partner	39 (52.7)	35 (36.1)
>one partner	35 (47.3)	62 (63.9)
No. of sexual partners within three months	(n=83)	(n=116)
One partner	31 (37.3)	43 (37.1)
>one partner	52 (62.7)	73 (62.9)
No. of sexual partners within six months	(n=82)	(n=128)
One partner	24 (29.3)	35 (27.3)
>one partner	58 (70.7)	93 (72.7)
No. of sexual partners within one year	(n=93)	(n=134)
One partner	24 (25.8)	22 (16.4)
>one partner	69 (74.2)	112 (83.6)
No. of sexual partners within life time	(n=110)	(n=146)
One partner	16 (14.5)	5 (3.4)
>one partner	94 (85.5)	141 (96.6)

Number of sexual partners of MSM within different time periods according to the type of MSM is described in Table (33). Association was detected between type of MSM and number of sexual partners in one month. Significantly higher proportion of open type of MSM had more than one sexual partner than other types of MSM ($p<0.001$). Over 69% of open type of MSM, 51.3% of hidden type and 26.5% of thange had more than one sexual partner. Similar pattern of association between type of MSM and number of partners was also seen for other time periods like within three months, six months and one year ($p<0.001$).

Table 33 Number of sexual partners of MSM at different time periods according to the type of MSM

	No. of sexual partners within 1 month n=171, n (%)		p value
	One partner	> one partner	
Type of MSM			<0.001
Apwint (Open type)	30 (30.6)	68 (69.4)	
Apone (Hidden type)	19 (48.7)	20 (51.3)	
Thange (Partner of MSM)	25 (73.5)	9 (26.5)	
	No. of sexual partners within 3 months n=199, n (%)		p value
	One partner	> one partner	
Type of MSM			<0.001
Apwint (Open type)	28 (26.2)	79 (73.8)	
Apone (Hidden type)	21 (41.2)	30 (58.8)	
Thange (Partner of MSM)	25 (61.0)	16 (39.0)	
	No. of sexual partners within 6 months n=210, n (%)		p value
	One partner	> one partner	
Type of MSM			<0.001
Apwint (Open type)	18 (16.2)	93 (83.8)	
Apone (Hidden type)	20 (36.4)	35 (63.6)	
Thange (Partner of MSM)	21 (47.7)	23 (52.3)	
	No. of sexual partners within one year n=227, n (%)		p value
	One partner	> one partner	
Type of MSM			0.001
Apwint (Open type)	14 (11.5)	108 (88.5)	
Apone (Hidden type)	17 (27.0)	46 (73.0)	
Thange (Partner of MSM)	15 (35.7)	27 (64.3)	

Table (34) shows the number of sexual partners of MSM within different time periods according to binge drinking. No significant association was detected between binge drinking and number of sexual partners at different time periods.

Table 34 Number of sexual partners of MSM at different time periods according to binge drinking

	Sexual partners within 1 month (n=96)		p-value
	One partner	>one partner	
Within one month			0.08
Non-binge drinking	19 (35.8)	34 (64.2)	
Binge drinking	23 (53.5)	20 (46.5)	
	Sexual partners within 3 months (n=126)		p-value
	One partner	>one partner	
Within three months			0.2
Non-binge drinking	24 (32.0)	51 (68.0)	
Binge drinking	22 (43.1)	29 (56.9)	
	Sexual partners within 6 months (n=142)		p-value
	One partner	>one partner	
Within six months			0.7
Non-binge drinking	24 (26.1)	68 (73.9)	
Binge drinking	12 (24.0)	38 (76.0)	
	Sexual partners within one year (n=165)		p-value
	One partner	>one partner	
Within one year			0.07
Non-binge drinking	13 (12.9)	88 (87.1)	
Binge drinking	15 (23.4)	49 (76.6)	
	Sexual partners within life time (n=225)		p-value
	One partner	>one partner	
Lifetime			0.5
Non-binge drinking	9 (6.3)	135 (93.8)	
Binge drinking	7 (8.6)	74 (91.4)	

Condom use with permanent partners according to age group of MSM is shown in Table (35). Never/inconsistent condom use was detected among 61.3% of young MSM and 56.1% of adult MSM. On the other hand, 60% 0f young MSM and 50.7% of adult MSM did not use condom regularly during three months.

Table 35 Condom use with permanent partners according to age group of MSM

	Age group	
	18-24 years n(%)	**≥25 years n(%)**
Condom use within one month	(n=31)	(n=57)
Never/inconsistent	19 (61.3)	32 (56.1)
Consistent	12 (38.7)	25 (43.9)
Condom use within three months	(n=40)	(n=67)
Never/inconsistent	24 (60.0)	34 (50.7)
Consistent	16 (40.0)	33 (49.3)
Condom use within six months	(n=41)	(n=76)
Never/inconsistent	27 (65.9)	36 (47.4)
Consistent	14 (34.1)	40 (52.6)
Condom use within one year	(n=93)	(n=134)
Never/inconsistent	24 (25.8)	22 (16.4)
Consistent	69 (74.2)	112 (83.6)
Condom use within life time	(n=68)	(n=117)
Never/inconsistent	42 (61.8)	68 (58.1)
Consistent	26 (38.2)	49 (41.9)

Condom use with non-permanent partners according to age group of MSM is shown in Table (36). Never/inconsistent condom use was detected among one-third of young MSM and 23.5% of adult MSM within one month. At different time periods, over one-third to nearly 40% of young MSM and over 75% to 82% of adult MSM never/inconsistently used condom.

Table 36 Condom use with non-permanent partners according to age group of MSM

	Age group	
	18-24 years	**≥25 years**
	n(%)	**n(%)**
Condom use within one month	(n=54)	(n=68)
Never/inconsistent	18 (33.3)	16 (23.5)
Consistent	36 (66.7)	52 (76.5)
Condom use within three months	(n=61)	(n=84)
Never/inconsistent	24 (39.3)	15 (17.9)
Consistent	37 (60.7)	69 (82.1)
Condom use within six months	(n=64)	(n=101)
Never/inconsistent	25 (39.1)	22 (21.8)
Consistent	39 (60.9)	79 (78.2)
Condom use within one year	(n=73)	(n=114)
Never/inconsistent	26 (35.6)	28 (24.6)
Consistent	47 (64.4)	86 (75.4)
Condom use within life time	(n=93)	(n=136)
Never/inconsistent	31 (33.3)	23 (24.3)
Consistent	62 (66.7)	103 (75.7)

As shown in Table (37), binge drinking was not associated with condom use within one month, three months and one year. However, binge drinking was associated with condom use in six months. In particular, never/inconsistent condom use was detected among 68.2% of non-binge drinkers and 43.3% of binge drinkers.

Table 37 Condom use with permanent partners according to alcohol consumption

	Condom use within one month n=42, n (%)		p value
	Never/inconsistent	Consistent	
Alcohol consumption			0.7
Non-binge	13 (59.1)	9 (40.9)	
Binge	11 (55.0)	9 (45.0)	

	Condom use within three months n=62, n (%)		p value
	Never/inconsistent	Consistent	
Alcohol consumption			0.5
Non-binge	22 (64.7)	12 (35.3)	
Binge	16 (57.1)	12 (42.9)	
	Condom use within six months n=74, n (%)		p value
	Never/inconsistent	Consistent	
Alcohol consumption			0.03
Non-binge	30 (68.2)	14 (31.8)	
Binge	13 (43.3)	17 (56.7)	
	Condom use within one year n=165, n (%)		p value
	Never/inconsistent	Consistent	
Alcohol consumption			0.07
Non-binge	13 (12.9)	88 (87.1)	
Binge	15 (23.4)	49 (76.6)	

Condom use with non-permanent partners according to alcohol consumption is shown in Table (38). Within different time periods, condom use with non-permanent partners was not associated with binge drinking.

Table 38 Condom use with non-permanent partners according to alcohol consumption

	Condom use within one month n=75, n (%)		p value
	Never/inconsistent	Consistent	
Alcohol consumption			0.7
Non-binge	14 (31.8)	30 (68.2)	
Binge	9 (29.0)	22 (71.0)	

	Condom use within three months n=98, n (%)		p value
	Never/inconsistent	Consistent	
Alcohol consumption			0.4
Non-binge	20 (32.3)	42 (67.7)	
Binge	9 (25.0)	27 (75.0)	
	Condom use within six months n=116, n (%)		p value
	Never/inconsistent	Consistent	
Alcohol consumption			0.5
Non-binge	23 (30.3)	53 (69.7)	
Binge	10 (25.0)	30 (75.0)	
	Condom use within one year n=140, n (%)		p value
	Never/inconsistent	Consistent	
Alcohol consumption			0.5
Non-binge	27 (29.3)	65 (70.7)	
Binge	12 (25.0)	36 (75.0)	

According to Table (39), last sex within one week was mentioned by 49.1% of young MSM and 52.7% of adult MSM. At last sex, 63.6% of young MSM and 75.3% of adult MSM used condom. Common reasons they mentioned for not using condom were “I don’t want to use” (40.0%, 36.1%), “partner did not want to use” (32.5%, 38.9%), and “belief my partner” (25.0%, 38.9%).

Table 39 Information about last sex according to the age group of MSM from Yangon and Mandalay

Characteristics	**Age group**	
	18-24 years n=110, n(%)	**≥25 years n=146, n(%)**
Last sex within		
One week	54 (49.1)	77 (52.7)

Two weeks	9 (8.2)	10 (6.8)
One month	18 (16.4)	13 (8.9)
Three months	13 (11.8)	21 (14.4)
> Three months	16 (14.6)	25 (17.1)
Condom use at last sex		
No	40 (36.4)	36 (24.7)
Yes	70 (63.6)	110 (75.3)
Reason for not using condom at last sex*	(n=40)	(n=36)
I did not want to use	16 (40.0)	13 (36.1)
Partner did not want to use	13 (32.5)	14 (38.9)
Belief my partner	10 (25.0)	14 (38.9)
Could not get easily	7 (17.5)	3 (8.9)

*Multiple responses

Table (40) shows the information about alcohol consumption and substance use before sex among MSM. About 35% of young MSM and over 26% of adult MSM consumed alcohol before sex and the most common type of alcohol they consumed was beer. On the other hand, 10.9% of young MSM and 6.8% of adult MSM used substance before sex and the most common type of substance was methamphetamine.

Table 40 Alcohol consumption and substance use before sex according to the age group of MSM from Yangon and Mandalay

Characteristics	**Age group**	
	18-24 years n=110, n(%)	**≥25 years n=146, n(%)**
Alcohol consumption before sex		
No	72 (65.5)	107 (73.3)
Yes	38 (34.5)	39 (26.7)
Type of alcohol consumption before sex	(n=38)	(n=39)
Beer	27 (71.1)	26 (66.7)
Wine	0 (0.0)	1 (2.6)
Whisky	5 (13.1)	8 (20.5)
Rum	4 (10.5)	3 (7.7)

Local alcohol	2 (5.3)	1 (2.6)
Alcohol consumption treated by sexual partner		
No	22 (57.9)	27 (69.2)
Yes	16 (42.1)	12 (30.8)
Substance use before sex		
No	98 (89.1)	136 (93.2)
Yes	12 (10.9)	10 (6.8)
Type of substance used before sex	(n=12)	(n=10)
Marijuana	1 (8.3)	1 (10.0)
Methamphetamine	10 (83.4)	7 (70.0)
Ice	1 (8.3)	2 (20.0)
Substance use treated by sexual partner		
No	9 (75.0)	7 (70.0)
Yes	3 (25.0)	3 (30.0)

About 14% and 24% of MSM knew other HIV prevention methods in addition to condom as shown in Table (41). Common HIV prevention methods they mentioned were pre-exposure prophylaxis or post-exposure prophylaxis (26.7%, 51.4%), "not sharing sharp instruments" (33.3%, 34.3%) and "avoid transfusion of infected blood" (52.3%, 14.3%).

Table 41 Knowledge about HIV prevention method according to the age group of MSM from Yangon and Mandalay

Characteristics	**Age group**	
	18-24 years n=110, n(%)	**≥25 years n=146, n(%)**
Know HIV prevention method other than condom		
No	95 (86.4)	111 (76.0)
Yes	15 (13.6)	35 (24.0)
HIV prevention methods other than condom*	(n=15)	(n=35)
PrEP/PEP	4 (26.7)	18 (51.4)

Not sharing sharp instruments	5 (33.3)	12 (34.3)
Avoid transfusion of infected blood	8 (52.3)	5 (14.3)
Avoid penetrative sex	2 (13.3)	2 (5.7)

*Multiple responses

Chapter 5

Discussions and conclusion

This chapter includes discussion on alcohol consumption, substance use and sexual behaviors among MSM. In addition, strengths and limitations of the study, conclusion and recommendations were also described.

- Alcohol consumption among MSM
- Substance use among MSM
- Sexual behavior among MSM
- Alcohol consumption, substance use and sexual behavior among MSM
- Strengths and limitations of the study
- Conclusion and recommendations

5.1 Alcohol consumption among MSM

Worldwide, prevalence of alcohol consumption was 43% in general population while about half has never consumed alcohol. Of all participants in present study, nearly 90% have ever consumed alcohol in their life time and over 50% were current drinkers within one month. Previous studies have documented the alcohol consumption among general population in Myanmar. They reported the prevalence of 50% life time drinkers and 20% current drinkers (Oo et al., 2015; Win & Areesantichai, 2014). Proportion of ever drinkers among young and adult MSM in current study was much higher than these previous studies done in two different townships in Myanmar. These studies focused on general adult population that might be differed from MSM population. Such kind of difference in study population and reporting different time periods might contribute to the discrepancy. According to the report of World Health Organization, in Myanmar, type of alcoholic beverages commonly consumed were spirits, beer and wine. Likewise, beer, whisky and wine were the common alcoholic beverages stated by young and adult MSM in current study.

Studies in China and other countries also highlighted alcohol consumption among MSM and general population but using different screening tools. Additionally, previous

studies have documented the prevalence of alcohol consumption at different time periods. In present study, nearly 70% of MSM consumed alcohol within 3 months and over 40% were binge drinkers among both age groups of MSM. In a large-scale study in China, over 56% of MSM among 3,588 MSM consumed alcohol in 3 months and 17% were binge drinkers (Liu et al., 2016). Though recent alcohol consumption within 3 months among MSM was similar between the studies, proportion of binge drinkers was higher in present study. In Peru, 45% of MSM had an alcohol use disorder (AUD) and over 90% were hazardous drinkers (Herrera et al., 2016). Another study in China among general adult aged 18 to 34 years also identified the prevalence of alcohol consumption as about 45% (Lu et al., 2019). Similarly, another study in US among MSM documented that nearly 14% and 25% were monthly and weekly binge drinkers (Santos et al., 2018). Unlike other studies in China, Fan W et al documented that twenty three percent of MSM had consumed a drink containing alcohol in the previous year while over seven percent were heavy alcohol drinkers (Fan et al., 2016).

Current study also identified the proportion of binge drinkers in different time periods and nearly half of MSM from both age group reported binge drinking within one month while over one-third of them stated life time binge drinking. Higher proportion of alcohol consumption was noted in current study than studies among MSM population in other countries except China. Difference in background sociocultural conditions may contribute to this discrepancy. Proportion of current drinkers were similar between current study and some studies in China. Additionally, alcohol consumption before sex was reported in one third of young MSM and one fourth of adult MSM in the current study and it was similar to a previous study in Peru (Herrera et al., 2016).

Over half of MSM from both age group in the current study consumed alcohol for the first time together with their friends. In addition, nearly two-third gave the reasons of first-time consumption as related to their friends. Similarly, for different time periods, many of them consumed alcohol together with their friends and reason they mentioned was “friends’ gathering”. According to the social learning theory, people’s behaviors were initiated from learning and observing other people’s behaviors from their environment. Friends’ influence was mentioned as an important factor of alcohol consumption in previous studies. Friends approval was one of the predictors of alcohol

consumption among school as well as college students (Bowden, Delfabbro, Room, Miller, & Wilson, 2017; Massengale, Ma, Rulison, Milroy, & Wyrick, 2017).

5.2 Substance use among MSM

In current study, use of any substance was identified in nearly half of young MSM and one third of adult MSM in their life time and their age at first use of substance was as young as 10 to 13 years. Among substance users, nearly one-fifth to half of young MSM and 15% to one third of adult MSM used amphetamine at different time periods. Substance use among MSM and other population was documented in previous studies across the countries showing both similar and different findings. Nation-wide online survey in China reported the prevalence of life time recreational drug use among MSM as over 77% which was higher than current study (Zhao et al., 2017). Another study conducted in China also identified substance use among MSM as about one-fourth which was lower than current study (Xu et al., 2014). Within one year, nearly one-fourth of MSM in current study used amphetamine and similar proportion of MSM in a study in China used popper (Zhao et al., 2017).

The use of specific substance varied across the regions and countries. Worldwide, the most widely used drug is cannabis while the pattern of drug use has been shifted from opiates to methamphetamines in South-East Asia regions (UNODC, 2019b). A study in UK reported the prevalence of different substance use within 3 months among MSM. Amphetamine and marijuana were two commonest types in present study whereas nitrites and cannabis were the commonest in UK (Daskalopoulou et al., 2014) and cannabis and was the commonest type in some African countries(Sandfort et al., 2017). Discrepancy in type of substance use may depend on the difference in production pattern across the regions.

Higher prevalence of substance use was seen in some African countries than current study (Sandfort et al., 2017). According to a systematic review of previous studies, prevalence of drug use varied by different time periods and by country, ranging from 7% in past 12 months in Nigeria to over 60% in the past three months in Zanzibar. Similarly, prevalence of drug use in other African countries without mentioning time period ranged from 2% in South Africa to 13% in Malawi.

Substance use in other population like university student was reported in a study in Germany in which around 3% of them used amphetamines and other stimulants. It was much lower than current study since nature and background social conditions of study populations were different (Schilling et al., 2017). Similarly, in India, prevalence of substance use including alcohol and tobacco among university students was over 50% whereas about 7% used cannabis. Half of the users were using the drugs on daily basis (Gupta et al., 2013).

5.3 Sexual behaviors among MSM

According to the findings, mean age at first anal sex was 17 years in present study which was consistent with IBBS data in Myanmar in 2015. Moreover, proportion of MSM who had sex within one year was 88%, significantly higher than that was reported in IBBS (20% in Yangon and 14% in Mandalay) (National_AIDS_Program, 2019).

Sexual risk behaviors like having more than one sexual partner/multiple partners and having condomless anal sex were prevalent among MSM all over the world. Present study reported that nearly two-third of MSM from both age group had more than one sexual partner within three months, nearly three-fourth within six months and over three-fourth within a year. Increasing proportions of MSM were having multiple partners in different time periods.

Present study highlighted that consistent condom use among MSM depended on the type of sexual partners in which it was higher with non-permanent sexual partners than with permanent partners. Around one fourth to one third of young MSM never or inconsistently used condom with permanent sexual partners at different time periods like one month, three months, six months, one year and lifetime. Similarly, nearly 16% to 60% of adult MSM never or inconsistently used condom with non-permanent sexual partners at different time periods.

Previous studies in other countries have also reported the presence of multiple partners and inconsistent condom use among MSM. In China, over 40% of MSM did not use condom within previous six months (Li et al., 2017) whereas in Malaysia, about 60% had unprotected sex within six months (Koh et al., 2013). Similarly, in US, 58% of

MSM reported condomless anal intercourse within six months (Santos et al., 2018). Mean number of sexual partners within six months was reported as 11 in Malaysia study while it was stated as 22 in current study. In addition, over 70% of MSM in current study had multiple sexual partners within six months. Similar findings were seen in other countries in which about 60% of MSM had multiple partners in China, about 70% had multiple partners in Vietnam (Garcia et al., 2016) and over 90% of MSM had multiple partners in US within six months (Santos et al., 2018). On the other hand, university students had lesser partners than MSM whereas about one-third of university students had multiple partners within one year (Choudhry et al., 2014).

Having multiple sexual partners was very common among MSM and it may lead the risk of sexually transmitted infections. According to the past studies, over half to two-third of MSM had multiple sexual partners and had six to ten sexual partners within previous year. One of the studies stated that, there was sexual relationship with ten sexual partners within last one year (Chittamuru et al., 2018; Garcia et al., 2016; Pérez et al., 2018; Pines et al., 2017).

According to a systematic review of studies done in high income countries documented that there was an increasing trend of condomless anal intercourse among MSM but a decreasing trend in number of partners (Hess, Crepaz, Rose, Purcell, & Paz-Bailey, 2017). Possible explanations for the decreasing trend of condom use included availability of other HIV prevention options and optimism about HIV treatments.

5.4 Alcohol consumption, substance use and sexual behaviors

According to the previous literature, sexual risk behaviors were found to be associated with alcohol drinking and substance use among MSM. In particular, alcohol consumption and the intention to engage in unprotected sex was documented in a systematic review. The review indicated that an increase in blood alcohol content of 0.1 mg/ml resulted in an increase of 5% of engaging in unprotected sex (Rehm et al., 2012). Higher incidence of condomless anal intercourse was reported among MSM with alcohol use disorders in Peru (Herrera et al., 2016). Likewise, inconsistent condom use was found to be associated with use of alcohol in relation to sexual activity among university students (Choudhry et al., 2014). Unlike previous studies, condomless sex

among MSM with non-permanent or permanent partners was not related to binge alcohol consumption in the present assessment.

Sexual risk behaviours of MSM were identified according to their sexual orientation like insertive or receptive type. In a study in US, over half of both receptive and insertive type of MSM had condomless anal intercourse within six months (Santos). However, in current study, having multiple partners was found to be associated with type of MSM whereas higher proportion of apwint (open type) had multiple sexual partners at different time periods than apone (hidden type) and thange (partner of MSM).

According to the findings from the current study, alcohol consumption before sex was reported by about one-third of young MSM and one fourth of adult MSM. Similarly, about 7-11% of MSM from both age group reported that they used substance before sex. Similar finding was seen in a Peru study whereas over one third of MSM in a study in Peru consumed alcohol before last sex (Herrera et al., 2016). Similarly, over one-fourth of university students consumed alcohol at their last sex (Choudhry et al., 2014). Unlike, about 9% of MSM had ever drunk alcohol during or prior sex in the last 3 months which was lesser than other studies (Zhao et al., 2017). Additionally, alcohol consumption and having multiple partners among MSM was identified in the past studies. Garcia et al. had documented that, within six months, MSM who consumed alcohol before or during sex were more likely to engage in multiple sexual partners than non-drinkers (Garcia et al., 2016).

5.4 Strengths and limitations

Strengths

Additional information obtained from current study was identifying the three types of risk behaviors such as alcohol consumption, substance use and sexual behaviors in a single study. Moreover, current study included all common types of MSM in Myanmar.

Limitations

There were certain limitations in present study that should be acknowledged. Alcohol consumption, substance use and sexual behaviors were identified by the responses of MSM and their behaviors could not be validated with other method like observation. Using purposive sampling and conducting at only two major cities may limit the generalization of the research findings to other areas in Myanmar. However, we tried to overcome this limitation by carefully explaining the objectives of the study to answer the correct responses.

5.5 Conclusion and recommendations

Current study identified the alcohol consumption, substance use and sexual behaviors among MSM in major cities of Myanmar. Among 256 participants, 55% of MSM reported alcohol consumption within one month while 71% had ever consumed in their life time. Binge drinking was reported by over 48% of MSM within one month and 36% in their life time. Common types of alcohol they consumed were beer, whisky and wine. Nearly 38% of MSM used any type of substance in their life time and among them, common substances were tobacco (44%), amphetamine (42%) and marijuana (17%). Around 90% of tobacco and amphetamine users had moderate risk of developing health and other problems.

Having multiple partners within one month, three months, six months and one year was reported by 57%, 63%, 72% and 80% of MSM respectively. Around 30% to 43% of MSM never used condom with permanent sexual partners at different time periods. Similarly, about 6% to 10% of MSM never used condom with non-permanent sexual partners. Over half of MSM reported their last sexual activity within one week while about 30% of them did not use condom at their last sex. Nearly one-third of MSM consumed alcohol before sex and most common type was beer. Moreover, about 9% of MSM used substance before sex and amphetamine was the commonest type. With regards to HIV, nearly 20% knew prevention methods other than condom.

Following recommendations were made based on the study findings:

1. It is suggested to develop and implement alcohol control policy for MSM since over one-third to nearly half of them had binge drinking at different time periods that could lead to adverse health and social consequences.
2. Targeted control strategies should be developed to control the use of tobacco and substance among MSM since over one-third to less than half of MSM had used tobacco and about one-fifth to two-fifth of MSM had used amphetamine at different time periods.
3. Intervention to reduce unsafe sexual practices like having multiple partners and condomless anal intercourse should be carried out since many MSM in the current study had practiced these unsafe sexual behaviors.
4. Behavioral intervention study should be conducted to identify the ways and means in reducing the unsafe sexual practices among MSM in Yangon and Mandalay.

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Annex 1

Questionnaire

Township	(1) Yangon (2) Mandalay	|___|
Respondent ID	_____	|___|___|___|
Date of interview	____/____/____	

Section 1 Background characteristics

1.1	Respondent's age (completed year)	_____years	|___|___|
1.2	Education	(1) Illiterate (2) Read & write (3) Primary school (4) Middle school (5) High school (6) Graduate/University	|___|
1.3	Do you have any job which could earn income?	(1) No (Skip to Q.1.6) (2) Yes, always (3) Yes, not regular	|___|
1.4	If yes, occupation of the respondent	(1) Manual/unskilled labour (2) Private/Government employee (3) NGO/INGO staff (4) Own business (5) Sex work	|___|

		(6) Others (specify) _____	
1.5	Estimate monthly income (Kyats)	_____	
1.6	Type of MSM (as perceived by himself)	(1) Apwint or Open type (2) Apone or Hidden (3) Thange or Partner of open or hidden MSM (4) Others (specify) _____	|___|
1.7	Marital status	(1) Single (2) Married (3) Divorce (4) Others (specify) _____	|___|
1.8	If you got married, please identify the gender of your permanent partner.	(1) Male (2) Female (3) Transgender Women	|___|
1.9	If you have non-permanent partner, please identify the gender.	(0) Never (1) Male (2) Female (3) Transgender Women	|___| |___| |___| |___|

Section 2 Information on family, friends and working environment

2.1	Type of family	(1) Nuclear type (2) Extended type	|___|
2.2	Current living condition	(1) Live with parents (2) Live with either parent (3) Live with relatives (4) Live with friends (5) Live at work place with colleagues (6) Others (specify) _____	|___|
2.3	Do your parents or guardians accept you as a gay/MSM?	(0) No (1) Yes (Skip to Q. 2.5) (2) Don't know (Skip to Q. 2.5)	|___|
2.4	If not, why?	_____	
2.5	If you have siblings, do your siblings accept you as a gay/MSM?	(0) No (1) Yes (Skip to Q. 2.7) (2) Don't know (Skip to Q. 2.7)	|___|
2.6	If not, why?	_____	
2.7	How many friends do you have?	_____	|__|__|
2.8	Do your friends accept you as MSM?	(0) No (1) Yes (Skip to Q. 2.10) (2) Don't know (Skip to Q. 2.10)	|___|
2.9	If no, why?	_____	

2.10	Do you have closed-friends?	(0) No (Skip to Q. 2.12) (1) Yes (2) Don't know	|___|
2.11	If yes, how many closed-friends do you have?	_____	|__|__|
2.12	Do your closed-friends accept you as MSM?	(0) No (1) Yes (Skip to Q. 2.14) (2) Don't know (Skip to Q. 2.14)	|___|
2.13	If not, why?	_____	
2.14	Do you have MSM friends, among your close-friends?	(0) No (Skip to Q. 2.17) (1) Yes (2) Don't know (Skip to Q. 2.17)	|___|
2.15	If yes, how many MSM friends do you have among your closed-friends?	_____	|__|__|
2.16	Do your closed MSM friends accept you as MSM?	(0) No (1) Yes (Skip to Q. 2.18) (2) Don't know (Skip to Q. 2.18)	|___|
2.17	If not, why?	_____	
2.18	Do your friends who are not MSM accept you as a MSM?	(0) No (1) Yes (Skip to Q. 2.20) (2) Don't know (Skip to Q. 2.20)	|___|
2.19	If not, why?	_____	

2.20	How do you spend the time with your closed-friends within three months?	(1) Going picnic (2) Cooking and eating together (3) Going to night club (4) Others (specify) _____	|___| |___| |___| |___|
2.21	Do you have an experience of gathering with your closed-friends in a venue within three months?	(0) No (Skip to Q. 2.23) (1) Yes	|___|
2.22	If yes, how many times within three months?	_____	|__|__|
2.23	Do you have an experience of going night out with your closed-friends?	(0) No (Skip to Q. 2.26) (1) Yes	|___|
2.24	If yes, how many times within three months?	_____	|__|__|
2.25	If yes, where did you go with your closed-friends?	(1) Restaurant (2) Bar (3) Karaoke (4) Night club (5) Others (specify) _____	|___| |___| |___| |___| |___|
2.26	Have you already disclosed as a MSM at your workplace?	(0) No (1) Yes	|___|
2.27	Do your colleagues accept you as a gay/MSM?	(0) No (1) Yes (Skip to Q. 2.29)	|___|

2.28	If no, Why?	_____	
2.29	Did you have any experience of bully at your work place as you are a MSM?	(0) No (1) Yes	|___|
2.30	Is there any stigmatization or discrimination at your work place as you are a MSM?	(0) No (1) Yes	|___|
2.31	Have you ever experienced that you was fired from your work place as you are a MSM?	(0) No (1) Yes	|___|

Section 3 Alcohol consumption

3.1	Have you ever consumed alcohol in your life time?	(0) No (Skip to Q.4.1) (1) Yes	|___|
3.2	Age at first consumption of alcohol in your life time.	_____ years	|___|___|
3.3	What type of alcohol did you consume when you started your first drink of alcohol in your life time?	(1) Beer (2) Wine (3) Whisky (4) Vodka (5) Rum (6) Tequila (7) Palm tree juice (8) Others _____	|___| |___| |___| |___| |___| |___| |___| |___|
3.4	How many units did you consume when you started your first drink of alcohol in your life time?	_____	|___|___|
3.5	With whom did you consume your first drink of alcohol in your life time?	(1) Friends (2) MSM friends (3) Colleagues from work (4) Permanent sexual partner (5) Non-permanent sexual partners (6) Parents/Relatives (7) Others _____	|___| |___| |___| |___| |___| |___| |___|

3.6	What was the reason for starting your first time of alcohol consumption in your life time?	_____											
3.7	Type of alcohol	First use		Lifetime		Within one year		Within six months		Within three months		Within one month	
		N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
3.7.1	Beer												
3.7.2	Wine												
3.7.3	Whisky												
3.7.4	Vodka												
3.7.5	Rum												
3.7.6	Tequila												
3.7.7	Palm tree juice												
3.7.8	Others												

3.8	In your lifetime,	Type 1	Type 2
	Frequency[a] Amount/time[b] Consumed with whom[c] Consumed alcohol at (time)[d] Factors influence to drink alcohol	_____ _____ _____ _____ _____	_____ _____ _____ _____ _____
3.9	Within one year,	Type 1	Type 2

	Frequency[a] Amount/time[b] Consumed with whom[c] Consumed alcohol at (time)[d] Factors influence to drink alcohol	_____ _____ _____ _____ _____	_____ _____ _____ _____ _____
3.10	Within six months,	Type 1	Type 2
	Frequency[a] Amount/time[b] Consumed with whom[c] Consumed alcohol at (time)[d] Factors influence to drink alcohol	_____ _____ _____ _____ _____	_____ _____ _____ _____ _____
3.11	Within three months,	Type 1	Type 2
	Frequency[a] Amount/time[b] Consumed with whom[c] Consumed alcohol at (time)[d] Factors influence to drink alcohol	_____ _____ _____ _____ _____	_____ _____ _____ _____ _____
3.12	Within one month,	Type 1	Type 2
	Frequency[a] Amount/time[b] Consumed with whom[c]	_____ _____ _____	_____ _____ _____

	Consumed alcohol at (time)[d] Factors influence to drink alcohol	_____ _____	_____ _____

[a]1 = 1 time; 2 = 2-4 times in a month; 3 = 2-3 times/week; 4 = 4 or more times/week

[b] 1= 1-2 units; 2 = 3-4 units; 3 = 5-6 units; 4 = 7-9 units; 5 = 10 or more units

[c]1 = Friends; 2 = Closed-friends; 3 = Closed-MSM friends; 4 = Relatives; 5 = Parents/Guardians; 6 = Permanent sexual partner; 7 = Non-permanent sexual partner; 8 = Others

[d]1 = Morning; 2 = Afternoon; 3 = Evening; 4 = Night

Section 4 Substance use

4.1	Have you ever used any kind of drug in your life time?	(0) Never (Skip to Q.5.1) (1) Yes	|___|
4.2	Age at first use of drug in your life time.	_____	|___|___|
4.3	What type of drug did you use when you started your first drug use in your life time?	(1) Tobacco (2) Marijuana (3) Harsh (4) Cocaine (5) Amphetamine (6) Methamphetamine (7) Ice (8) Morphine (9) Heroin (10) Inhalant (11) Others _____	|___| |___| |___| |___| |___| |___| |___| |___| |___| |___| |___|
4.4	How many amounts did you use when you started your first drug use in your life time?	_____	|___|___|
4.5	With whom did you use your first drug in your life time?	(1) Friends (2) MSM friends (3) Colleagues from work (4) Permanent sexual partner (5) Non-permanent sexual partners	|___| |___| |___| |___| |___|

		(6) Parents/Relatives (7) Others _____	|___
___	
4.6	What was the reason for starting your first time of drug use in your life time?	_____	

4.7	Type of substance	First use		Lifetime		Route of administration[#]	Within one year		Within six months		Within three months		Within one month	
		N	Y	N	Y		N	Y	N	Y	N	Y	N	Y
4.7.1	Tobacco													
4.7.2	Marijuana													
4.7.3	Cocaine													
4.7.4	Amphetamine													
4.7.6	Methamphetamine													
4.7.7	Ice													
4.7.8	Morphine													
4.7.9	Heroin													
4.7.10	Others													

1 = Snorting; 2 = Inhalation; 3 = Smoking; 4 = Swallowing; 5 = Injection

4.8	In your lifetime,	Type 1	Type 2
	Frequency[a] Amount/time Used drug with who[b] Used drug at (time)[c] Factors influence to use drug	_____ _____ _____ _____ _____	_____ _____ _____ _____ _____
4.9	Within one year,	Type 1	Type 2
	Frequency[a] Amount/time Used drug with who[b] Used drug at (time)[c] Factors influence to use drug	_____ _____ _____ _____ _____	_____ _____ _____ _____ _____
4.10	Within six months,	Type 1	Type 2
	Frequency[a] Amount/time Used drug with who[b] Used drug at (time)[c] Factors influence to use drug	_____ _____ _____ _____ _____	_____ _____ _____ _____ _____
4.11	Within three months,	Type 1	Type 2
	Frequency[a] Amount/time Used drug with who[b] Used drug at (time)[c] Factors influence to use drug	_____ _____ _____ _____ _____	_____ _____ _____ _____ _____

4.12	Within one month,	Type 1	Type 2
	Frequency[a]	_____	_____
	Amount/time	_____	_____
	Used drug with who[b]	_____	_____
	Used drug at (time)[c]	_____	_____
	Factors influence to use drug	_____	_____

[a]1 = Once or twice; 2 = 1-3 times in a month; 3 = 1-4 times/week; 4 = 5-7 days per week

[b]1 = Friends; 2 = Closed-friends; 3 = Closed-MSM friends; 4 = Relatives; 5 = Parents/Guardians; 6 = Permanent sexual partner; 7 = Non-permanent sexual partner; 8 = Others

[c]1 = Morning; 2 = Afternoon; 3 = Evening; 4 = Night

Section 5 Sexual risk behaviours

5.1	Have you ever had sex with man in your life time?	(0) No (1) Yes	|___|
5.2	Age of first sex in your life time	_____	|___|___|
5.3	How many sexual partners did you have sex in your life time	_____	|___|___|
5.4	Your sexual partners in your life time were	(1) Sex worker (Male) (2) Sex worker (Female) (3) Permanent partner (4) Non-permanent partner (5) One night stand (6) Friends (Male) (7) Others _____	|___| |___| |___| |___| |___| |___| |___|
5.5	Did you use condom with your permanent sexual partner?	(0) No (1) Sometimes (2) Most of times (3) Always (Skip to Q. 5.7)	|___|
5.6	If no, why?	(1) I did not want to use (2) My partner did not want to use (3) Because my partner is permanent and I believe in him (4) Others (specify) _____	|___| |___| |___| |___|

5.7	Did you use condom with your non-permanent sexual partner?	(0) No (1) Sometimes (2) Most of times (3) Always (Skip to Q. 5.9)	|___|
5.8	If no, why?	(1) I did not want to use (2) My partner did not want to use (3) Because my partner is permanent and I believe in him (4) Others (specify) _____	|___| |___| |___| |___|
5.9	Have you had sex with man within one year?	(0) No (Skip to Q. 5.16) (1) Yes	|___|
5.10	How many sexual partners did you have sex within one year?	_____	|___|___|
5.11	Your sexual partners within one year were	(1) Sex worker (Male) (2) Sex worker (Female) (3) Permanent partner (4) Non-permanent partner (5) One night stand (6) Friends (Male) (7) Others_____	|___| |___| |___| |___| |___| |___| |___|
5.12	Did you use condom with your permanent sexual partner within one year?	(0) No (1) Sometimes (2) Most of times (3) Always (Skip to Q. 5.14)	|___|

5.13	If no, why?	(1) I did not want to use (2) My partner did not want to use (3) Because my partner is permanent and I believe in him (4) Others (specify) _____	|___| |___| |___| |___|
5.14	Did you use condom with your non-permanent sexual partner within one year?	(0) No (1) Sometimes (2) Most of times (3) Always (Skip to Q. 5.16)	|___|
5.15	If no, why?	(1) I did not want to use (2) My partner did not want to use (3) Because my partner is permanent and I believe in him (4) Others (specify) _____	|___| |___| |___| |___|
5.16	Have you had sex with man within six months?	(0) No (Skip to Q. 5.23) (1) Yes	|___|
5.17	How many sexual partners did you have sex within six months?	_____	|___|___|
5.18	Your sexual partners within six months were	(1) Sex worker (Male) (2) Sex worker (Female) (3) Permanent partner (4) Non-permanent partner (5) One night stand (6) Friends (Male)	|___| |___| |___| |___| |___| |___|

5.19	Did you use condom with your permanent sexual partner within six months?	(0) No (1) Sometimes (2) Most of times (3) Always (Skip to Q. 5.21)	|___| |___| |___| |___|
5.20	If no, why?	(1) I did not want to use (2) My partner did not want to use (3) Because my partner is permanent and I believe in him (4) Others (specify) _____	|___| |___| |___| |___|
5.21	Did you use condom with your non-permanent sexual partner within six months?	(0) No (1) Sometimes (2) Most of times (3) Always (Skip to Q. 5.23)	|___|
5.22	If no, why?	(1) I did not want to use (2) My partner did not want to use (3) Because my partner is permanent and I believe in him (4) Others (specify) _____	|___| |___| |___| |___|
5.23	Have you had sex with man within three months?	(0) No (Skip to Q. 5.30) (1) Yes	|___|
5.24	How many sexual partners did you have sex within three months?	_____	|___|___|
5.25	Your sexual partners within three months were	(1) Sex worker (Male) (2) Sex worker (Female)	|___| |___|

		(3) Permanent partner (4) Non-permanent partner (5) One night stand (6) Friends (Male)	|___| |___| |___| |___|
5.26	Did you use condom with your permanent sexual partner within three months?	(0) No (1) Sometimes (2) Most of times (3) Always	|___| |___| |___| |___|
5.27	If no, why?	(1) I did not want to use (2) My partner did not want to use (3) Because my partner is permanent and I believe in him (4) Others (specify) _____	|___| |___| |___| |___|
5.28	Did you use condom with your non-permanent sexual partner within three months?	(0) No (1) Sometimes (2) Most of times (3) Always	|___|
5.29	If no, why?	(1) I did not want to use (2) My partner did not want to use (3) Because my partner is permanent and I believe in him (4) Others (specify) _____	|___| |___| |___| |___|
5.30	Have you had sex with man within one month?	(0) No (Skip to Q. 5.37) (1) Yes	|___|

5.31	How many sexual partners did you have sex within one month?	_____	|___|___|
5.32	Your sexual partners within one month were	(1) Sex worker (Male) (2) Sex worker (Female) (3) Permanent partner (4) Non-permanent partner (5) One night stand (6) Friends (Male)	|___| |___| |___| |___| |___| |___|
5.33	Did you use condom with your permanent sexual partner within one month?	(0) No (1) Sometimes (2) Most of times (3) Always	|___| |___| |___| |___|
5.34	If no, why?	(1) I did not want to use (2) My partner did not want to use (3) Because my partner is permanent and I believe in him (4) Others (specify) _____	|___| |___| |___| |___|
5.35	Did you use condom with your non-permanent sexual partner within one month?	(0) No (1) Sometimes (2) Most of times (3) Always	|___|
5.36	If no, why?	(1) I did not want to use (2) My partner did not want to use	|___| |___| |___|

		(3) Because my partner is permanent and I believe in him (4) Others (specify) _____	|___|
5.37	When was your last sex?	(1) Within one week (2) Within two weeks (3) Within one month (4) Within three months (5) Within six months (6) More than six months	|___|
5.38	Did you use condom at your last sex?	(0) No (1) Yes	|___|
5.39	If no, why?	_____	
5.40	Can you easily access to use condom at your last sex?	(0) No (1) Yes (Skip to Q. 5.42)	|___|
5.41	If no, Why cannot you access to use condom at your last sex?	(1) Don't know the place to buy or to get (2) I think that it is reluctant to buy (3) NGOs/DIC/Condom selling shop is too far (4) Condom in the shop is expensive (5) The shop don't want to sell (6) Others (specify) _____	|___
___
___
___
___
___	
5.42	Did you consume any type of alcohol before sex?	(0) No (Skip to Q. 5.46) (1) Yes	|___|

5.43	What type of alcohol?	_____	
5.44	Amount of alcohol	_____	|___|___|
5.45	Did your partner treat you to consume alcohol with free of charge before sex?	(0) No (1) Yes (2) Don't remember	|___|
5.46	Did you use any type of substance before sex?	(0) No (Skip to Q. 5.51) (1) Yes	|___|
5.48	What type of substance?	_____	
5.49	Amount of substance	_____	
5.50	Did your partner treat you to use drug with free of charge before sex?	(0) No (1) Yes (2) Don't remember	|___|
5.51	Did you use both alcohol and substance before sex?	(0) No (Skip to Q. 5.55) (1) Yes	|___|
5.52	What type of alcohol and substance	_____	
5.53	Amount of alcohol and substance	_____	
5.54	Did your partner treat you to consume alcohol and use drug with free of charge before sex?	(0) No (1) Yes (2) Don't remember	|___|
5.55	Do you know the other way to protect HIV instead of using condom?	(0) No (1) Yes	|___|

5.56	If yes, pls specify	_____	

The Alcohol, Smoking and Substance Involvement Screening Test (ASSIST)

Question 1
(if completing follow-up please cross check the patient's answers with the answers given for Q1 at baseline. Any differences on this question should be queried)

In your life, which of the following substances have you ever used? *(NON-MEDICAL USE ONLY)*	No	Yes
a. Tobacco products (cigarettes, chewing tobacco, cigars, etc.)	0	3
b. Alcoholic beverages (beer, wine, spirits, etc.)	0	3
c. Cannabis (marijuana, pot, grass, hash, etc.)	0	3
d. Cocaine (coke, crack, etc.)	0	3
e. Amphetamine type stimulants (speed, diet pills, ecstasy, etc.)	0	3
f. Inhalants (nitrous, glue, petrol, paint thinner, etc.)	0	3
g. Sedatives or Sleeping Pills (Valium, Serepax, Rohypnol, etc.)	0	3
h. Hallucinogens (LSD, acid, mushrooms, PCP, Special K, etc.)	0	3
i. Opioids (heroin, morphine, methadone, codeine, etc.)	0	3
j. Other - specify:	0	3

Question 2

In the past three months, how often have you used the substances you mentioned *(FIRST DRUG, SECOND DRUG, ETC)*?	Never	Once or Twice	Monthly	Weekly	Daily or Almost Daily
a. Tobacco products (cigarettes, chewing tobacco, cigars, etc.)	0	2	3	4	6
b. Alcoholic beverages (beer, wine, spirits, etc.)	0	2	3	4	6
c. Cannabis (marijuana, pot, grass, hash, etc.)	0	2	3	4	6
d. Cocaine (coke, crack, etc.)	0	2	3	4	6
e. Amphetamine type stimulants (speed, diet pills, ecstasy, etc.)	0	2	3	4	6
f. Inhalants (nitrous, glue, petrol, paint thinner, etc.)	0	2	3	4	6
g. Sedatives or Sleeping Pills (Valium, Serepax, Rohypnol, etc.)	0	2	3	4	6
h. Hallucinogens (LSD, acid, mushrooms, PCP, Special K, etc.)	0	2	3	4	6
i. Opioids (heroin, morphine, methadone, codeine, etc.)	0	2	3	4	6
j. Other - specify:	0	2	3	4	6

Question 3

During the past three months, how often have you had a strong desire or urge to use *(FIRST DRUG, SECOND DRUG, ETC)*?	Never	Once or Twice	Monthly	Weekly	Daily or Almost Daily
a. Tobacco products (cigarettes, chewing tobacco, cigars, etc.)	0	3	4	5	6
b. Alcoholic beverages (beer, wine, spirits, etc.)	0	3	4	5	6
c. Cannabis (marijuana, pot, grass, hash, etc.)	0	3	4	5	6
d. Cocaine (coke, crack, etc.)	0	3	4	5	6
e. Amphetamine type stimulants (speed, diet pills, ecstasy, etc.)	0	3	4	5	6
f. Inhalants (nitrous, glue, petrol, paint thinner, etc.)	0	3	4	5	6
g. Sedatives or Sleeping Pills (Valium, Serepax, Rohypnol, etc.)	0	3	4	5	6
h. Hallucinogens (LSD, acid, mushrooms, PCP, Special K, etc.)	0	3	4	5	6
i. Opioids (heroin, morphine, methadone, codeine, etc.)	0	3	4	5	6
j. Other - specify:	0	3	4	5	6

Question 4

During the past three months, how often has your use of *(FIRST DRUG, SECOND DRUG, ETC)* led to health, social, legal or financial problems?	Never	Once or Twice	Monthly	Weekly	Daily or Almost Daily
a. Tobacco products (cigarettes, chewing tobacco, cigars, etc.)	0	4	5	6	7
b. Alcoholic beverages (beer, wine, spirits, etc.)	0	4	5	6	7
c. Cannabis (marijuana, pot, grass, hash, etc.)	0	4	5	6	7
d. Cocaine (coke, crack, etc.)	0	4	5	6	7
e. Amphetamine type stimulants (speed, diet pills, ecstasy, etc.)	0	4	5	6	7
f. Inhalants (nitrous, glue, petrol, paint thinner, etc.)	0	4	5	6	7
g. Sedatives or Sleeping Pills (Valium, Serepax, Rohypnol, etc.)	0	4	5	6	7
h. Hallucinogens (LSD, acid, mushrooms, PCP, Special K, etc.)	0	4	5	6	7
i. Opioids (heroin, morphine, methadone, codeine, etc.)	0	4	5	6	7
j. Other - specify:	0	4	5	6	7

Question 5

During the past three months, how often have you failed to do what was normally expected of you because of your use of *(FIRST DRUG, SECOND DRUG, ETC)*?	Never	Once or Twice	Monthly	Weekly	Daily or Almost Daily
a. Tobacco products					
b. Alcoholic beverages (beer, wine, spirits, etc.)	0	5	6	7	8
c. Cannabis (marijuana, pot, grass, hash, etc.)	0	5	6	7	8
d. Cocaine (coke, crack, etc.)	0	5	6	7	8
e. Amphetamine type stimulants (speed, diet pills, ecstasy, etc.)	0	5	6	7	8
f. Inhalants (nitrous, glue, petrol, paint thinner, etc.)	0	5	6	7	8
g. Sedatives or Sleeping Pills (Valium, Serepax, Rohypnol, etc.)	0	5	6	7	8
h. Hallucinogens (LSD, acid, mushrooms, PCP, Special K, etc.)	0	5	6	7	8
i. Opioids (heroin, morphine, methadone, codeine, etc.)	0	5	6	7	8
j. Other - specify:	0	5	6	7	8

Ask Questions 6 & 7 for all substances ever used (i.e. those endorsed in Question 1)

Question 6

Has a friend or relative or anyone else ever expressed concern about your use of *(FIRST DRUG, SECOND DRUG, ETC.)?*	No, Never	Yes, in the past 3 months	Yes, but not in the past 3 months
a. Tobacco products (cigarettes, chewing tobacco, cigars, etc.)	0	6	3
b. Alcoholic beverages (beer, wine, spirits, etc.)	0	6	3
c. Cannabis (marijuana, pot, grass, hash, etc.)	0	6	3
d. Cocaine (coke, crack, etc.)	0	6	3
e. Amphetamine type stimulants (speed, diet pills, ecstasy, etc.)	0	6	3
f. Inhalants (nitrous, glue, petrol, paint thinner, etc.)	0	6	3
g. Sedatives or Sleeping Pills (Valium, Serepax, Rohypnol, etc.)	0	6	3
h. Hallucinogens (LSD, acid, mushrooms, PCP, Special K, etc.)	0	6	3
i. Opioids (heroin, morphine, methadone, codeine, etc.)	0	6	3
j. Other – specify:	0	6	3

Question 7

Have you ever tried and failed to control, cut down or stop using *(FIRST DRUG, SECOND DRUG, ETC.)?*	No, Never	Yes, in the past 3 months	Yes, but not in the past 3 months
a. Tobacco products (cigarettes, chewing tobacco, cigars, etc.)	0	6	3
b. Alcoholic beverages (beer, wine, spirits, etc.)	0	6	3
c. Cannabis (marijuana, pot, grass, hash, etc.)	0	6	3
d. Cocaine (coke, crack, etc.)	0	6	3
e. Amphetamine type stimulants (speed, diet pills, ecstasy, etc.)	0	6	3
f. Inhalants (nitrous, glue, petrol, paint thinner, etc.)	0	6	3
g. Sedatives or Sleeping Pills (Valium, Serepax, Rohypnol, etc.)	0	6	3
h. Hallucinogens (LSD, acid, mushrooms, PCP, Special K, etc.)	0	6	3
i. Opioids (heroin, morphine, methadone, codeine, etc.)	0	6	3
j. Other – specify:	0	6	3

Question 8

	No, Never	Yes, in the past 3 months	Yes, but not in the past 3 months
Have you ever used any drug by injection? *(NON-MEDICAL USE ONLY)*	0	2	1

VITA

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PUBLICATION	1. Kyaw Min Htut, Myo Myo Mon, Zin Mar Aye, Lwin Lwin Ni. Young key affected population in Myanmar: are there any challenges in seeking information and care for HIV/sexually transmitted infections and reproductive health? F1000Research 2018, 7:1515 (https://doi.org/10.12688/f1000research.16029.2) 2. Kyaw Min Htut, Myo Myo Mon, Lwin Lwin Ni, Aung Soe Min, Ni Ni Htay Aung. Are they disclosed?: Situation of HIV status disclosure among adolescents in four townships of Myanmar. Myanmar Health Science Research Journal 2018.Vol 30. No.1, 76-82 3. Myo-Myo Mon, Tippawan Liabsuetrakul, Edward B.Mcneil, Kyaw-Min-Htut. Mindfulness-integrated reproductive health package for adolescents with parental HIV infection: A group randomized-controlled trial. Vulnerable Children and Youth Studies. DOI: 10.1080/17450128.2017.1282072. 4. Myo-Myo Mon, Tippawan Liabsuetrakul, Kyaw-Min Htut. Effectiveness of mindfulness intervention on psychological behaviours among adolescents with parental HIV infection: A group-randomized controlled trial. Asia Pacific Journal of Public Health 2016 Nov;28(8):765-775. DOI:10.1177/1010539516675698.
AWARD RECEIVED	1. Kyaw Min Htut, Myo Myo Mon, Lwin Lwin Ni, Aung Soe Min, Ni Ni Htay Aung. Are they disclosed?: Situation of HIV status disclosure among adolescents. A poster presented at 44th Myanmar Health Research Congress, Programme and Abstracts, January 2016. (1st Prize, Best Poster Award) 2. Kyaw Min Htut, Myo Myo Mon, Htun Nyunt Oo, Zin Mar Aye, Lwin Lwin Ni, Aung Soe Min, Ni Ni Htay Aung. Young Key Affected Population: Is there any challenge in seeking reproductive health information and care?", 46th Myanmar Health Research Congress,

Programme and Abstract, Jan 2018. (3rd Prize, Best Poster Award)