MULTI-LEVEL RISK AND PROTECTIVE FACTORS

AND HIV-RELATED RISK BEHAVIOURS AMONG YOUNG MEN

WHO HAVE SEX WITH MEN (YMSM) IN MYANMAR

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ACRONYMS

AIDS	Acquired Immune Deficiency Syndrome
DMR	Department of Medical Research
HIV	Human Immuno-deficiency Virus
IBBS	Integrated Behavioural and Biological Surveillance
INGO	International non-governmental organization
MSM	Men who have sex with men
MSI	Marie Stopes International
n/s	Not significant
NAP	National AIDS Programme
PSI	Population Services International
NGO	Non-governmental organization
NSP	National Strategic Plan
PWID	People who inject drugs
RDS	Respondent driven sampling
YMSM	Young men who have sex with men

EXECUTIVE SUMMARY

This report presents findings from two cross-sectional surveys conducted in 2013–2014 among young (18 to 28 years) men who have sex with men (YMSM) in Yangon and Monywa, Myanmar. The primary objective of these surveys was to measure risk and protective factors and HIV related risk behaviours within this population. 200 YMSM were recruited in Yangon and 200 in Monywa using respondent driven sampling (RDS). RDS is a chain-referral sampling method specifically designed to obtain probability-based samples of hard-to-reach populations that are socially networked. Sampling was initiated with seven seeds (initial non-randomly selected members of the survey population) in Yangon and four seeds in Monywa. Eligible YMSM who enrolled in the survey were screened, provided consent and then given a face-to-face interview about their background, sexual identity, sexual history, affiliations with organizations, relationships with family, sexual health and HIV testing. Descriptive and regression analyses were adjusted for differential network sizes and recruitment patterns in RDS Analyst (www.hpmrg.org).

YMSM in Yangon and Monywa had a median age of 21 and 23, respectively, and most had nuclear families with both parents being alive. Although most YMSM reported having a good relationship with their father and mother, less than half of YMSM in both townships reported that both of their parents were aware of their same-sex preferences or behaviours. Furthermore, just over 40% of YMSM in both townships reported having problems with family members (because of their sexual identify or orientation).

The majority of YMSM in both townships had their first sexual experience when they were 16 years or older. More than three quarters of YMSM were sexually active in the past month with over half reporting having more than one partner. However, there are indications that YMSM are knowledgeable about the protective factors of condom use as most reported using a condom the last time they had sex (Yangon: 72%; Monywa: 79%). Roughly half of YMSM reported ever joining a youth or religious organization; past involvement in an organization found lower odds of condom use but higher odds of HIV testing. Although drug use was low, YMSM in both townships had higher prevalence of smoking and alcohol use.

The three MSM types sampled in this survey (i.e. Apone, Apwint, Tha-nge) had different risks. Although close to one-third of YMSM in both townships had their first sexual experience at or before 15 years of age, of which over 80% did so with a male partner, Apwint YMSM had the highest percentages of early sexual debut (compared to Apone or Tha-nge). Apwint YMSM in both townships also had higher percentages of having ever been forced to have sex. Apwint and Tha-nge youth compared to Apone youth had significantly lower odds of condom use at last sex. Apwint had higher prevalence of alcohol use whereas Tha-nge had higher prevalence of cigarette smoking. YMSM who identify themselves as one of the different MSM types may require distinct intervention strategies to address their unique risks.

This is one of the first surveys using a probability based sampling method to study the risk and protective factors among a diverse sample of YMSM in Myanmar. These findings provide useful information upon which to plan new and expand existing services. Furthermore, these findings form a baseline on which to monitor trends within this population and to design future research.

INTRODUCTION

In most of Asia, HIV prevalence in the general population is stabilizing. However, key populations at higher risk of HIV exposure, such as people who inject drugs (PWID), sex workers and their clients, and men who have sex with men (MSM) continue to experience significantly higher HIV infection rates compared to people in the general population.[1,2] The epidemic in these sub-populations is driven primarily through unprotected sexual contact and the use of contaminated needles and syringes. In Myanmar, HIV prevalence among the general population aged 15 years and above is estimated to be 0.47%. The most recent surveillance data from 2013 indicate prevalence of HIV among FSW 8.1% among female sex workers, 10.4% among MSM, and 18.7% among PWID.[3] The prevalence of HIV has increased among MSM in recent years, including among younger cohorts under age 25. There is heightened concern that unless targetted actions are taken, the further spread of HIV among MSM is inevitable.[4,5]

MSM worldwide are considered a hard to reach population, making it difficult to obtain accurate data about their risk behaviours. In Myanmar, punitive laws which make male to male sex punishable by a prison sentence of up to 10 years, pushes MSM to be distrustful of government institutions and organizations.[6] In addition, MSM in Myanmar face social stigma and various forms of discrimination. Young MSM (YMSM) are especially vulnerable to experienced and self-perceived social stigma and discrimination. Emerging adulthood, typically defined as the time between the ages of 18–25, is a time of greater independence, self-development and exploration and a time to make decisions about sexuality.[7] Young men who are subject to stigma and discrimination because of their same sex preferences may experience psychological distress such as low self-esteem, social phobia and risk-taking behaviours including having multiple partners and unprotected sex. However, stressful life events (such as social rejection in the case of YMSM) are balanced by protective factors present at individual, family and school environment. Emotional and sexual life development programme for adolescents and young people should therefore, not only focus on reducing risk factors but also on promoting protective factors.[8]

National responses to HIV and AIDS in Myanmar began in the mid-1980s. A multi-sectoral National AIDS Committee, chaired by the Minister of Health, was formed in 1989. Consequently, a short term plan for the prevention of HIV transmission was launched that same year resulting in the first National Strategic Plan (NSP) for the period of 2006 to 2010. The second NSP (2011–2015 'NSP II') was produced in 2011. Of three strategic priorities in the second NSP, reducing HIV among MSM comprises intervention 2 of Strategic Priority I. A key component of this intervention is to conduct quality surveys to gather representative data among YMSM in an effort to tailor needed HIV prevention, treatment and care programmes. These data are essential to establishing improved health care and social support services for YMSM in the country.

In 2013-2014, with funding from UNESCO, the Department of Medical Research undertook a survey of YMSM in Yangon and Monywa, Myanmar, to understand social and sexual risks and protective factors. While there have been studies of MSM in Myanmar, this is the first study, to our knowledge, that focused exclusively on young MSM. The findings from these surveys will provide a baseline for monitoring and evaluation, to identify gaps in existing programmes and help in the development of high standard targeted HIV prevention and improved health care programmes.

STUDY OBJECTIVES

The objectives of these surveys are the following:

1. To identify the risk and protective factors influencing YMSM in relation to HIV transmission at the individual level.
2. To identify the risk and protective factors influencing YMSM in relation to HIV transmission at the family, school and immediate environment.
3. To find out the association between risk and protective factors and HIV related risk behaviours.
4. To provide information to develop appropriate strategies and interventions for HIV prevention and control programmes for YMSM.

STUDY METHODOLOGY

Study design

Cross-sectional surveys were conducted among YMSM ages 16 to 26 years in Yangon and Monywa (Figure 1). These two townships were selected because they were estimated to have a high number of MSM (> 1,000 individuals) living there. Located in lower Myanmar, Yangon (approximate population: 7.3 million) is the country's former capital. It is the largest township in Myanmar, its most important commercial center, and the capital of Yangon Region. Monywa (approximate population: 372,000) is in central Myanmar about 136 km north-west of Mandalay.

Figure 1: Map of Myanmar and identification of survey sites

Study population-Operational definition of YMSM

The study population was defined as persons between the ages of 16 and 28 years, who had same-sex attractions, male-to-male sexual behaviours and/or practices which will fall under one of three classifications identified in Myanmar culture and research:

(1) *Apone*, biological males who are perceived as masculine in their outward dress and behaviour. These males tend to not be open about their same sex attractions, and are more likely to also have relationships with females and to have families. In some cases these men may only maintain relationships with females in order to hide their same sex attractions.

(2) *Apwint,* biological males who openly behave and dress as women. This include persons who have transitioned and have undergone sex reassignment survey, as well as well as those who dress and behave as females.

(3) *Tha Nge*, biological males who are perceived as masculine in their outward dress and behaviour. They may have sex with males and females and, in some cases, could be classified as bi-sexual. Their male sex partners are often Apwint or Apone.

While this classification is used in the Integrated Biological and Behavioural Surveillance (IBBS)[9] for Myanmar, there is no consistent agreement on the use of these terms to classify MSM.[10] It is not clear whether all YMSM would classify themselves as belonging to one of the groups. In addition, it is not known whether each of these groups is mutually exclusive; some YMSM may not perceive themselves as perfectly fitting in one specific group. The eligibility did not include geographic restrictions.

Sampling

Based on consultations with local MSM networks and because YMSM in Yangon and Monywa do not have sampling frames and are often unreached populations, Respondent driven sampling (RDS) was selected to sample study participants. RDS is a variant of a chain referral sampling method which can provide representative data when implemented and analyzed properly[11]. It has been used successfully around the work to sample hard-to-reach populations such as MSM, female sex workers and PWID.[12]

RDS uses social networks to access members of populations. Recruitment is initiated by selecting a small number of "seeds" (eligible population members). Each seed receives a fixed number of recruitment coupons to recruit his/her peers who then present the coupons at a fixed site to enroll in the survey. Eligible recruits who finish the survey process are also given a set number of coupons to recruit their peers. This process continues until the desired sample size is reached. Participants are provided a "primary" incentive for participating in the survey and a "secondary" incentive for successfully recruiting peers to enroll in the survey.

Sample size calculation

There are currently no reliable data to calculate a sample size for YMSM in Yangon and Monywa. For this reason, the most conservative estimate of 50% was used to establish a point estimate for risk behaviours. At the 95% confidence level, with a desired precision of 0.1 and design effect of 2, the necessary sample size was calculated to be 192 (rounded up to 200).

Survey preparation

Formative assessment

Formative assessment was conducted with YMSM in September 2013 to determine the following information:

(1) The type and amount of primary and secondary incentives;
(2) The interview site and opening days and hours; and
(3) The information to be written down on the coupon.

Based on findings from the assessment, the primary incentive was set at 2000 Ks (US$20) and the secondary incentive was set at 1500 Ks (US$15). The Blue Star drop-in center for youth run by Marie Stopes International in Yangon and "Top Center" run by Population Services International in Monywa were selected as survey sites. Sites were open between 9:00 am to 4:30 pm on two weekdays and one weekend day.

Questionnaire development

The questionnaire was developed by reviewing both national and international literature. First, a draft of a structured questionnaire was prepared in English and translated into Myanmar Language. Then, a workshop was conducted for training the research team members during which the questionnaire was modified. Finally, the questionnaire was modified based on findings for a pre-testing carried out in Yangon. The final questionnaire can be found in Annex 1.

Survey process

Three research assistants from the DMR and three MSM interviewers received training on RDS methodology, screening for enrollment, consent procedures, interviewing and coupon explanation. Each person who presented at the survey site with a valid coupon (seeds did not have a coupon but underwent the entire survey process) were screened for eligibility and asked to consent. Eligible and consenting persons were given a face-to-face interview, instructed on how to recruit their peers and given up to three recruitment coupons and their primary incentive. Participants who successfully recruited their peers were able to go to the interview site to retrieve their secondary incentive.

Data cleaning and management

Data were entered into SPSS version 16.0 and separated into two data sets by township for data cleaning. Coupon numbering consistency checks were conducted by reviewing recruitment graphics generated in RDS Analyst.[13] Data consistency checks were performed by frequencies and cross-tabulations for all the variables. Data were formatted and coded in Microsoft Excel and SPSS before being imported into RDS Analyst for descriptive data analysis.

Data analysis and presentation

Graphics

Recruitment graphics for each sample were created using NETDRAW in UCINET. [14]

Descriptive analysis

Descriptive analyses were conducted for each township separately with RDS Analyst.[15] Population proportions and 95% confidence intervals were calculated using the Gile successive sampling estimator[16] and adjusted for social network sizes using estimated population sizes of 1,000 YMSM in Monywa and 15,000 in Yangon. The tables for descriptive analyses display the category samples sizes for each variable analyzed, the adjusted point estimates and 95% confidence intervals. The tables also display the mean percentage of each township's adjusted estimate weighted by population size and the p-value for the differences in adjusted estimates between the two townships.

Bivariate and multivariable analyses

Data from Yangon and Monywa were pooled and bivariate and multivariable analyses were conducted in STATA 11.0 using exported Gile successive sampling weights. Multiple variables were analyzed using backward stepwise regression. Five outcomes from this study were selected for bivariate and multivariable analyses. These main outcomes of interest were:
  (1) Age at first sex;
  (2) The number of sexual partners in the past month (one partner v. multiple partners), among youth who were sexually active in the past month;
  (3) Condom use at last sex;
  (4) Ever experiencing forced sex; and,
  (5) Ever testing for HIV.

The following risk factors were assessed: Alcohol and drug use; negative peer culture; type of family; having a bad relationship with parents; not staying with family; unemployment; stigma and discrimination at home and school/work; and experience of violence or abuse. The following protective factors were assessed: Taking part in religious activities; being in school; steady employment; involvement in youth organizations and activities; participation in social organizations and activities; staying with parents; parental harmony; access to health information; and exposure to health education or peer education.

Tables for bivariate and multivariable regression of categorical data display odds ratios, confidence intervals and significance at the $p < .05$, $.01$ and $.001$ levels. Tables for continuous data display linear regression coefficients (β) and standard errors (SE) and significance at $p < .05$, $.01$ and $.001$ levels.

Ethical considerations
As part of the consent process, all participants were provided a thorough explanation of the objectives and nature of the survey, informed that the survey was voluntary, confidential and anonymous, and that they were free to withdraw at any time without any penalties during the survey. No personal identifying information was collected from participants and all materials were linked through a unique coupon code number. Once participants stated that they understood the above information they were asked to consent before being enrolled in the survey. Ethical approval was obtained from the "Proposal and Ethical Review Committee" of the DMR.

FINDINGS

Recruitment characteristics

Each township began with four seeds and sampled up to 200 participants in each of the two cities. Three seeds were added to the Yangon survey in order to increase recruitment. Figures 2 and 3 display recruitment graphics of YMSM in Yangon and in Monywa, respectively. The seeds are identified as the larger, differently colored nodes with arrows directed away from them. In Yangon there were a maximum of eight recruitment waves and in Monywa there were a maximum of five recruitment waves.

Figure 2: Recruitment graph of YMSM in Yangon, 2014
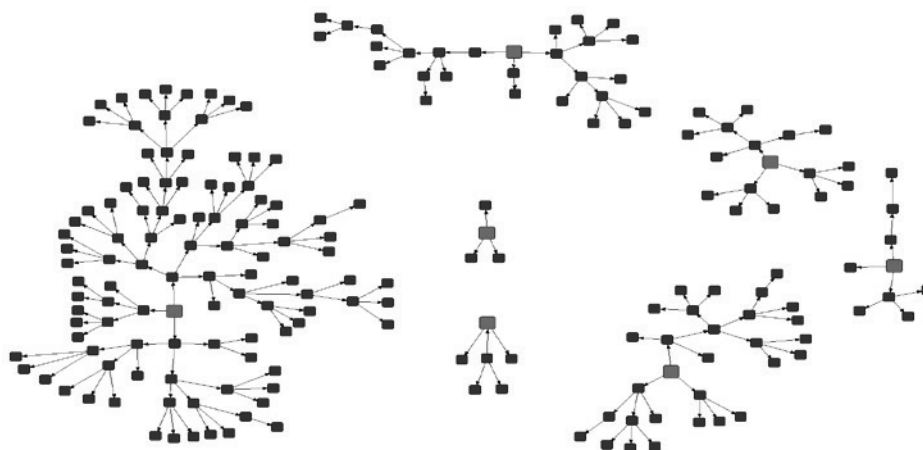
Figure 3: Recruitment graph of YMSM in Monywa, 2014
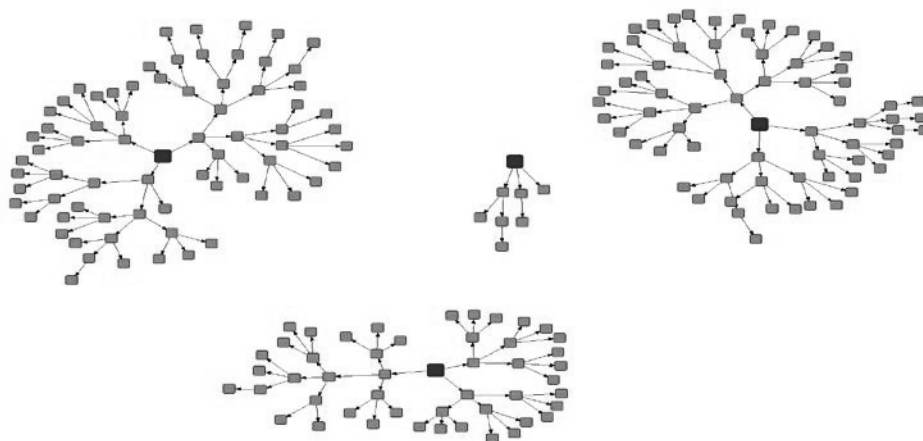
An important question is whether the three MSM types (Apone, Apwint and Tha-nge) were socially networked. An important assumption of RDS is that the sampled network forms one complete network component (i.e. that all sub-groups in the defined network are connected). Failure to meet this assumption may result in unstable estimates.

Figures 4 and 5 display recruitment graphics of MSM in Yangon and Monywa, respectively, by MSM type. Apone are identified as blue boxes, Apwint are identified as pink circles and Tha-nge are identified as green triangles. By examining these graphics, the three MSM types appear to be well mixed within the entire sample of recruitment chains. Although some of the recruitment chains are small and do not contain all three MSM types in each township, the largest recruitment chain is said to represent all recruitment chains in the sample. This mix in colors indicates that the three groups were fairly-well connected to each other (e.g. all colors recruited at least one of the other colors as well as their own color) in the network of YMSM in each of the townships.

Figure 4: Recruitment graph of YMSM according to the type of MSM in Yangon, 2014

■ Apone   ● Apwint   ▲ Tha-nge
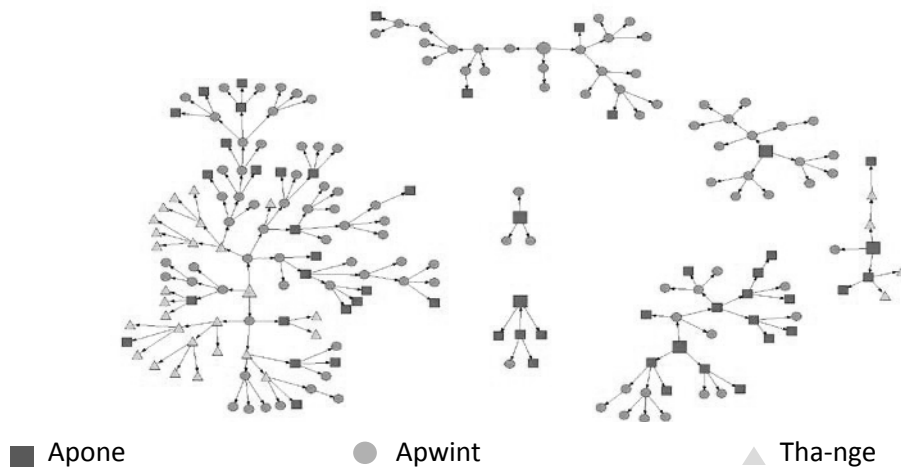
Figure 5: Recruitment graph of YMSM according to the type of MSM in Monywa, 2014

■ Apone   ● Apwint   ▲ Tha-nge
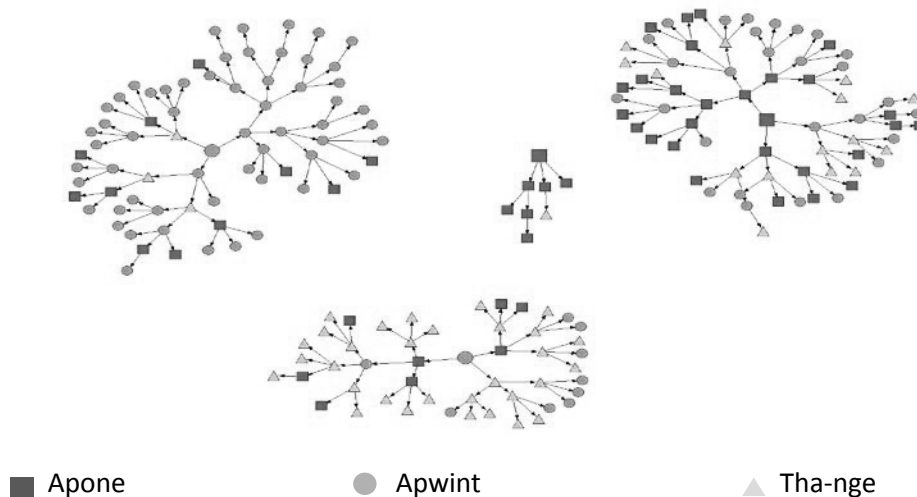
Seed characteristics

The final sample in Yangon was recruited with seven seeds (Table 1). These seeds had a range of social network sizes from 15 to 150 and consisted of ages 21 to 26 years. Five seeds self-identified as Apone, one as Apwint and one as Tha-nge. The chain from seed two comprised the highest number of participants (n-105) and waves (n=8) and made up the largest percentage of the sample (52.5%). Seed five managed to recruit only three participants into the chain and made up only one wave, comprising only 1.5% of the sample.

Table 1: Characteristics of seeds in Yangon

	Social network size	Age	Self-identified MSM type	Maximum number of recruits^	Maximum number of waves^	Percent of sample
Seed 1	30	21	Apone	5	2	2.5
Seed 2	30	21	Tha-nge	105	8	52.5
Seed 3	15	24	Apone	8	3	4.0
Seed 4	70	24	Apwint	27	6	13.5
Seed 5	35	25	Apone	3	1	1.5
Seed 6	150	25	Apone	29	5	14.5
Seed 7	80	26	Apone	16	3	8.0

Note: ^ Excluding seeds

The final sample in Monywa was recruited with four seeds. These seeds had a range of social network sizes from 30 to 200 and consisted of ages 21 to 25 years. Two seeds self-identified as Apone and two self-identified as Apwint. The chain from seed four comprised the highest number of participants (n-71) and waves (n=5) and made up the largest percentage of the sample (35.5%).

Table 2: Characteristics of seeds in Monywa

	Social network size	Age	Self-identified MSM type	Maximum number of recruits^	Maximum number of waves^	Percent of sample
Seed 1	50	21	Apone	7	3	3.5
Seed 2	40	23	Apone	70	4	35.0
Seed 3	200	24	Apwint	48	4	24.0
Seed 4	30	25	Apwint	71	5	35.5

Note: ^ Excluding seeds

Descriptive Analysis

Background characteristics

The median age of YMSM was 21 in Monywa and 23 in Yangon (Table 3). The aggregated largest percentage was 16 to 20; a significantly higher percentage of YMSM in Yangon were between 16 and 20 years, compared to Monywa. Forty three percent of YMSM in Yangon self-identified as Apwint (feminine) whereas 32% in Monywa self-identified as Apwint (no significant difference [n/s]). Yangon had a significantly higher percentage of YMSM who reported having a high school education or more compared to Monywa (p=0.00). Most YMSM in both townships reported having a regular job, but a higher percentage of in Monywa reported an estimated monthly income of >100,000 Kyats compared to YMSM in Yangon (p=0.00). Most MSM in both townships currently live with one or both parents (n/s).

Table 3: Socio-demographic characteristics of YMSM, Yangon and Monywa, Myanmar, 2013–2014

	Yangon N = 200		Monywa N = 200		Aggregated estimates	P-value
	n	%, (95% CI)	n	%, (95% CI)	%	p
Age (years)						
Median	200	21 (range: 16–26)		23 (range: 16–28)	--	--
16 to 20	59	44.9 (34.3, 55.5)		26.4 (18.8, 33.9)	43.05	0.00
21 to 24	83	41.2 (31.2, 51.2)		47.0 (37.0, 57.0)	41.78	0.35
25 to 28	58	13.9 (8.8, 19.0)		26.6 (18.0, 35.3)	15.17	0.06
Type of MSM						
Apone (non-feminine)	53	24.0 (14.1, 33.8)	54	30.0 (19.7, 40.3)	24.6	0.32
Apwint (feminine)	116	42.9 (27.0, 58.8)	96	31.9 (23.5, 40.3)	41.8	0.21
Tha-nge	31	33.1 (14.0, 52.3)	50	38.1 (27.6, 48.7)	33.6	0.65
Education level						
≤ Middle school	66	31.8 (22.0, 41.6)	116	63.4 (54.0, 72.8)	35.0	0.00
≥ High school	134	68.2 (58.4, 78.0)	84	36.6 (27.2, 45.0)	65.0	0.00
Employment status						
Regular job	126	55.8 (43.3, 68.3)	131	69.6 (61.2, 77.1)	57.2	0.00
Non-regular job	46	17.8 (11.1, 24.5)	51	19.5 (13.5, 25.4)	18.0	0.93
Unemployed	28	26.4 (14.0, 38.8)	18	10.9 (4.2, 17.6)	24.9	0.21
Estimated monthly income (Kyats)						
No income	28	26.4 (13.3, 39.5)	18	10.9 (4.8, 17.5)	24.9	0.00
≤100,000	108	53.8 (42.0, 65.6)	91	44.1 (35.0, 53.4)	52.8	0.32
>100,000	64	19.8 (11.5, 28.1)	91	45.0 (35.6, 53.8)	22.3	0.00
Current living situation						
Live with one/both parents	97	52.5 (41.2, 63.8)	119	57.5 (47.6, 67.4)	53.0	0.51
Stay at hostel/with friends/at work	51	19.0 (11.3, 26.7)	34	16.0 (10.0, 21.4)	18.7	0.73
Live w/wife/ partners/others	52	28.5 (18.4, 38.7)	47	26.6 (16.8, 36.3)	28.3	0.95

Family related characteristics

Most YMSM reported having nuclear families (68% Yangon, 87% Monywa, p=0.05) and having both parents alive (65% Yangon, 52% Monywa, n/s). Among those with living parents, the majority reported that their parents have a "good" relationship with each other; this percentage was higher in Monywa than in Yangon (54% Yangon, 87% Monywa, p=0.00). Most YMSM have a "good" relationship with their father and over 90% have a good relationship with their mother (n/s). A higher percentage of YMSM in Yangon, compared to Monywa, reported that their fathers and mothers completed high school or higher education (n/s). Roughly one-third of fathers from Yangon were government/private employees whereas 36% from Monywa were manual laborers. The majority of mothers reported their occupation as "dependent" (55% Yangon, 65% Monywa, n/s). Forty percent of YMSM in Yangon and 33% in Monywa reported that both of their parents are aware of their sexual identify or orientation (n/s); among those, 41% in Yangon and 51% in Monywa reported that both parents are accepting of their sexual identify or orientation (n/s). Just over 40% of YMSM reported having problems with family members (n/s).

Table 4: Family-related characteristics of YMSM, Yangon and Monywa, Myanmar, 2013–2014

	Yangon N = 200		Monywa N = 200		Aggregated estimates	P-value
	n	%, (95% CI)	n	%, (95% CI)	%	p
Type of family						
Nuclear	157	68.3 (58.2, 78.3)	173	86.5 (79.9, 92.3)	70.1	0.05
Extended	43	31.7 (21.7, 41.8)	27	13.5 (7.7, 19.3)	29.9	0.05
Parents living status						
Both alive	118	65.0 (56.4, 73.6)	103	52.2 (42.1, 62.4)	63.7	0.06
Father or mother alive	59	24.7 (17.1, 32.4)	65	30.1 (21.9, 38.3)	25.2	0.30
Both passed away	23	10.3 (4.5, 16.0)	32	17.7 (10.3, 25.1)	11.0	0.06
Relationship between parents						
Good	87	54.4 (40.4, 68.3)	89	87.1 (78.4, 95.7)	57.7	0.00
Poor	21	29.6 (16.0, 43.1)	5	4.9 (3.3, 9.6)	27.1	0.00
Divorced	10	16.1 (4.8, 27.3)	9	7.9 (0.2, 15.7)	15.3	0.06
Relationship with father						
Good	90	72.1 (60.5, 83.6)	85	78.6 (68.6, 88.6)	72.8	0.28
Poor	42	27.9 (16.4, 39.5)	28	21.4 (11.4, 31.4)	27.3	0.28
Relationship with mother						
Good	154	92.8 (86.0, 99.6)	151	94.5 (90.3, 98.7)	93.0	0.92
Poor	9	7.2 (0.4, 14.0)	8	5.4 (1.2, 9.7)	7.0	0.90
Father's education level						
≤ Middle school	91	39.5 (30.0, 49.1)	115	54.6 (44.6, 64.5)	41.0	0.09
≥ High school	109	60.5 (50.9, 70.0)	85	45.4 (35.5, 55.4)	59.0	0.09
Mother's education level						
≤ Middle school	107	45.7 (35.4, 56.0)	174	87.8 (82.1, 93.6)	49.9	0.00
≥ High school	93	54.3 (44.0, 64.6)	26	12.2 (6.4, 17.9)	50.1	0.00

	Yangon N = 200		Monywa N = 200		Aggregated estimates	P-value
	n	%, (95% CI)	n	%, (95% CI)	%	p
Father's occupation						
Manual laborer	45	21.5 (13.5, 29.4)	87	36.3 (27.5, 45.1)	23.0	0.78
Government/ private employee	69	33.1 (23.2, 42.9)	42	17.9 (11.5, 24.2)	31.6	0.80
NGO/INGO staff	0	−	5	1.8 (0.0,3.5)	0.2	0.34
Own business	59	31.3 (21.7, 40.9)	40	32.8 (22.4, 41.7)	31.5	1.00
Dependent	27	14.2 (7.0, 21.4)	26	12.2 (6.3, 80.0)	14.0	0.99
Mother's occupation						
Manual laborer	14	4.8 (1.7, 8.0)	25	12.7 (7.0, 18.4)	5.6	0.62
Government/ private employee	17	10.3 (4.3, 16.3)	17	3.7 (1.9, 6.1)	9.6	0.14
NGO/INGO staff	2	3.2 (0.0, 7.2)	2	0.4 (0.0, 0.7)	2.9	0.31
Own business	55	27.0 (17.6, 36.5)	34	18.7 (11.1, 26.3)	26.2	0.47
Dependent	112	54.6 (44.4, 64.9)	124	64.5 (55.7, 73.6)	55.6	0.18
Parents' awareness of same-sex preferences or behaviours						
Both aware	107	40.2 (27.7, 52.8)	91	32.5 (24.6, 40.3)	39.4	0.12
Father or mother aware	46	18.5 (10.8, 26.3)	46	19.4 (12.6, 26.1)	18.6	0.99
Neither aware	34	32.1 (19.0, 45.2)	37	28.6 (18.1, 38.4)	31.8	0.79
Don't know	13	9.1 (3.1, 15.1)	26	19.6 (11.5, 27.7)	10.2	0.20
Parents' acceptance of same-sex preferences or behaviours						
Both accept	69	41.4 (28.7, 54.0)	71	50.6 (38.7, 62.6)	42.3	0.08
Father accepts	5	5.5 (0.0, 12.1)	6	4.9 (0.3 −9.4)	5.4	0.99
Mother accepts	56	34.9 (24.1, 45.8)	47	36.0 (24.3, 47.6)	35.0	0.99
Neither accept	20	11.9 (5.5, 18.4)	10	6.7 (2.8, 10.6)	11.4	0.16
Don't know	3	6.3 (0.0, 14.2)	3	1.8 (0.0, 3.4)	5.9	0.24
Any problem with family members						
Yes	89	42.4 (30.8, 54.1)	101	43.3 (33.7, 52.9)	42.5	0.99
No	111	57.6 (45.9, 69.3)	99	56.7 (47.1, 66.3)	57.5	0.99

Individual characteristics

No significant differences between the townships were found for any individual characteristics (Table 5). Half of YMSM in Yangon and 40% in Monywa reported having a partner. The majority of YMSM reported becoming aware of their same sex attraction at 16 years or older, however, 46% in Yangon and 40% in Monywa disclosed this information to anyone at the time. A higher percentage of YMSM in Yangon, compared to Monywa, reported being ≤ 15 when they first disclosed their same sex attractions (32% Yangon, 18% Monywa), with the majority of YMSM reporting this disclosing to MSM friends and other friends. Twenty nine percent in Yangon and 33% in Monywa reported trying to change their personal feelings or behaviours (related to same sex attraction).

About 70% of YMSM in both townships reported having a role model, among which 46% in each township reported their role model as being male. The majority of YMSM reported that having a 'good personality' was the primary reason for selecting their role models (Figure 6). Over 90% of YMSM in each township reported not currently being in school; 48% of YMSM in Yangon and 46% in

Monywa reported not being in school due to financial problems and 36% in Yangon and 32% in Monywa reporting that they were not interested. Over 80% in Yangon and Monywa reported never displaying same sex attraction while they were in school. Almost all YMSM reported having MSM friends and 83% in Yangon and 57% in Monywa reported having MSM friends who have many sexual partners.

Table 5: Individual characteristics of YMSM, Yangon and Monywa, Myanmar, 2013–2014

	Yangon N = 200		Monywa N = 200		Aggregated estimates	P-value
	n	%, (95% CI)	n	%, (95% CI)	%	p
Ever had a partner						
Yes, currently	106	49.5 (40.1, 59.0)	95	39.5 (29.9, 49.0)	48.5	0.14
Yes, but in the past	48	23.2 (15.3, 31.2)	62	26.6 (18.0, 35.2)	23.5	0.70
Never	46	27.2 (19.0, 35.5)	43	33.9 (22.4, 45.5)	27.9	0.20
Age of awareness of same sex attraction (years)						
≤ 10	35	14.2 (7.1, 21.3)	17	4.2 (2.1, 6.3)	13.2	0.01
11 to 15	79	32.6 (22.8, 42.3)	83	37.6 (28.6, 46.1)	33.1	0.45
≥ 16	86	53.3 (42.5, 64.0)	100	58.2 (48.3, 67.6)	53.8	0.50
Shared same sex attraction at the time of awareness						
Yes	89	45.5 (35.8, 55.1)	88	39.5 (30.1, 48.9)	44.9	0.29
No	111	54.5 (44.9, 64.2)	122	60.5 (51.3, 69.8)	55.1	0.29
Age at first disclosure of same sex attraction						
≤ 15	88	31.8 (22.0, 41.6)	44	17.6 (10.9, 24.4)	30.4	0.08
≥ 16	112	68.2 (58.4, 78.0)	156	82.4 (75.6,89.1)	69.6	0.08
To whom disclosed						
Either parent(s) or sibling(s)	4	1.4 (0.0, 3.2)	7	2.2 (0.7, 3.6)	1.5	0.94
MSM friends	115	51.1 (39.8, 62.4)	104	57.8 (47.7, 68.0)	51.8	0.24
Others friends	67	45.9 (34.4, 57.3)	62	38.3 (28.5, 47.5)	45.1	0.14
Other	2	1.6 (0.0, 3.5)	7	1.6 (0.7, 4.2)	1.6	1.00
Attempted to change same-sex personal feelings or behaviour						
Yes	35	29.0 (18.5, 39.5)	53	32.7 (21.9, 43.4)	29.4	0.73
No	165	71.0 (60.5, 81.5)	147	67.3 (56.5, 78.0)	70.6	0.73
Has a role model						
Yes	166	70.7 (59.9, 81.5)	159	69.9 (59.3, 79.7)	70.6	0.99
No	34	29.3 (18.5, 40.1)	41	30.1 (19.4, 40.7)	29.4	0.99
Sex of role model						
Male	51	46.4 (35.2, 57.6)	51	46.3 (36.1, 57.0)	46.4	1.00
Female	10	6.4 (1.8, 11.1)	13	10.8 (3.6, 18.1)	6.8	0.36
MSM[17]	105	47.1 (35.6, 58.7)	95	42.8 (31.4, 53.3)	46.7	0.65
Currently attending school						
Yes	12	9.6 (3.7, 15.5)	11	6.5 (2.1, 10.7)	9.3	0.61
No	188	90.4 (84.5, 96.3)	189	93.5 (89.2, 97.8)	90.7	0.61
Main reason for being out of school						
Graduated	13	6.0 (2.0, 10.0)	16	8.4 (2.5, 15.1)	14.2	0.91
Financial problem	87	47.8 (37.9, 57.8)	86	46.5 (35.9, 57.1)	47.7	0.98
Social problem	13	6.4 (2.1, 10.7)	8	3.6 (0.5, 6.6)	6.1	0.55
Discrimination	2	3.2 (0.0, 7.5)	6	5.2 (0.3, 10.1)	3.4	0.83
No interest	71	36.4 (26.5, 46.2)	69	32.3 (25.2, 43.4)	36.0	0.62
Other	2	0.2 (0.0, 0.6)	4	1.5 (0.1, 3.2)	0.3	0.65

	Yangon N = 200		Monywa N = 200		Aggregated estimates	P-value
	n	%, (95% CI)	n	%, (95% CI)	%	p
Ever display same sex attraction at school						
Yes, always	6	3.7 (0.3, 6.6)	12	5.2 (1.1, 9.2)	3.9	0.89
Yes, sometimes	21	12.4 (4.4, 20.4)	24	8.4 (4.6, 12.1)	12.0	0.44
No, never	173	84.1 (75.4, 92.9)	164	86.4 (80.5, 92.3)	84.3	0.87
Have any MSM friends						
Yes	198	97.2 (93.2, 100.0)	199	99.4 (98.3, 100)	97.4	0.60
No	2	2.8 (0.0, 6.8)	1	0.6 (0.2, 1.7)	2.6	0.60
Have any MSM friends with many partners						
Yes	183	83.0 (74.2, 91.7)	169	67.3 (56.4, 78.5)	81.4	0.08
No	17	17.0 (8.3, 25.8)	31	32.7 (21.5, 44.0)	18.6	0.08

Figure 6: Reason for choosing role model among YMSM. Yangon and Monywa, Myanmar, 2013–2014
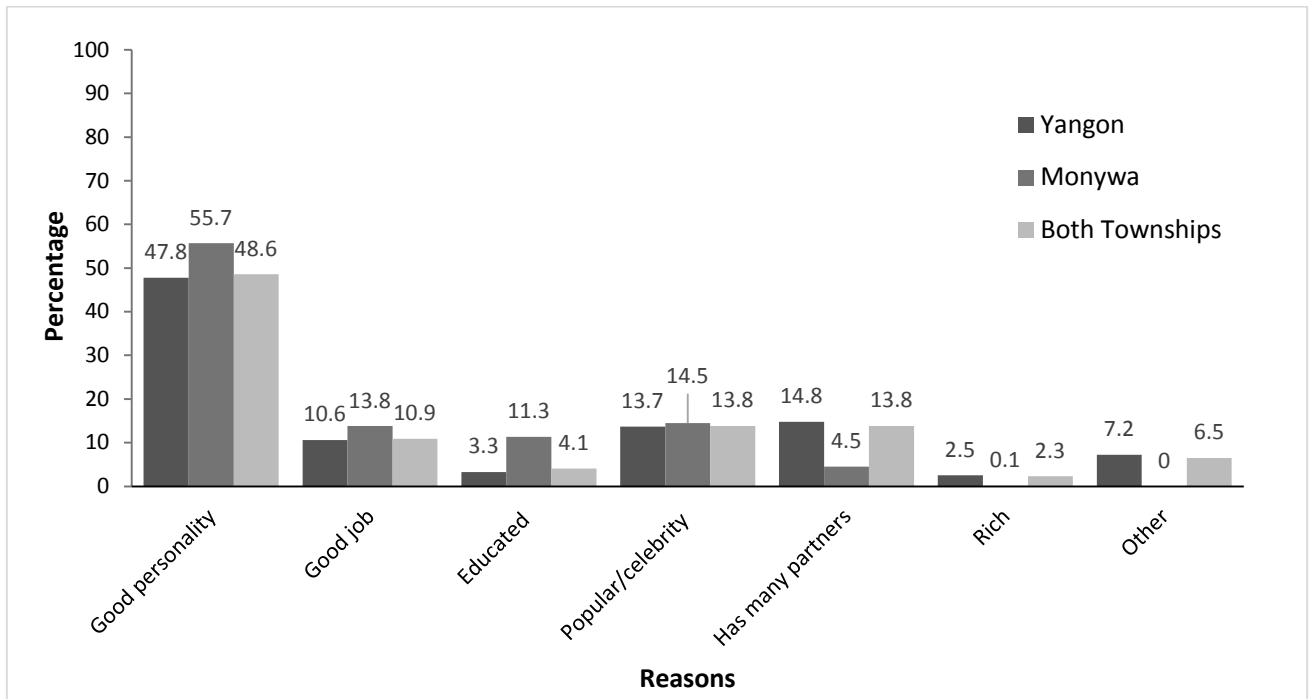
Social participation

No significant differences between the townships were found for social participation variables (Table 6). About half of YMSM reported never joining any youth organization; among those have ever joined a youth organization more than 90% reported being ordinary members of that organization and 47% in Yangon and 71% in Monywa reported being involved in social activities. Just over half of YMSM reported never joining any religious organization and about 22% in Yangon and 35% in Monywa reported ever participating in any religious activity.

Table 6: Information on social participation of YMSM, Yangon and Monywa, Myanmar, 2013–2014

	Yangon N = 200		Monywa N = 200		Aggregated estimates	P-value
	n	%, (95% CI)	n	%, (95% CI)	%	p
Ever joined any youth organization						
Yes, current	52	32.2 (21.8, 42.6)	48	27.0 (16.7, 37.2)	31.7	0.46
Already quit	45	17.7 (9.7, 25.7)	51	21.8 (14.9, 29.1)	18.1	0.53
Never	103	50.1 (40.4, 59.8)	101	51.2 (41.3, 61.1)	50.2	0.42
Position in organization						
Ordinary member	89	93.8 (85.7, 100)	93	97.4 (95.3, 99.2)	94.2	0.48
Member of executive committee	5	1.1 (0.0, 2.7)	2	0.8 (0.02 –1.9)	1.1	0.99
Leader	3	5.1 (0.0, 13.0)	4	1.8 (0.1, 3.5)	4.8	0.52
Involvement in activities[m]						
Peer education	34	25.9 (14.3, 37.5)	50	37.4 (22.3, 51.5)	27.1	0.18
Social activity	53	47.1 (32.8, 61.3)	59	71.2 (60.5, 81.3)	49.5	0.09
Sport activity	24	42.0 (26.9, 57.2)	20	24.2 (12.2, 36.2)	40.2	0.09
Other	1	1.2 (0.0, 3.8)	-	-	1.1	0.97
Ever joined any religious organization						
Yes, current	30	23.5 (14.1, 32.8)	44	27.1 (18.1, 35.9)	32.0	0.39
Already quit	58	16.6 (10.6, 22.6)	48	18.9 (12.5, 25.2)	16.8	0.84
Never	112	59.9 (49.6, 70.3)	108	54.1 (44.7, 63.4)	23.3	0.33
Ever participated in any religious activity						
Yes, always	30	20.7 (12.8, 28.6)	32	16.8 (9.4, 23.8)	20.3	0.58
Yes, sometimes	119	57.3 (48.4, 66.3)	104	48.0 (38.3, 57.7)	56.4	0.28
No, never	51	22.0 (14.2, 29.8)	64	35.2 (25.3, 45.2)	23.3	0.22

Note: [m] Multiple response.

Substance use

No significant differences between the townships were found for substance use variables (Table 7). Half of YMSM in Yangon and 42% in Monywa reported being current smokers; 66% in Yangon and 55% in Monywa were occasional or social drinkers and roughly 90% in both townships never used drugs.

Table 7: Substance use among YMSM, Yangon and Monywa, Myanmar, 2013–2014

	Yangon N = 200		Monywa N = 200		Aggregated estimates	P-value
	n	%, (95% CI)	n	%, (95% CI)	%	p
Smoker						
Yes, current	73	52.2 (41.9, 62.5)	74	42.9 (32.9, 52.8)	51.3	0.42
Already quit	12	5.3 (1.2, 9.4)	14	11.6 (1.7, 21.3)	5.9	0.13
Never	115	42.5 (31.9, 53.1)	112	45.5 (36.5, 54.6)	42.8	0.82
Frequency of drinking alcohol						
Daily drinker	3	1.2 (0.0, 2.6)	6	2.9 (0.0, 5.8)	1.4	0.72
Frequent drinker	5	2.9 (0.0, 6.5)	16	13.8 (3.9, 23.7)	4.0	0.14
Occasional/social drinker	130	66.2 (56.8, 75.6)	114	55.3 (45.4, 65.1)	65.1	0.71
Never	62	29.8 (20.8, 38.8)	64	28.0 (19.6, 36.5)	29.6	0.95
Frequency of drug use						
Daily	0	-	2	1.1 (0.02, 2.3)	0.1	0.58
Frequently	0	-	-	-	--	
Occasionally	11	11.2 (4.1, 18.3)	6	8.2 (0.05, 16.5)	10.9	0.77
Never	189	88.8 (81.7, 95.9)	192	90.7 (82.3, 99.0)	89.0	0.92

Sexual risk behaviours

No significant differences between the townships were found for sexual risk behaviour variables (Table 8). One-third (31.8%) of YMSM in Yangon and 27.4% in Monywa had their first sexual experience at or before 15 years of age, of which over 80% did so with a male partner. Few YMSM in either township reported their first sex being forced. And, 67% in Yangon and 60% in Monywa reported using a condom at the time of their first sexual experience.

Just over three quarters of YMSM in both townships reported having sex in the past month, among which more than half reported having more than one partner. Fifty three percent in Yangon and 59% in Monywa reported their last sex occurring in the past week. The majority of YMSM in both townships (Yangon: 72%; Monywa: 79%) used a condom the last time they had sex. Among those who did not use a condom the last time they had sex, 51% in Yangon and 30% in Monywa stated that the main reason for not doing so was that they had sex with a regular partner.

Table 8: Sexual risk behaviours among YMSM, Yangon and Monywa, Myanmar, 2013–2014

	Yangon N = 200		Monywa N = 200		Aggregated estimates	P-value
	n	%, (95% CI)	n	%, (95% CI)	%	p
Age at first sex (years)						
≤ 15	90	31.7 (23.1, 40.4)	73	27.5 (18.4, 36.4)	31.3	0.58
≥ 16	107	68.3 (59.6, 76.9)	127	72.5 (63.6, 81.6)	68.7	0.58
Sex of partner at first sex						
Male	187	86.5 (75.6, 97.4)	181	82.7 (72.7, 92.8)	86.1	0.73
Female	10	13.5 (2.6, 24.4)	19	17.3 (7.1, 27.3)	13.9	0.73
First sex was consensual						
Yes	185	93.6 (87.1, 100.0)	180	88.3 (81.8, 94.6)	93.1	0.22
No, forced	12	6.4 (0.0, 12.9)	20	11.7 (5.1, 18.2)	6.9	0.22
Condom use at first sex						
Yes	47	33.0 (22.3, 43.8)	64	39.6 (30.5, 49.5)	33.7	0.24
No	150	67.0 (56.3, 77.8)	136	60.4 (51.0, 69.5)	66.3	0.24
Sex within the past month						
Yes	167	76.1 (66.8, 85.4)	167	78.4 (70.2, 86.5)	76.3	0.898
No	30	23.9 (14.6, 33.2)	33	21.6 (13.5, 29.8)	23.7	0.898
Number of sexual partners in the past month						
One	67	42.4 (31.0, 53.8)	79	44.1 (33.8, 54.5)	42.6	0.97
More than one	100	57.6 (46.2, 69.0)	88	55.9 (45.5, 66.2)	57.4	0.97
Last sex						
Within past week	137	53.5 (42.4, 64.7)	135	58.9 (48.2, 69.6)	54.0	0.44
More than one week ago	60	46.5 (35.3, 57.6)	65	41.1 (30.4, 51.8)	46.0	0.44
Condom use at last sex						
Yes	152	72.4 (62.4, 82.4)	164	78.8 (70.9, 86.7)	73.0	0.22
No	45	27.6 (17.5, 37.6)	36	21.2 (13.2, 29.1)	27.0	0.22
Main reason for not using condom						
Dislike condoms	11	30.7 (10.2, 51.2)	9	24.7 (9.8, 39.6)	30.1	0.57
Regular partner	27	50.8 (28.7, 73.0)	17	29.7 (12.6, 46.8)	48.7	0.45
Other	7	18.5 (3.9, 33.1)	10	45.6 (25.8, 65.3)	21.2	0.54

Forced sex

Just under one quarter of YMSM reported having experienced forced sex (Table 9). Among those, around one quarter experienced forced sex when they were 15 years or younger. There were no significant differences between Yangon and Monywa for forced sex variables.

Table 9: Experience of forced sex among YMSM, Yangon and Monywa, Myanmar, 2013–2014

	Yangon N = 200		Monywa N = 200		Aggregated estimates	P-value
	n	%, (95% CI)	n	%, (95% CI)	%	p
Ever experienced forced sex						
Yes	57	24.5 (15.8, 33.2)	52	20.7 (12.0, 28.1)	24.1	0.61
No	140	75.5 (66.8, 84.2)	148	79.4 (60.7, 86.8)	75.9	0.59
Age when experienced forced sex						
≤15	17	26.5 (6.0, 47.0)	21	25.6 (11.9, 39.2)	26.4	0.99
≥16	40	73.5 (53.0, 94.1)	31	74.4 (60.8, 88.0)	73.6	0.99

Stigma and discrimination

Around half of YMSM in both townships reported never experiencing discrimination because of their same sex attraction (Table 10). Among those who experienced discrimination, 60% in Yangon and 53% in Monywa reported experiencing discrimination exhibited as insults or verbal abuse and just over one third in both townships reported discrimination exhibited as physical abuse or beating. Seventy percent of YMSM in both townships reported experiencing discrimination most often in public places. The highest percentage of YMSM in Yangon reported that "exclusion from social occasion" was perceived as the worst discrimination (40% vs. 15%, p=0.01) and the highest percentage of YMSM in Monywa reported "beating" as the worst discrimination (47% vs. 27%, n/s).

Table 10: Stigma and discrimination among YMSM, Yangon and Monywa, Myanmar, 2013–2014

	Yangon N = 200		Monywa N = 200		Aggregated estimates	P-value
	n	%, (95% CI)	n	%, (95% CI)	%	p
Frequency of experiencing discrimination						
Always	15	4.4 (1.0, 7.8)	12	4.5 (0.6, 8.3)	4.4	1.00
Sometimes	113	43.1 (32.8, 53.4)	117	41.7 (32.7, 50.2)	43.0	0.97
Very rare	2	0.6 (0.0, 1.7)	9	5.2 (0.9, 9.5)	1.1	0.53
Never	70	51.8 (41.2, 62.4)	62	48.5 (38.6, 58.5)	51.5	0.79
Type of discrimination						
Excluded from social occasion	13	5.7 (2.2, 9.3)	20	10.5 (5.9, 15.0)	6.2	0.13
Insulted/verbal abuse	70	59.9 (47.4, 72.3)	71	52.8 (43.8, 63.6)	59.2	0.20
Physical abuse/ beating*	47	34.4 (22.3, 46.6)	47	36.7 (27.1, 46.2)	34.6	0.92
Places where discrimination experienced						
At home	15	9.4 (3.1, 15.8)	6	5.7(0.1, 11.5)	9.0	0.53
At school	6	7.7 (0.4, 15.0)	16	16.3 (7.8, 25.0)	8.6	0.02
At work	9	13.5 (4.7, 22.4)	11	8.0 (2.6, 13.4)	13.0	0.24
In public places	100	69.3 (57.5, 81.1)	105	70.0 (59.8, 80.1)	69.4	0.99
Perceived worst discrimination						
Exclusion from social occasion	61	39.9 (30.0, 49.8)	34	15.3 (8.6, 21.8)	37.4	0.01
Insult/verbal abuse	45	21.9 (13.6, 30.3)	46	19.9 (11.1, 28.7)	21.7	0.92
Physical behaviours of disapproval	39	11.2 (6.6, 15.9)	38	17.8 (11.0, 24.6)	11.9	0.44
Beating	55	26.9 (17.7, 36.1)	82	46.9 (30.7, 56.9)	28.9	0.42

Note: *Four respondents from each township reported that they had experienced discrimination by beating.

HIV information sources

The most common sources of HIV information reported by YMSM in Yangon and Monywa were health staff (74% vs. 75%, n/s), followed by health talks (50% vs. 55%, n/s) (Figure 7). Other important sources of HIV information were from peers (43% vs. 51%, n/s) and from journals, magazines and/or pamphlets (48% vs. 44%, n/s).

Figure 7: Where YMSM received HIV-related information (multiple responses allowed), Yangon and Monywa, Myanmar, 2013–2014
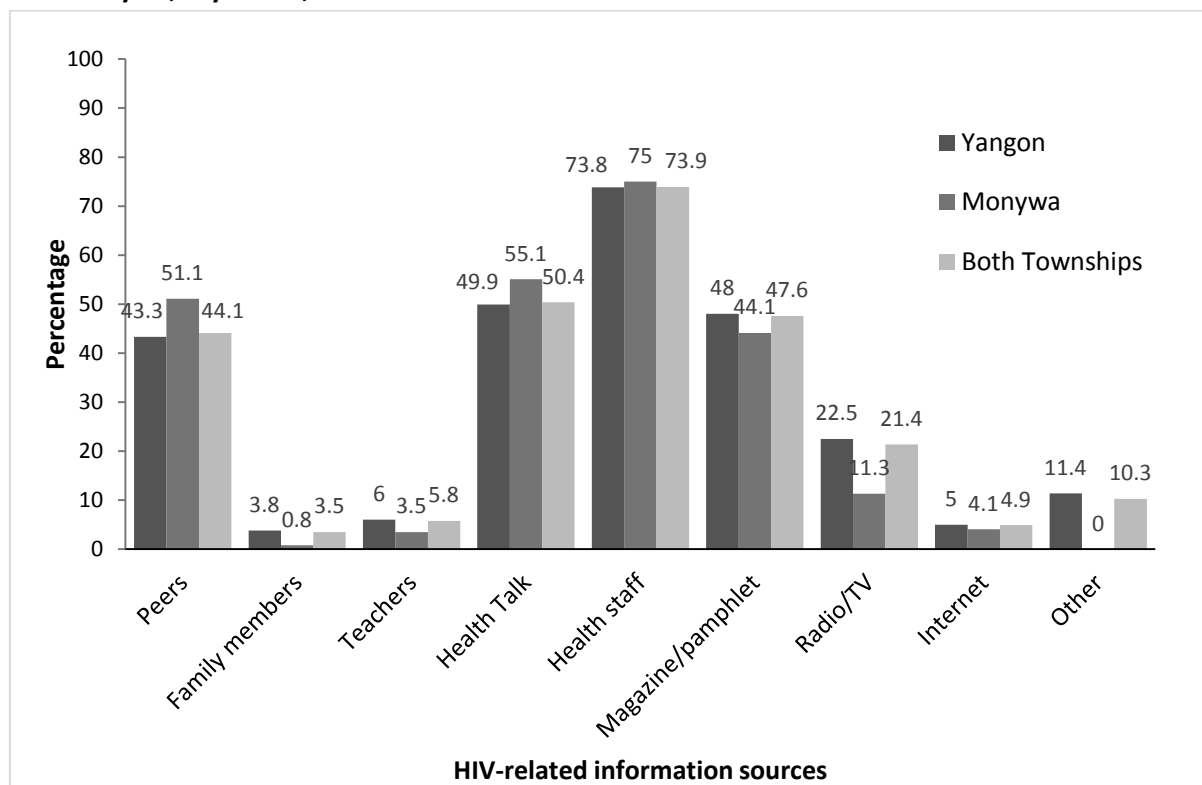
HIV counseling and testing

Most YMSM from both townships were ever tested for HIV (92% vs. 85%, n/s), among which 42% in Yangon and 46% in Monywa reported having done so at least four or more times (Table 11). Among those ever tested, 49% in Yangon and 31% in Monywa were tested within the previous month. More than half of YMSM in both townships reported "wanting to know their HIV status" as their main reason for having an HIV test. The majority of YMSM in both townships reported having their HIV test at an NGO clinic. Almost all YMSM reported that they had close friends who had been tested for HIV.

Table 11: HIV counseling and testing among YMSM, Yangon and Monywa, Myanmar, 2013–2014

	Yangon N = 200		Monywa N = 200		Aggregated estimates	P-value
	n	%, (95% CI)	n	%, (95% CI)	%	p
Ever tested for HIV						
Yes	190	92.0 (84.6, 99.4)	177	85.0 (77.6, 92.4)	91.3	0.09
No	10	8.0 (0.6, 15.4)	23	15.0 (7.6, 22.3)	8.7	0.09
How many times tested						
≤ 3 times	81	57.9 (45.8, 70.1)	89	54.1 (43.4, 65.0)	57.5	0.75
≥ 4 times	109	42.1 (29.9, 54.2)	88	45.9 (35.2, 56.6)	42.5	0.75
Time since last HIV test						
< 1 month	93	49.6 (38.5, 60.8)	72	30.8 (22.7, 38.8)	47.7	0.07
1– 6 months	70	40.5 (30.3, 50.8)	74	45.9 (36.0, 55.8)	41.0	0.42
> 6 months	27	9.8 (3.5, 16.2)	31	23.3 (12.0, 34.4)	11.2	0.08
Reason for HIV test						
Friends also took test	84	38.3 (28.3, 48.3)	71	32.4 (23.6, 41.3)	37.7	0.30
Want to know HIV status	86	51.6 (40.7, 62.4)	90	59.2 (48.7, 69.2)	52.4	0.14
Other	20	10.1 (4.6, 15.6)	16	8.5 (32.4, 14.0)	9.9	0.92
Place of testing						
NGO clinic	183	92.1 (84.6, 99.6)	154	82.3 (73.7, 90.8)	91.1	0.09
Others	7	7.9 (0.4, 15.4)	23	17.7 (9.1, 26.3)	8.9	0.09
Any close friend who received HIV test						
Yes	196	94.0 (88.9, 99.1)	186	90.8 (85.1, 96.5)	93.7	0.60
No	4	6.0 (0.9, 11.1)	14	9.2 (3.5, 14.9)	6.3	0.60

Stratified analysis

Differences among YMSM types

Table 12 displays estimates and confidence bounds for Yangon and Monywa stratified by YMSM type (i.e. Apone, Apwint and Tha-nge). Because this analysis is using a subset of each variable, the confidence intervals are very wide resulting in few significant differences between types and townships. As reported in Table 3, in Yangon, 24% of YMSM reported being Apone, 43% were Apwint and 33% were Tha-nge. In Monywa, 30% of YMSM reported being Apone, 32% were Apwint and 38% were Tha-nge.

Among YMSM who reported being current members of a youth organization or being current members of a religious organization the lowest percentages in Yangon were Apone and in Monywa were Apwint (youth organization: 29% vs. 25%; religious organization: 29% vs. 24%). The largest percentages of current smokers in both townships were among Tha-nge (54% vs. 48%), the largest percentages of YMSM who ever consumed alcohol in both townships were Apwint (53% vs. 50%) and, the largest percentages of YMSM who ever used drugs was among Tha-nge (60%) in Yangon and Apone (58%) in Monywa. The highest percentage of YMSM who had their first sex at or below the age of 15 years was among Apwint in both Yangon and Monywa (75% vs. 57%) and the highest percentage that used a condom at first sex was among Tha-nge in both Yangon and Monywa (41% vs. 62%). Condom use at last sex ranged from 26% among Apone to 43% among Apwint in Yangon and ranged from 30% among Tha-nge to 36% among Apone in Monywa. Apwint YMSM in both Yangon and Monywa comprised the highest percentages to report ever experiencing forced sex (67% vs. 47%); Tha-nge comprised the lowest percentages to report ever experiencing forced sex (5% vs. 18%).

Ever having an HIV test ranged from 25% among Apone to 44% among Apwint in Yangon and ranged from 32% among Apone and 35% among Tha-nge in Monywa. The largest percentages of YMSM in both townships who reported ever experiencing discrimination, were among Apwint (64% in Yangon; 50% in Monywa). The largest percentages of YMSM in Yangon who reported having regular employment were among Apwint (58%) and in Monywa were among Tha-nge (38%). In Yangon, Apwint (76%) and in Monywa, Apone (39%) comprised the largest percentages of YMSM who reported earning a monthly income of >100,000 Kyat.

YMSM who reported having a good relationship with their mothers ranged from 29% among Apone to 39% among Apwint in Yangon and 25% among Apone to 45% among Tha-nge in Monywa. And, YMSM who reported having a good relationship with their fathers ranged from 26% among Apone to 38% among Tha-nge in Yangon and 23% among Apwint to 47% among Tha-nge in Monywa. The largest percentages of YMSM who reported that both parents were aware of sexual preference were among Apwint in both Yangon (68%) and Monywa (59%); Apwint also comprised the largest percentages in Yangon (83%) and Monywa (61%) of YMSM who reported that both parents accept their sexual preferences. However, Apwint in Yangon (42%) and Monywa (41%) were also the group with the highest percentages reporting having problems with family members.

Table 12: Estimates and 95% confidence intervals stratified by type of MSM, Yangon and Monywa, Myanmar, 2013–2014

	Yangon						Monywa					
	Apone N = 53		Apwint N = 116		Tha-nge N = 31		Apone N = 54		Apwint N = 96		Tha-nge N = 50	
Variable of Interest	n	%, (95% CI)	n	%, (95% CI)	n	%, (95% CI)	n	%, (95% CI)	n	%, (95% CI)	n	%, (95% CI)
Current member of youth organization	17	28.6 (11.4, 45.7)	23	35.5 (15.5, 55.5)	12	35.9 (15.2, 56.6)	16	42.0 (17.9, 58.9)	22	25.1 (12.0, 38.1)	10	32.9 (10.8, 55.0)
Current member of religious organization	8	28.7 (6.4, 51.4)	15	38.4 (16.2, 60.5)	7	33.0 (9.2, 56.8)	13	37.0 (12.7, 61.2)	19	23.8 (9.0, 38.3)	12	39.3 (17.8, 61.3)
Current smoker	13	17.6 (6.0, 29.3)	36	27.9 (14.1, 41.8)	24	54.5 (38.3, 70.6)	17	24.1 (8.5, 39.1)	33	27.7 (15.3, 40.2)	24	48.2 (31.0, 61.3)
Ever consumed alcohol	17	18.8 (6.2, 31.3)	39	52.6 (31.5, 73.7)	6	28.6 (49.1, 52.3)	14	22.1 (5.5, 38.6)	42	49.7 (29.9, 67.6)	8	28.2 (8.0, 48.4)
Ever used drugs	2	19.9 (0.0, 43.8)	4	19.7 (0.0, 42.1)	5	60.4 (30.6, 90.3)	3	57.8 (10.0, 100)	1	9.7 (0.0, 32.3)	4	32.5 (1.1, 75.3)
Age first sex ≤15^^	18	19.8 (9.6, 33.1)	69	75.0 (60.3, 89.7)	3	5.2 (0.0, 11.4)	14	18.3 (3.8, 18.5)	52	56.5 (34.8, 78.1)	7	32.4 (8.4, 56.4)
Condom use at first sex – yes^^	10	28.6 (12.0, 45.3)	24	30.0 (12.3, 47.6)	13	41.4 (20.4, 62.5)	20	13.5 (8.7, 38.3)	16	16.2 (7.0, 25.4)	28	61.7 (46.3, 77.7)
Condom use at last sex – yes^^	45	25.9 (15.7, 36.1)	84	43.4 (29.8, 57.0)	23	30.7 (15.4, 46.0)	50	36.2 (24.0, 48.3)	78	34.1 (23.0, 45.1)	36	29.8 (17.9, 41.7)
Forced sex - ever^^	12	28.9 (8.8, 49.2)	43	66.6 (46.3, 86.8)	2	4.6 (0.0, 9.6)	14	35.9 (15.2, 56.6)	33	46.5 (25.5, 67.6)	5	17.5 (3.6, 31.4)
Ever HIV tested	50	24.5 (14.2, 34.8)	112	44.4 (28.9, 59.9)	28	31.1 (12.1, 50.1)	50	31.5 (19.3, 43.8)	87	33.2 (23.1, 43,2)	40	35.3 (23.6, 47.0)
Ever experienced discrimination	43	31.1 (19.3, 42.9)	84	64.3 (51.9, 76.8)	3	4.5 (0.0, 10.0)	37	24.1 (14.0, 34.3)	79	49.7 (38.6, 60.9)	22	26.2 (15.0, 37.3)
Employment status –regular job	34	21.9 (11.4, 32.4)	84	57.5 (43.1, 71.9)	8	20.6 (6.9, 34.3)	39	36.2 (22.5, 49.8)	60	26.3 (18.2, 34.4)	32	37.6 (25.3, 49.9)
Monthly income ≥100,000	16	13.7 (3.5, 23.8)	45	76.2 61.6, 90.7)	3	10.2 (0.6, 19.8)	25	39.0 (22.2, 55.8)	45	29.4 (16.6, 42.3)	21	31.6 (17.8, 45.4)
Good relationship with mother (if living)^^^	45	25.2 (14.1, 36.2)	82	39.8 (25.9, 53.7)	27	35.0 (18.9, 51.1)	38	25.2 (13.0, 37.4)	71	29.2 (19.7, 38.7)	42	45.6 (33.5, 57.7)
Good relationship with father (if living)^^^^	25	26.2 (12.6, 39.8)	47	35.7 (20.4, 50.9)	18	38.2 (21.4, 54.9)	24	29.7 (12.83, 46.6)	35	23.3 (11.1, 35.5)	26	47.0 (30.4, 63.6)
Both parents aware of sexual preference	25	28.4 (13.7, 43.2)	80	67.5 (52.6, 82.4)	2	4.0 (0.5, 8.6)	20	19.8 (6.7, 32.9)	62	59.0 (42.0, 76.0)	9	21.2 (5.7, 36.7)

Variable of Interest	Yangon						Monywa					
	Apone N = 53		Apwint N = 116		Tha-nge N = 31		Apone N = 54		Apwint N = 96		Tha-nge N = 50	
	n	%, (95% CI)	n	%, (95% CI)	n	%, (95% CI)	n	%, (95% CI)	n	%, (95% CI)	n	%, (95% CI)
Among parents aware of sexual preference, both parents accept	9	10.8 (2.4, 19.2)	59	83.2 (72.2, 94.3)	1	6.0 (0.0, 14.2)	14	19.9 (4.6, 35.3)	51	60.7 (41.9, 79.5)	6	19.4 (0.4, 38.4)
Any problems with family – Yes	32	32.2 (18.3, 46.1)	45	42.0 (24.9, 59.2)	12	25.8 (7.4, 44.1)	23	25.2 (14.3, 36.2)	55	41.3 (29.0, 53.7)	23	33.5 (20.1, 46.8)

Notes: ^Weighted using the Gile successive sampling estimate (Gile & Handcock, 2010); ^^Among youth who had ever had sex (Yangon – Apone N = 51, Yangon - Apwint N = 115, all others same N); ^^^Yangon: Apone N = 46, Apwint N = 89, Tha-nge N = 28; Monywa: Apone N = 43, Apwint N = 73, Tha-nge N = 43; ^^^^Yangon: Apone N = 37, Apwint N = 71, Tha-nge N = 24; Monywa: Apone N = 36, Apwint N = 47, Tha-nge N = 30.

Regression Analysis

Predictors of age at first sex

Bivariate and multivariable regressions for the outcome age at first sex are shown in Table 13. When tested in bivariate regressions, many variables were statistically significant predictors of age at first sex. Apwint sexual debut was estimated to be 2.17 years earlier than Apone (p < 0.001), while the difference in age at first sex between Tha-nge and Apone was not significant. The sexual debut of YMSM between the ages of 21 and 24 at the time of the survey was an estimated 1.42 years later than those ages 20 or under at the time of the survey (p < 0.01). YMSM who had completed at least a high school education had an estimated 0.97 years later sexual debut than YMSM who had completed less education (p < 0.05).

The relationship between parental acceptance and age at first sex was unclear. Compared to YMSM who were accepted for their same-sex attraction by both of their parents, YMSM who were accepted by only their father delayed their sexual debut by an estimated 1.42 years (p < 0.05), while YMSM who were not accepted by either parent delayed sexual debut by an estimated 1.88 years (p < 0.001). YMSM who did not know if their parents accepted them for their sexual preference also delayed sexual debut by an estimated 1.42 years (p < 0.05).

Current involvement in a youth or religious organization was associated with a delay of sexual debut by an estimated 0.88 years (p < 0.05). Age of awareness of their same-sex attraction was also associated with age at first sex. Compared to those who reported becoming aware of their preference at age ten or below, YMSM who became aware between the ages of 11 and 15 delayed sexual debut by an estimated 2.52 years (p < 0.01), while YMSM who became aware at age 16 or above delayed sexual debut by an estimated 4.94 years (p < 0.001). Finally, YMSM who first had sex with a female delayed their sexual debut by an estimated 1.34 years compared to YMSM who first had sex with a male (p < 0.01).

All variables that were significant at the p < 0.2 level were included as predictors in the multivariable regression of age at first sex. YMSM type, current age, education level, and age of awareness of same-sex preference remained significant at the p < 0.05 level or lower. Holding current age, education level, and age of awareness of same-sex preference fixed, Apwint had an estimated 1.19 years earlier sexual debut than Apone (p < 0.01), while Tha-nge did not have a statistically significantly different age at first sex than Apone. Holding YMSM type, education level, and age of awareness of same-sex preferences fixed, compared to YMSM who were age 20 or below when they completed the survey, both YMSM between the ages of 21 and 24 and youth 25 or older had later ages of sexual debut (1.57 and 1.14 years, p < 0.001 and p < 0.01). Holding YMSM type, current age, and age of awareness of same-sex preference fixed, YMSM who had completed high school had an estimated 0.82 year delayed age of first sex compared to those with less than a high school education. Finally, holding YMSM type, current age, and education level fixed, compared to those who became aware of their preference at age ten or below, YMSM who became aware between the ages of 11 and 15 delayed sexual debut by an estimated 2.49 years (p < 0.001), while YMSM who became aware at age 16 or above delayed sexual debut by an estimated 4.56 years (p < 0.001).

Table 13: Bivariate and multivariable linear regression coefficients (β) and standard errors (SE) of predictors of age at first sex among YMSM who have ever had sex, pooled from Yangon and Monywa, Myanmar, 2013–2014

	Predictors of age at first sex (N = 397)			
	Bivariate regression		Multivariable regression	
	β	SE	β	SE
Type of MSM (ref. Apone)				
Apwint	-2.17***	0.45	-1.19**	0.39
Tha-nge	0.16	0.44	-0.43	0.37
Age (ref. ≤20)				
21 to 24	1.42**	0.43	1.57***	0.31
≥25	0.75	0.47	1.14**	0.39
Education level (ref. ≤ Middle school)				
≥ High school	0.97*	0.39	0.82**	0.29
Employment status (ref. Regular job)				
Non-regular job	-0.93	0.59		
Unemployed	0.06	0.39		
Type of family (ref. Nuclear)				
Extended	-0.23	0.56		
Problem with family members (ref. No)	-0.13	0.39		
Current living situation (ref. Live with one/both parents)				
Stay at friends/hostel/work	-0.68	0.54		
Live with stable partner/wife	0.49	0.47		
*Parental acceptance as gay/MSM^* (ref. Both accept)				
Father accepts	1.48*	0.73		
Mother accepts	0.88	0.53		
Neither accept	1.88***	0.42		
Don't know	1.42*	0.62		
Ever drink alcohol (ref. No)	0.36	0.38		
Involvement in youth or religious organization (ref. Never)				
Previously	0.41	0.49		
Currently	0.88*	0.44		
Has role model (ref. No)	-0.76	0.45		
Has MSM friend with many partners (ref. No)	-0.76	0.43		
Age of awareness of same sex preference (ref. ≤10)				
11 to 15	2.52**	0.73	2.49***	0.61
≥ 16	4.94***	0.70	4.56***	0.60
Type of partner at first sex (ref. Male)				
Female	1.34**	0.47		

Note: Variables in italics are significant at the p < 0.2 level in the bivariate model and were included in the initial multivariable model; *p<0.05; **p<0.01; ***p<0.001; ^Coded as "neither accept" if parents were unaware of status.

Odds of having multiple sexual partners within the past month
Though the same variables were tested as predictors for the outcome of having multiple sexual partners within the past month (compared to one sexual partner) among YMSM who had sex in the past month, none were significant at the $p < 0.05$ level in either the bivariate or multivariable model (Table not shown).

Odds of condom use at last sex
Bivariate and multivariable odds ratios for the outcome of condom use at last sex are shown in Table 14. In the bivariate model, YMSM type, current living situation, and involvement in a youth or religious organization were all statistically significantly associated with condom use at last sex. The odds of using a condom at last sex were 73% less among Tha-nge compared with Apone ($p < 0.05$). YMSM who live with friends, at a hostel, or at work had three times higher odds of using a condom at last sex compared to YMSM who live with their parents ($p < 0.05$). Compared to YMSM who had never been involved with a youth or religious organization, those who were previously or currently involved had 61% and 57% lower odds of condom use at last sex ($p < 0.05$).

When all variables that were significant at the $p < 0.2$ level were combined into a multiple logistic regression, YMSM type, current living situation, parental acceptance, and involvement in a youth or religious organization all remained significant at the $p < 0.05$ or below level. The adjusted odds of condom use at last sex were 73% and 71% lower among Apwint and Tha-nge compared to Apone ($p < 0.05$). The association between condom use and living situation also became stronger, with YMSM who live with friends, at a hostel, or at work having over four times higher adjusted odds of condom use at last sex compared to YMSM who live with their parents ($p < 0.01$). YMSM who were accepted for their sexual preference by their father but not their mother had 91% lower adjusted odds of condom use at last sex compared to those who were accepted by both ($p < 0.05$). Finally, the adjusted odds of condom use at last sex among YMSM who had previously been involved with a youth or religious organization were 67% less than YMSM who had never been involved with an organization ($p < 0.05$).

Table 14: Bivariate and multivariable odds ratios (OR) and 95% confidence intervals (95% CI) of condom use at last sex among YMSM who have ever had sex, pooled from Yangon and Monywa, Myanmar, 2013–2014

	Odds of condom use at last sex N = 397	
	Unadjusted OR (95% CI)	Adjusted OR (95% CI)
Type of MSM (ref. Apone)		
Apwint	0.45 (0.15, 1.31)	0.27 (0.10, 0.73)*
Tha-nge	0.27 (0.09, 0.86)*	0.29 (0.11, 0.81)*
Age (ref. ≤20)		
21 to 24	1.01 (0.43, 2.36)	
≥25	1.45 (0.56, 3.61)	
Education level (ref. ≤ Middle school)		
≥ High school	0.57 (0.28, 1.16)	
Employment status (ref. Regular job)		
Non-regular job	1.32 (0.59, 2.96)	
Unemployed	1.97 (0.66, 5.84)	
Type of family (ref. Nuclear)		
Extended	0.88 (0.35, 2.23)	
Problem with family members (ref. No)	1.05 (0.52, 2.14)	
Current living situation (ref. Live with one/both parents)		
Stay at friends/hostel/work	3.01 (1.18, 7.66)*	4.07 (1.46, 11.33)**
Live with stable partner/wife	1.13 (0.49, 2.61)	1.16 (0.51, 2.63)
*Parental acceptance as gay/MSM^* (ref. Both accept)		
Father accepts	0.16 (0.03, 1.00)	0.09 (0.01, 0.59)*
Mother accepts	0.81 (0.34, 1.94)	0.73 (0.30, 1.76)
Neither accept	0.50 (0.22, 1.12)	0.44 (0.17, 1.12)
Don't know^^	*could not calculate*	*could not calculate*
Ever drink alcohol (ref. No)	1.37 (0.62, 3.03)	
Involvement in youth or religious organization (ref. Never)		
Previously	0.39 (0.18, 0.87)*	0.33 (0.13, 0.80)*
Currently	0.43 (0.19, 0.99)*	0.45 (0.19, 1.06)
Has role model (ref. No)	1.85 (0.81, 4.21)	
Has MSM friend with many partners (ref. No)	0.92 (0.34, 2.54)	
Age of awareness of same sex preference (ref. ≤10)		
11 to 15	1.12 (0.39, 3.25)	
≥ 16	0.63 (0.22, 1.78)	
Type of partner at first sex (ref. Male)		
Female	0.37 (0.12, 1.11)	

Note: Variables in italics are significant at the p < 0.2 level in the bivariate model and were included in the initial adjusted model; *p<0.05; **p<0.01; ***p<0.001; ^Coded as "neither accept" if parents were unaware of status; ^^All six respondents answered Yes.

Odds of experiencing forced sex

Bivariate and multivariable odds ratios for the outcome of ever experiencing forced sex are presented in Table 15. When tested individually (bivariate), YMSM type, having a problem with family members, parental acceptance, having an MSM friend with many partners, age of awareness of same-sex preference, and type of partner at first sex were all statistically significant at the $p < 0.05$ or below level. Compared to Apone, Tha-nge have 84% lower odds of experiencing forced sex ($p < 0.01$). YMSM who reported problems with family members had over twice the odds of experiencing forced sex than those who reported no problems ($p < 0.05$). Trends in the association between parental acceptance and experiences of forced sex changed when adjusted by other variables, but alone, youth who were not accepted as gay or MSM by either parent had 65% lower odds of experiencing forced sex compared to those who were accepted by both parents, while YMSM who did not know had over ten times higher odds of experiencing forced sex ($p < 0.05$).

YMSM who reporting having an MSM friend with many partners had 31 times higher odds of experiencing forced sex than those who did not ($p < 0.001$). YMSM who had become aware of their same-sex preference at or above the age of 16 had 89% lower odds of experiencing forced sex compared to those who became aware at or below the age of ten ($p < 0.001$). Finally, YMSM who had a female partner at their first sex had 83% lower odds of experiencing forced sex compared to youth who had a male partner at first sex ($p < 0.01$).

When all variables that were significant at the $p < 0.2$ level were combined into a multiple logistic regression, having a problem with family members, parental acceptance, having an MSM friend with many partners, and age of awareness of same-sex preference remained significant in the adjusted model at the $p < 0.05$ or below level. YMSM who had problems with family members had over twice the adjusted odds of experiencing forced sex compared to YMSM with no family problems ($p < 0.05$).

YMSM who were only accepted for their sexual preference by their mother (compared to those accepted by both parents) had 63% lower adjusted odds of experiencing forced sex ($p < 0.05$). YMSM who had an MSM friend with many partners had 19 times higher adjusted odds of experiencing forced sex than those who did not ($p < 0.001$). Finally, YMSM who became aware of their same-sex preference at or above the age of 16 had 85% lower odds of experiencing forced sex compared to those who became aware at or below the age of ten ($p < 0.001$).

Table 15: Bivariate and multivariable odds ratios (OR) and 95% confidence intervals (95% CI) of experiencing forced sex among YMSM who have ever had sex, pooled from Yangon and Monywa, Myanmar, 2013–2014

	Odds of experiencing forced sex N = 397	
	Unadjusted OR (95% CI)	Adjusted OR (95% CI)
Type of MSM **(ref. Apone)**		
Apwint	1.41 (0.61, 3.25)	
Tha-nge	0.16 (0.05, 0.49)**	
Age **(ref. ≤20)**		
21 to 24	1.19 (0.50, 2.82)	
≥25	1.11 (0.45, 2.77)	
Education level **(ref. ≤ Middle school)**		
≥ High school	0.70 (0.35, 1.40)	
Employment status **(ref. Regular job)**		
Non-regular job	1.38 (0.69, 2.78)	
Unemployed	0.68 (0.20, 2.92)	
Type of family **(ref. Nuclear)**		
Extended	1.32 (0.58, 3.04)	
Problem with family members **(ref. No)**	2.35 (1.17, 4.74)*	2.10 (1.06, 4.18)*
Current living situation **(ref. Live with one/both parents)**		
Stay at friends/hostel/work	2.27 (0.98, 5.25)	
Live with stable partner/wife	0.68 (0.30, 1.53)	
*Parental acceptance as gay/MSM^* **(ref. Both accept)**		
Father accepts	0.73 (0.13, 3.96)	1.02 (0.21, 4.93)
Mother accepts	0.56 (0.24, 1.31)	0.37 (0.15, 0.93)*
Neither accept	0.35 (0.16, 0.78)*	0.51 (0.22, 1.19)
Don't know	10.51 (1.25, 88.11)*	5.10 (0.65, 40.06)
Ever drink alcohol **(ref. No)**	0.93 (0.45, 1.90)	
Involvement in youth or religious organization **(ref. Never)**		
Previously	1.03 (0.44, 2.39)	
Currently	0.99 (0.44, 2.23)	
Has role model **(ref. No)**	2.92 (0.86, 9.89)	
Has MSM friend with many partners **(ref. No)**	31.49 (6.52, 151.96)***	19.12 (3.82, 95.77)***
Age of awareness of same sex preference **(ref. ≤10)**		
11 to 15	0.46 (0.17, 1.21)	0.49 (0.18, 1.32)
≥ 16	0.11 (0.04, 0.28)***	0.15 (0.06, 0.39)***
Type of partner at first sex **(ref. Male)**		
Female	0.17 (0.04, 0.63)**	

Note: Variables in italics are significant at the p < 0.2 level in the bivariate model and were included in the initial adjusted model; *p<0.05; **p<0.01; ***p<0.001; ^Coded as "neither accept" if parents were unaware of status.

Odds of ever being tested for HIV

Bivariate and multivariable odds ratios for the outcome of ever being tested for HIV are presented in Table 16. When these predictors were tested individually (bivariate), only involvement in a youth or religious organization and having a close friend who received an HIV test remained statistically significant at the $p < 0.05$ or below level. YMSM who were currently involved with a youth or religious organization had over four times higher odds of ever being tested for HIV than those who had never been involved with an organization ($p < 0.01$). Similarly, YMSM who had a close friend receive an HIV test had almost five times higher odds of getting tested compared with those who did not have such a friend ($p < 0.05$).

When all variables that were significant at the $p < 0.2$ level were combined into a multiple logistic regression, ever drinking alcohol became significant and involvement in a youth or religious organization and having a close friend tested for HIV remained significant at the $p < 0.05$ level. YMSM who had ever consumed alcohol had 3.7 times higher adjusted odds of ever being tested for HIV, compared to those who had never consumed alcohol ($p < 0.05$). Trends for organization involvement and having a close friend who was tested became even stronger, with YMSM currently involved in an organization having 8.81 times higher adjusted odds and YMSM having a close friend who was tested having 7.25 times higher adjusted odds of being tested themselves ($p < 0.01$).

Table 16: Bivariate and multivariable odds ratios (OR) and 95% confidence intervals (95% CI) of ever being tested for HIV, pooled from Yangon and Monywa, Myanmar, 2013–2014

	Odds of being tested for HIV N = 400	
	Unadjusted OR (95% CI)	Adjusted OR (95% CI)
Type of MSM (ref. Apone)		
Apwint	1.21 (0.39, 3.75)	
Tha-nge	0.42 (0.13, 1.36)	
Age (ref. ≤20)		
21 to 24	1.25 (0.42, 3.72)	
≥25	1.70 (0.46, 6.29)	
Education level (ref. ≤ Middle school)		
≥ High school	1.45 (0.54, 3.88)	
Employment status (ref. Regular job)		
Non-regular job	1.10 (0.34, 3.59)	
Unemployed	0.39 (0.12, 1.25)	
Type of family (ref. Nuclear)		
Extended	0.78 (0.24, 2.51)	
Problem with family members (ref. No)	1.06 (0.40, 2.87)	
Current living situation (ref. Live with one/both parents)		
Stay at friends/hostel/work	1.88 (0.39, 9.00)	
Live with stable partner/wife	0.48 (0.17, 1.38)	
*Parental acceptance as gay/MSM^* (ref. Both accept)		
Father accepts^^	*could not calculate*	
Mother accepts	3.09 (0.91, 10.54)	
Neither accept	0.84 (0.30, 2.39)	
Don't know^^^	*could not calculate*	
Ever drink alcohol (ref. No)	2.45 (0.91, 6.61)	3.70 (1.25, 10.97)*

	Odds of being tested for HIV N = 400	
	Unadjusted OR (95% CI)	Adjusted OR (95% CI)
Involvement in youth or religious organization (ref. Never)		
Previously	2.99 (0.90, 9.90)	3.57 (0.99, 12.84)
Currently	4.32 (1.49, 12.55)**	8.81 (2.41, 32.22)**
Has role model (ref. No)	1.20 (0.45, 3.21)	
Has MSM friend with many partners (ref. No)	2.21 (0.72, 6.71)	
Age of awareness of same sex preferences (ref. ≤10)		
11 to 15 years	0.77 (0.17, 3.61)	
>= 16 years	0.49 (0.11, 2.14)	
Type of partner at first sex[+] (ref. Male)		
Female	0.68 (0.15, 3.04)	
Age at first sex[+] (ref. ≤15)		
>= 16	1.01 (0.87, 1.19)	
Number of sexual partners in past month[+] (ref. None or one)		
≥2	1.52 (0.51, 4.54)	
Condom use at last sex[+] (ref. No)	2.21 (0.81, 6.01)	
Ever experienced forced sex[+] (ref. No)	1.19 (0.41, 3.52)	
Have a close friend who received an HIV test (ref. No)	4.90 (1.22, 19.71)*	7.25 (1.96, 26.81)**

Note: Variables in italics are significant at the $p < 0.2$ level in the bivariate model and were included in the initial adjusted model. *$p<0.05$; **$p<0.01$; ***$p<0.001$; ^Coded as "neither accept" if parents were unaware of status; ^^All eleven respondents answered Yes; ^^^All six respondents answered Yes; [+]N = 397 who had ever had sex.

DISCUSSION AND CONCLUSION

Family disclosure, acceptance, and sexual risk

Most YMSM reported having nuclear families and having both parents alive. In addition, most YMSM reported having a good relationship with their father and almost all reported having a good relationship with their mother. However, less than half of YMSM in both townships reported that both of their parents are aware of their same-sex preferences or behaviours but, among those, 41% in Yangon and 51% in Monywa reported that both parents are accepting of their same-sex preferences or behaviours. However, just over 40% of YMSM in both townships reported having problems with family members (because of their same-sex preferences or behaviours).

Though parental acceptance of a youth's sexual preferences or behaviours was expected to be protective against sexual risk behaviours, the associations found in this analysis were unclear. YMSM had higher odds of delaying their sexual debut if they were accepted by their father, accepted by neither parent or if they did not know if their parents accepted them, compared to being accepted by both parents. In a multivariable logistic regression of condom use at last sex, YMSM had lower odds of condom use at last sex if there were accepted by their father but not their mother (compared to those who were accepted by both). In a multivariable logistic regression of experiencing forced sex, YMSM had lower odds of experiencing forced sex if they were only accepted by their mother (compared to those accepted by both parents). This difficulty determining the effects of parental acceptance could be due to the high rate of parental mortality within the study population (36.2% of youth had lost one or both parents).

Some associations between the family environment and sexual risk, however, were clear. Youth who had problems with family members had over twice the odds of experiencing forced sex compared to youth with no family problems. Youth who live with friends, at a hostel, or at work also had over four times higher adjusted odds of condom use at last sex compared to youth who live with their parents.

Early sexual debut of Apwint (transgender) youth

Close to one-third of YMSM in both townships had their first sexual experience at or before 15 years of age, of which over 80% did so with a male partner. The percentages of having their first sexual experience at or before 15 years of age was highest among Apwint YMSM (compared to Apone or Tha-nge). Few YMSM in either township reported their first sex being forced and more than half reported using a condom at the time of their first sexual experience. Apwint YMSM in both townships had higher percentages of having ever been forced to have sex.

When predictors of age at first sex were tested together in a multivariable regression, type of MSM, current age, education level, and age of awareness of same-sex preference were significant. In particular, holding current age, education level, and age of awareness of same-sex preference fixed, Apwint youth had over a one-year earlier sexual debut than Apone youth, while Tha-nge youth did not have a statistically significantly different age at first sex than Apone youth.

Unclear reasons for multiple partners in the past month

Just over three quarters of YMSM in both townships reported having sex in the past month, among which more than half reported having more than one partner. This is lower than previous studies of sexual risk behaviour among MSM including higher age groups. In 2010, a study among 1,370 MSM found that more than 90% reported having more than one male partner.[18] Similarly, a study conducted in 2007 among 423 MSM reported that 82% had multiple sexual partners in past month.[19] These differences may be related to our survey comprising younger MSM than those captured in other surveys.

According to the WHO risk and protection framework, youth who are older, employed, and experience early age of first sex are more likely to have more than one sexual partner.[20] Though age, employment, and other variables were tested as predictors for the outcome of having multiple sexual partners within the past month (compared to one sexual partner) among youth who had sex in the past month, none were significant at the $p < 0.05$ level in either the bivariate or multivariable model. There are several possible explanations for this finding. First, by limiting the analysis to the youth who had sex in the past month (N = 334), the sample size was reduced, widening confidence intervals and making significant differences more difficult to detect. Second, it is possible that the variables selected for analysis do not capture the primary reasons youth do or do not have multiple sexual partners in the past month. Third, youth may have been reticent to respond honestly about their numbers of sexual partners. Most likely, these and other reasons all contributed to a greater or lesser extent resulting in the lack of significant findings for this outcome.

Lower condom use at last sex among Apwint and Tha-nge youth

The majority of YMSM in both townships used a condom the last time they had sex (Yangon: 72%; Monywa: 79%). Among those who did not use a condom the last time they had sex, 51% in Yangon and 30% in Monywa stated that the main reason for not doing so was that they had sex with a regular partner. Reported condom use at last sex was lower than the 89% described in a 2010 study among 1370 MSM from four townships, which could be due to the higher proportion of Apwint youth in this sample (42% versus 33%).[21] It was also lower than 81.6% mentioned in a progress report by the National AIDS Programme in Myanmar.[22] However, our findings were close to that (67%) found in the 2007 survey of 423 MSM in two major townships in Myanmar.[23]

When predictors of condom use at last sex were tested in a multiple logistic regression, type of MSM, current living situation, parental acceptance, and involvement in a youth or religious organization all remained significant at the $p < 0.05$ or below level. Apwint and Tha-nge youth compared to Apone youth had significantly lower odds of condom use at last sex. The associations between condom use and living situation, parental acceptance, and involvement in a youth or religious organizations are discussed elsewhere.

Friendship's different effects – forced sex and HIV testing

About 70% of YMSM in both townships reported having a role model, among which 46% in each township reported their role model as being male. Almost all YMSM reported having MSM friends and high percentages reported having MSM friends with many sexual partners.

Study findings indicate that friends may increase or decrease HIV risks. For example, a multiple logistic regression of experiences of forced sex found that youth who had an MSM friend with many partners had 19 times higher adjusted odds of experiencing forced sex than those who did not. In contrast, youth with a close friend who had been tested for HIV had 7.25 times higher adjusted odds of being tested themselves.

Involvement in youth and religious organizations

About half of YMSM reported never joining any youth organization; among those have ever joined a youth organization more than 90% reported being ordinary members of that organization and 47% in Yangon and 71% in Monywa reported being involved in social activities. About half of YMSM reported never joining any religious organization and few reported ever participating in any religious activities.

Like the findings for friendship, involvement in youth or religious organizations appears to have differing effects on HIV risks. For example, youth who had previously been involved with a youth or religious organization had lower adjusted odds of condom use at last sex than youth who had never been involved with an organization. However, in the case of HIV testing, youth currently involved in a youth or religious organization had higher adjusted odds of being tested themselves compared to those who had never been involved with an organization.

Low reported drug use

Alcohol and drug use has been found to impact sexual risk behaviours. Eleven percent of youth in this study reported ever using drugs, of which 11% said they used drugs "occasionally" and just 0.1% said they used drugs "daily." Because of these low reported levels of drug use, it could not be tested as a predictor of sexual risks or HIV testing. However, higher percentages (70%) of YMSM, especially among Apwint, reported drinking alcohol of which 65% reported doing so occasionally. Although frequency was investigated here, quantity was not, which makes it difficult to understand whether alcohol may be impacting sexual risk among YMSM.

Half of YMSM, especially among Tha-nge, are current smokers, which, although not unusual among youth in many Asian countries, may result in negative health outcomes in the future.

LIMITATIONS

There are some limitations to this survey which may have impacted the findings. No seeds were younger than 21 years of age which may have resulted in there being fewer younger YMSM in this survey. The survey originally planned to include YMSM only up to the ages of 25 years but due to recruitment difficulties, participants as old as 28 years were included. In Yangon the sample was able to capture 45% of YMSM who were between the ages of 16 and 20 years whereas in Monywa only 26% of YMSM were between the ages of 16 and 20 years. The findings in this survey most likely represent a more mature population of YMSM.

Some of the findings may be impacted by different understandings between participants and researchers of terminologies employed in the survey instrument. This includes terms related to sexual orientation and behaviours, gender presentation and gender identity, as well as some of the temporal definitions included in the survey. Moreover, other measurements of social support may need to be considered in future studies to better understand the dynamics of family acceptance beyond those included in the present survey.

The eligibility criteria did not have a geographic restriction which may have resulted in YMSM who were not residents of Yangon or Monywa to participate. Although this is not a problem, it limits the interpretation of the results to YMSM who live or work in either of the townships. Furthermore, the eligibility was premised upon conceptual types and labels of MSM (i.e. Apone, Apwint and Tha-nge) rather than on behaviour. Many people, even if they are one of these types, may not want to label themselves as such. Furthermore, each of these types may not be mutually exclusive and some YMSM may fall into two of these groups. It could have been problematic for the interpretation of the successive sampling population estimates if one of these groups formed an independent sub-group not connected to the other groups. Thankfully, the recruitment graphics indicated that these groups do form one complete network component and, therefore, the estimates would not be biased for this reason.

To our knowledge, while other studies have used RDS to sample MSM (including younger cohorts), this was the first use of RDS to sample YMSM alone in Myanmar. The sampling method worked well in this population with the exception of capturing younger aged MSM. If this survey were to be reproduced it is recommended that seeds who know and will recruit the youngest MSM will be selected. Other approaches may also be needed which would rely on a thorough formative assessment to understand why younger MSM may not have enrolled in this survey and what incentives could be used to encourage their participation in this important research.

RECOMMENDATIONS

Based on the findings presented here, the following recommendations are suggested to reduce HIV risks and encourage protective behaviours among YMSM in Myanmar.

Further research

Below are some recommendations for further research on YMSM:

1. Parental acceptance: Future studies of YMSM in Myanmar should continue to ask questions about parental acceptance. Variables should be coded in a way that is not affected by parental mortality, for example, 1 – All living parents accept, 2 – Living mother accepts, living father does not, 3 – Living father accepts, living mother does not, 4 – Both parents living, neither accept, 5 – No living parents.

2. Stratify outcomes by type of MSM: This study provides evidence that the profiles and risks of YMSM in Myanmar vary by type of MSM. Research should continue to study these similarities and differences so that programmes can be developed effectively for each group. However, eligibility for these types of surveys should be based on concrete and objective behaviours (e.g., felt sexual attraction for another man in the past six months, engaged in sex with a male in the past year), rather than conceptual typologies and labels.

3. Multiple partners: This study failed to determine statistically significant predictors of multiple partners among YMSM. This is a known risk factor for HIV infection and should be studied further in this population.

4. Condom use by type of MSM: Apone youth had higher rates of condom use at last sex compared to Apwint and Tha-nge youth. Reasons for these differences should be studied, and programs for Apone youth should be modified and replicated to improve condom use among Apwint and Tha-nge youth.

5. MSM friend with many partners: YMSM who reported having an MSM friend with many partners were over nineteen times more likely to experience forced sex. Reasons for this finding should be qualitatively discussed or researched further so that appropriate interventions can be developed.

6. Drug use: Drug use of any kind was found only at very low levels in this study. Other studies in the region have documented meth/amphetamine use among MSM[24,25], and associations between meth/amphetamine use and HIV infection. Future studies of YMSM in Myanmar should include questions on type of drugs used, and a recall period in line with other data instruments (e.g. past 6 months or lifetime).

7. Alcohol use: Future surveys of YMSM should include more questions to measure alcohol use and to understand its impact of sexual risk.

8. Cigarette smoking: More research is needed to understand why YMSM engage in smoking cigarettes. Programmes to reduce cigarette smoking are needed in this population.

Family interventions

1. Prevention and stigma reduction for forced sex: This study found that experiencing forced sex was associated with family problems. It could be that YMSM do not feel that they can count on support from their parents as they are not open about their sexuality, or fear prejudice and discrimination. Another possibility is that they did share about violence experienced, and were shamed by parents and/or siblings. More research is also needed to better understand the

context, and family interventions established to provide assistance to children who have experienced forced sex.

2. Parental promotion of condom use: This study found that living with family reduced the odds of a youth using a condom at last sex. This may be a response of YMSM who live with their parents not wanting to have condoms with them (to avoid their parents finding the condoms), resulting in missed opportunities for using condoms when needed. Interventions should target parents to encourage their children to practice safe sex and condom use.

Youth interventions

1. Behaviour change communication for delaying sexual debut should be tailored and targeted specifically towards Apwint youth.
2. Condom use among YMSM should be maintained and encouraged, particularly among Apwint and Tha-nge youth.
3. This study found that youth with a close friend who had been tested for HIV had over seven times higher odds of getting tested themselves. This peer-to-peer encouragement of HIV testing should be fostered through specific interventions.
4. This study found that HIV testing was also higher among youth who were currently involved with youth or religious organizations. Organizations that welcome YMSM youth should be fostered and supported to provide access to educational materials and referrals to testing.
5. Higher percentages of Apwint youth, compared to Apone and Tha-nge, experienced forced sex and earlier sexual debut. Strong outreach is needed to provide support and services to Apwint youth in Myanmar.

ANNEX: STRUCTURED QUESTIONNAIRE [ENGLISH TRANSLATION]

Study Township	(1) Monywa (2) Yangon	|___|
Respondent ID		|___|___|___|
Coupon No		
Estimated number of MSM friends		

Section I Background characteristics

1.1	Respondent's age (completed year)	_____ Yrs	|___|___|
1.2	Type of MSM	(1) Ah-pone (non-feminine) (2) Ah-pwint (feminine) (3) Tha-nge (partner of above two) (4) Others (specify) _____	|___|
1.3	Religion of the respondent	(1) Buddhist (2) Christian (3) Muslim (4) Hindu (5) Others (specify) _____	|___|
1.4	Education level of the respondent	(1) Illiterate (2) Read and write (3) Primary school (4) Middle school (5) High school (6) University/Graduate (7) Post graduate	|___|
1.5	Do you have any job which could earn income?	(1) Yes, always (2) Yes, not regular (3) No (Go to Q1.8)	|___|
1.6	If yes, occupation of the respondent	(1) Manual/unskilled labour (2) Private/Government employee (3) NGO/INGO staff (4) Volunteer (5) Sex worker (6) Natkataw (spititual) (7) Own business (8) Others (specify) _____	|___|
1.7	Estimated monthly income (Kyats)		
1.8	Are you married to a female partner? (Do you have a wife?)	(1) Yes (2) Yes, but in the past (Go to Q1.10) (3) Never (Go to Q1.10)	|___|
1.9	If yes, do you currently live together?	(1) Yes (2) No	|___|
1.10	Do you have any partner?	(1) Yes (2) Yes, but in the past (3) Never	|___|
1.11	Current living condition	(1) Live with both parents (2) Live with either parent (3) Stay at hostel (4) Stay together with friends (5) Stay at work place (6) Stay with wife (7) Stay with partner (8) Others (specify) _____	|___|

Section 2 Family information

2.1	Type of family	(1) Nuclear (2) Extended	|___|
2.2	Are both of your parents alive?	(1) Yes, both alive (2) Yes, father alive (Go to Q2.4) (3) Yes, mother alive (Go to Q2.5) (4) Both passed away (Go to Q2.6) (5) Don't know/no communication (Go to Q2.4)	|___|
2.3	Relationship between your parents	(1) Have good relationship (2) Some dispute (3) Always quarrel/Poor relationship (4) Divorced	|___|
2.4	Relationship between you and your father	(1) Have a good relationship (2) Have a poor relationship	|___|
2.5	Relationship between you and your mother	(1) Have a good relationship (2) Have a poor relationship	|___|
2.6	Father's education	(1) Illiterate (2) Read and write (3) Primary school (4) Middle school (5) High school (6) University/Graduate (7) Post graduate (8) Don't know	|___|
2.7	Father's occupation	(1) Manual/unskilled labour (2) Private/Government employee (3) NGO/INGO staff (4) Own business (5) Others (specify) _____	|___|
2.8	Mother's education	(1) Illiterate (2) Read and write (3) Primary school (4) Middle school (5) High school (6) University/Graduate (7) Post graduate (8) Don't know	|___|
2.9	Mother's occupation	(1) Manual/unskilled labour (2) Private/Government employee (3) NGO/INGO staff (4) Own business (5) Others (specify) _____	|___|
2.10	Are your parents aware of your sexual identity/orientation?	(1) Yes, both aware (2) Yes, father aware (3) Yes, mother aware (4) No one know (Go to Q2.12) (5) Don't know (Go to Q2.12) (6) Not relevant (Go to Q2.12)	|___|

		(7) Others (specify) _____		
2.11	Do they accept you as a gay/MSM?	(1) Yes, both accept (2) Yes, father accept (3) Yes, mother accept (4) Both don't accept (5) Don't know	|___|
2.12	Is there any problem between you and family members?	(1) Yes (2) No	|___|

Section 3 Individual factors

3.1	Age of awareness of same-sex attraction	_____ years	|___|___|
3.2	At that time, did you disclose this to anyone?	(1) Yes (2) No	|___|
3.3	Age at first disclosure	_____ years	|___|___|
3.4	To whom did you disclose?	(1) Either parent (Father/mother) (2) Gay/MSM friend (3) Other friends (4) Siblings (5) Others (specify) _____	|___|
3.5	Why did you choose that person to disclose about yourself?		|___|
3.6	Have you ever try to change your feeling/behaviour?	(1) Yes (2) No	|___|
3.7	Where did you get information related to same sex attraction?	(1) Peers (2) Other friends (3) Family members (4) Health personnel (5) Internet (6) Others (specify) _____	|___|
3.8	Do you have any role model in your life?	(1) Yes (2) No (Go to Q3.11)	|___|
3.9	If yes, sex of your role model	(1) Male (2) Female (3) MSM	|___|
3.10	Which factor(s) of him/her make you to choose as a role model?	(1) Have good personality (2) Have a good job (3) Being an educated person (4) Being popular/Celebrity (5) Have sexual attraction/have many partners (6) Because he/she is rich (7) Others	|___
___
___
___
___	 	___
___	
3.11	What do you want to achieve in next 3 years?		|___|
3.12	Are you currently attending the school?	(1) Yes (Go to Q3.14) (2) No	|___|
3.13	If not in-school, why did you leave school? (To answer only one main reason)	(1) Already graduate (2) Financial problem (3) Social problem (4) Discrimination at school (5) Not interest in education	|___|

			(6) Others (specify) _____	
3.14	Have you ever presented as a girl at your school?	(1) Yes, always (2) Yes, sometimes (3) No, never	|__|
3.15	Do you have any MSM friend?	(1) Yes (2) No	|__|
3.16	Do you have any MSM friend who has many partners?	(1) Yes (2) No	|__|

Section 4 Social information

4.1	Have you ever joined any youth organization?	(1) Yes, current (2) Already quit (3) Never (Go to Q4.4)	|__|
4.2	If you presently involved, what is your position in the organization?	(1) Ordinary member (2) Member of executive committee (3) Leader (4) Others (specify) _____	|__|
4.3	Have you ever participated in the following activities?	(1) Peer education activities (2) Social activity (3) Sports activity (4) Others (specify) _____		__
__
__
__	
4.4	Have you ever joined any religious organization?	(1) Yes, current (2) Already quit (3) Never	|__|
4.5	Have you ever participated in religious activities?	(1) Yes, always (2) Yes, sometimes (1) No, never	|__|

Section 5 Health risk behaviours

5.1	Are you a smoker?	(2) Yes, current (3) Already quit (4) Never	|__|
5.2	Are you a drinker? (include all types of alcohol and beers)	(1) Yes, daily drinker (2) Yes, frequent drinker (3) Yes, occasional/social drinker (4) Never	|__|
5.3	Have you ever used any kind of drug? (stimulant/depressant)	(1) Yes, daily user (2) Yes, frequent user (3) Yes, occasional user (4) Never	|__|
5.4	Have you ever had sex?	(1) Yes (2) No, never (Go to Q5.18)	|__|
5.5	Age of first sex	_____ years	|__|__|
5.6	At that time, who was your partner?	(1) Male (2) Female	|__|
5.7	At that time, were you willing to have sex (consensual)?	(1) Yes (2) No	|__|
5.8	Did you use condom at that time?	(1) Yes (Go to Q5.10) (2) No (3) Don't remember (Go to Q5.10)	|__|

5.9	If you didn't use condom at that time, why? (To answer only one main reason)	(1) Because I don't like condoms (2) Because my partner rejected them (3) Both of us didn't want to use (4) He was my regular partner (5) No condoms were available at that time (6) Condoms can reduce pleasure (7) Others (specify) _____	|___|
5.10	Did you have any sexual relationship within the last month?	(1) Yes (2) No (Go to Q5.12)	|___|
5.11	How many partners have you had in the last month?	(1) No one (2) One partner (3) >one partner	|___|___|
5.12	When was your last sexual relationship?	(1) Yesterday (2) Within one week (3) Within one month (4) Within 1 to 3 months (5) Within 4 to 6 months (6) Within one year (7) Don't remember	|___|
5.13	Did you use a condom at the last sexual act?	(1) Yes (Go to Q5.15) (2) No	|___|
5.14	If you didn't use condom, why? (Please choose only one main reason)	(1) Because I don't like condoms (2) Because my partner rejected them (3) Both of us didn't want to use (4) He was my regular partner (5) No condoms were available at that time (6) Condoms can reduce pleasure (7) Others (specify) _____	|___|
5.15	Have you ever been forced to have sex against your will?	(1) Yes (2) No (Go to Q5.18)	|___|
5.16	Who did that to you?		
5.17	What age were you?	_____ years	
5.18	Where have you received HIV related health information? (more than one answer)	(1) Peers (2) Family members (3) School teachers (4) Health talk (5) Health staff (6) Journal/magazine/pamphlets (7) Radio/TV (8) Internet (9) Others (specify) _____	|___| |___| |___| |___| |___| |___| |___| |___| |___|

Section 6 Stigma and discrimination

6.1	Have you ever experienced discrimination from other people because you are MSM?	(1) Yes, always (2) Yes, sometimes (3) Very rare (1) Never (Go to Q6.4)	|___|
6.2	Which kind of discrimination have you faced?	(1) By excluding from social occasion (2) By insulting/telling bad things	|___| |___|

			(3) By physical behaviour of disapproval	|___|
			(4) By beating/blowing	|___|
6.3	Have you ever experienced any discrimination in these places?		(1) At home	|___|
			(2) At school	|___|
			(3) At work	|___|
			(4) At public place	|___|
6.4	Which type of discrimination did you consider to be the worst?		(1) By excluding from social occasion	|___|
			(2) By insulting/telling bad things	
			(3) By behaviour of disapproval	
			(5) By beating/blowing	

Section 7 Blood testing and related information

7.1	Have you ever had HIV testing?	(1) Yes	|___|
		(2) No (Go to Q7.6)	
7.2	If yes, how many times?	-------------------- times	|___|___|
7.3	When was the last time?	(1) Within 2 weeks	|___|
		(2) Within 1 month	
		(3) Between 1 – 6 month	
		(4) Between 6 month – 1 year	
		(5) > one year	
7.4	Why did you take the test?	(1) Because friends also take test	|___|
		(2) Needs to test for applying job	
		(3) NGO staff comes & ask for test	
		(4) To go abroad	
		(5) Others (specify)	
7.5	Where did you take the test?	(1) NGO clinic	|___|
		(2) Private clinic	
		(3) STD clinic	
		(4) Public hospital	
		(5) Others (specify)	
7.6	Do you have any close friend who received an HIV test?	(1) Yes	|___|
		(2) No	

ENDNOTES

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