Logo: Revolutionary Gov't of Znz

Integrated Behavioral and Biological Surveillance Survey among Key populations at risk in Zanzibar, 2011-2012

Sex Workers, People who Inject Drugs, and Men who have Sex with Men

INSTITUTIONAL INVOLVEMENTS

Zanzibar AIDS Control Programme, Ministry of Health
P.O. Box 1300
Zanzibar, Tanzania

US Centers for Disease Control and Prevention, Global AIDS Program,
Dar es Salaam, Tanzania and Atlanta, Georgia

University of California, San Francisco, Global Health Sciences,
San Francisco, California

STUDY TEAM MEMBERS

Dr Mohammed J. U. Dahoma	Principal Investigator
Dr Ahmed Mohammed Khatib	Co-Investigator
Dr Farhat Jowhar Khalid	Co-Investigator
Ameir Khamis Ali	Co-Investigator
Asha Ahmed Othman	Co-Investigator
Issa Maulid Issa	Lab technologist
Hassan Vuai Hassan	Lab technician
Najaat Mohammed Khatib	Lab Scientist
Said Seif Said	Lab technologist
Zabibu Khamis Juma	Lab technician
Kurwa Kazi Waziri	Coupon Manager
Sophia Mohamed	Coupon Manager
Zeyana Hamid	Coupon Manager
Radhia Mataka	Interviewer
Zuhura Saleh	Interviewer
Halima Hamad Nassor	Interviewer
Maryam Ali Khamis	Interviewer
Mgeni Seif Mohammed	Interviewer
Abdalla Omar Hassan	Interviewer
Fatma Mussa Juma	Interviewer
Jasjit Singh	Interviewer
Hassan Muhiddin	Interviewer
Jabu Amour Abdalla	Interviewer
Laki Mahmoud	Interviewer
Ahmed Abdulrahman	Screener
Kassim Ali Simai	Screener
Suhaila Masoud	Receptionist
Mohammed Abdi Nasib	Receptionist
Bahati Ameir Khamis	Data Clerk
Kailu Ameir Nassor	Data Clerk
Ame Ali Ame	Watchman
Hassan Mohammed Haji	Watchman
Mohammed Juma Mussa	Watchman
Asha Ussi Khamis	Data Analysis and Report Writing

Shaaban Hassan Haji	Data Analysis and Report Writing
Willi McFarland	Technical Support
Henry Fisher Raymond	Technical Support
Susie Welty	Technical Support
Christen Said	Technical Support
Joel Ndyongeje	Technical Support
Aimee Leidich	Technical Support
Evelyn Kim	Technical Support
Eva Matiko	Technical Support
Mary Kibona	Technical Support
Imee Cambronero	Technical Support

ACKNOWLEDGEMENTS

The successful completion of this study was made possible by the joint efforts of a number of individuals whose participation we would like to acknowledge with gratitude.

We would like to thank the members of the study team for their tireless efforts in planning and implementing the study, as well as analysing of the data and producing this report. In addition, we extend our thanks to the U.S. Centers for Disease Control and Prevention (CDC) as well as the University of California, San Francisco (UCSF) for their technical assistance throughout these processes.

TABLE OF CONTENTS

ABBREVIATIONS/ACRONYMS

AIDS	Acquired immunodeficiency syndrome
ANC	Antenatal clinic
CDC	Centers for Disease Control and Prevention
CI	Confidence Interval
DEFF	Design effect
ELISA	Enzyme-linked immunosorbent assay
EQA	External Quality Assessment
FGD	Focus group discussion
FSW	Female sex worker
HBsAg	Hepatitis B surface antigen
HBV	Hepatitis B virus
HCV	Hepatitis C virus
HIV	Human immunodeficiency virus
IBBS	Integrated behavioural and biological survey
IDI	In-depth interview
IQR	Inter-quartile range
KII	Key informant interview
KPAR	Key populations at risk
MAT	Medication-assisted therapy
MOH	Ministry of Health
MSM	Men who have sex with men
NGO	Non-governmental organization
NC	Not calculable
PEPFAR	President's Emergency Plan for AIDS Relief
PMTCT	Prevention of mother to child transmission
PWID	People who inject drugs
RDS	Respondent driven sampling
RDSAT	Respondent driven sampling analysis tool
RPR	Rapid plasma regain
STI	Sexually transmitted infection
SW	Sex worker
TB	Tuberculosis
TZS	Tanzanian Shillings
UCSF	University of California, San Francisco
VCT	Voluntary counselling and testing
ZACP	Zanzibar AIDS Control Programme
ZAMREC	Zanzibar Medical Research Ethical Committee

INTRODUCTION

Letter from Principal Secretary

EXECUTIVE SUMMARY

This report presents 2011/2012 findings from the first round of surveillance activities among key populations at risk (KPAR) in Pemba, Zanzibar, as well as findings from the second round of behavioural and biological surveillance surveys conducted among KPAR in Unguja, Zanzibar. The activities conducted in Unguja followed a round of similar surveillance surveys conducted among KPAR in Unguja in 2007. The primary objective of these surveys was to carry out routine surveillance in order to understand the trends in HIV and sexually transmitted infection (STI) sero-prevalence and risk behaviours among sex workers (SW), people who inject drugs (PWID) and men who have sex with men (MSM).

While the prevalence of HIV infection in Zanzibar remains low (1%) in the general population, routine surveillance among KPAR provides essential evidence for interventions to prevent more widespread transmission. The information obtained from these surveys should inform both programmatic and policy responses for these populations and, in the case of Unguja, provide data from which to monitor epidemic trends.

The 2011/2012 KPAR HIV surveillance surveys were implemented by the Zanzibar AIDS Control Programme (ZACP), Ministry of Health. Technical Assistance was provided by the University of California, San Francisco (UCSF) through the Global Health Sciences program and the US Centers for Disease Control and Prevention (CDC) in Tanzania and Atlanta. Funding was provided by the US President's Emergency Plan for AIDS Relief (PEPFAR) through CDC and the Global Fund through round 6 of HIV/AIDS.

In Pemba, the 2011 surveillance activities included rapid assessments using both qualitative and quantitative methods among all three of the above-mentioned KPAR. After providing informed consent, members of the KPAR completed an in-depth interview or participated in a focus group discussion, were tested on site for HIV, hepatitis B virus (HBV), hepatitis C virus (HCV) and syphilis, and immediately received their results. Key informant interviews were also conducted with local Non-Governmental Organizations (NGOs) and government officials who work with KPAR in Pemba.

In Unguja, the 2011/2012 KPAR surveillance surveys used respondent driven sampling (RDS) to obtain samples of 408 PWID, 344 MSM and 316 SWs aged 15 years and older. RDS is a chain-referral sampling method specifically designed to obtain probability-based samples of 'hidden' populations. After providing informed consent, respondents completed a face-to-face questionnaire, provided blood specimens to be tested for HIV, HBV, HCV and syphilis, and were given a voucher to receive test results with post-test counselling at the interview site after one to two weeks. Proportion estimates adjusted for participants' probability of recruitment were calculated using RDS Analysis Tool (RDSAT) Version 6.0.1.

Key Findings from Pemba

Findings from the rapid assessment confirmed the presence of KPAR in Pemba with population size estimates between 50-200 for PWID, 30-60 for MSM, and 300-800 for Female Sex Workers (FSW). Results from all three populations showed that members of these populations are engaging in behaviours that put them at increased risk for HIV infection, including risky drug injection practices, sexual intercourse with multiple partners, and low levels of condom use. HIV prevalence among study participants was higher than that of the general population of Pemba. HIV prevalence was found to be 8.8% among PWID participants, 5.0% among MSM, and 18.8% among FSW. In addition to HIV, study participants also tested for syphilis, HCV and HBV. No cases of HBV or HCV were identified among MSM or FSW, whereas HBV and HCV prevalence were found to be 5.9% and 20.6% among PWID, respectively. No cases of syphilis were identified among any of the populations.

High levels of stigma and potential criminalization make these three groups difficult to reach. While services targeting PWID are available and were being accessed by some PWID in this study, our survey findings confirmed the need for prevention efforts in Pemba to be brought to scale and expanded to include MSM and FSW, in addition to PWID. KPAR prevention programs must be more comprehensive and include activities that focus on harm reduction, condom promotion, peer education on HIV risk behaviours and HIV transmission prevention, HIV testing and referral to HIV care and treatment services, and sensitization of the authorities.

This rapid assessment serves as a foundation for program planning as well as future surveillance activities in Pemba. It is recommended that surveillance activities among KPAR on Pemba continue with a repeat rapid assessment combining qualitative and quantitative methods in three to five years. This repeat rapid assessment should focus on what factors have changed since the present study and could also serve as a stepping stone for larger quantitative surveys. Taking into account the estimated size of the KPAR in Pemba, it is recommended that a full integrated behavioural and biological survey (IBBS) be considered for FSW. For MSM and PWID, whose population sizes do not support a full IBBS survey, convenience samples in the 50 to 100 range may be more feasible and would garner a large proportion of identifiable MSM and PWID.

Key Findings from Unguja

In comparison to the general population of Zanzibar, the prevalence of HIV infection was high among all three risk groups in Unguja. HIV prevalence was 11.3% among PWID, 2.6% among MSM and 19.3% among SWs. Population size estimates were 3,000 for PWID, 3,958 for SWs, and 2,157 for MSM.

Even though all three groups reported engaging in behaviours that put them at risk of HIV infection such as having unprotected sex and using needles that have been used by someone else, protective behaviours were also reported. The majority (71.4%) of PWID used a clean, unused needle at last injection, and SWs reported moderately high levels of condom use, with 78.9% reporting using a condom at last sex. This positive change is attributable, at least in part, to prevention programs targeted at these populations that have been implemented over the past several years by the ZACP.

In spite of some encouraging results, Zanzibar's HIV epidemic is known to be concentrated in KPAR and all three populations continue to engage in high risk

behaviours, making it critical that prevention, care and treatment efforts continue and that targeted interventions be strengthened and expanded to increase uptake and access to services. HIV prevention services must be comprehensive and tailored to meet the needs of each high risk population. Services should include education on how to reduce sexual and drug use risk, promotion of skills and tools for safe injection, medication-assisted therapy for treatment among PWID, condom promotion and distribution, routine STI screening and treatment, and linkages to appropriate HIV care and treatment services for those found to be infected. Given the findings that stigma and discrimination continue to plague these populations, efforts must be made to ensure that services targeting KPAR, including care and treatment, are being provided in KPAR-friendly settings.

This is the first time that repeated rounds of IBBS surveys have been documented in Tanzania. The dramatic changes in HIV prevalence between the two rounds raises questions about whether RDS served its intended purpose of providing estimates that are representative of these populations. These findings may highlight the limitations of RDS as it is currently being implemented in many parts of the world. Despite efforts to ensure that methods were rigorously applied, this study emphasizes the need for continuous improvement and consideration of alternative methods to obtain accurate surveillance data.

People who inject drugs

PWID Biological Results, Unguja

- HIV prevalence: 11.3%
- Syphilis prevalence: 0.8%
- HBV prevalence: 5.9%
- HCV prevalence: 25.4%
- HIV and HCV co-infection: 6.9%

Risk behaviours

- *Injection drug use practices:* 71.4% of PWID reported using a clean, unused needle at last injection; however, 55.9% had ever shared a needle and 29.1% had injected with a previously used needle in the past month.
- *High risk sexual behaviours:* 34.9% of PWID reported having non-paid sex in the past month, while 22.2% and 8.4% reported buying sex and selling sex in the past month, respectively. Among those who had non-paid sex in the past month, 71.0% never used a condom.
- *Duration of injection drug use:* 48.0% of PWID had injected for 3 years or less. The median age at first injection was 26 years.

Service utilization and access

- *High rates of HIV testing*: 68.3% of PWID had ever tested for HIV, and 38.0% had tested in the past year. The majority of PWID (85.8%) knew where to go for a confidential HIV test.
- *High rates of contact with peer educators*: 70.8% of PWID reported having contact with a peer educator in the 12 months prior to the survey, of whom 80.6% received information on STI or HIV transmission or prevention and 45.0% received condoms.

- *Limited uptake of services from PWID-targeted clinics*: Only 28.1% of PWID had visited a clinic or drop-in centre that provides services to PWID in the 12 months prior to the survey. Of these, the most commonly received services were HIV tests (69.3%) and STI/HIV transmission or prevention information (63.6%).

Men who have sex with men

Risk behaviours

- *High risk sexual behaviours*:
  - Transactional sex: 86.1% of MSM reported buying sex from or selling sex to a man in the month prior to the survey.
  - Multiple partners: MSM had a median of 6 total sexual partners, (either male or female) in the month prior to the survey. 47.1% reported two or more non-paying male receptive sex partners in the past month and 39.5% reported two or more non-paying male insertive partners in the past month.
  - Condom use: Depending on partner type, 36.6% to 51.5% of MSM used a condom at last sex and 38.9% reported that they do not use condoms generally.
- *Low rates of injection drug use*: Only 1.0% of MSM reported using injection drugs in the three months prior to the survey.
- *High levels of risk perception:* The majority (86.6%) of MSM believed themselves to be at risk of HIV infection, with 65.0% considering themselves to be at high risk. MSM reported feeling at risk as a result of having multiple sexual partners (70.4%) and inconsistent condom use (67.4%).

MSM Biological Results, Unguja

- HIV prevalence: 2.6%
- Syphilis prevalence: 0.0%
- HBV prevalence: 2.7%
- HCV prevalence: 1.3%

Service utilization and access

- *High rates of HIV testing*: 68.2% of MSM had ever tested for HIV, and 53.7% had tested in the year prior to the survey.
- *High rates of contact with peer educators*: 53.6% of MSM had contact with a peer educator in the 12 months prior to the survey. Of these, 87.7% received STI/HIV information and 53.8% received condoms.
- *Limited uptake of services from MSM-targeted clinics*: 13.3% of MSM reported visiting a clinic with MSM-targeted services in the past year.

Sex workers

Risk behaviours

- *Moderately high levels of condom use:* 78.9% of SWs used a condom at last sex. Depending on partner type, 68.2-86.0% of SWs reported always using condoms in the past month. Frequency of condom use was lowest with casual, non-paying partners.
- *Low levels of risk perception:* 56.5% of SWs believed themselves to be at high risk of HIV infection. This number could be lower than expected due to the moderately high levels of condom use.
- *HIV prevalence among highest earning SWs:* HIV prevalence was highest among SWs earning more than 200,000 Tanzanian Shillings (TZS) per month (39.3%).

SWs Biological Results, Unguja

- HIV prevalence: 19.3%
- Syphilis prevalence: 3.1%
- HBV prevalence: 2.2%
- HCV prevalence: 1.6%

Stigma

- *Attitudes towards HIV:* 63.4% of SWs agreed that 'People with HIV/AIDS should be ashamed of themselves'. The same proportion said that 'I would feel ashamed if I were infected with HIV/AIDS'.

Service utilization and access

- *High rates of HIV testing:* 77.2% of SWs had ever tested for HIV and 50.8% had tested in the month prior to the survey.
- *Limited uptake of SW-targeted services:* 27.6% of SWs had been visited by a peer educator in the year prior to the survey and 13.8% had accessed services from a clinic or drop-in centre catering to SWs. The most common services received through both approaches were HIV/STI information and condoms.

BACKGROUND

The HIV Epidemic in Zanzibar

Since the first case of HIV was reported at Mnazi Mmoja hospital in 1986, HIV prevalence among the general population in Zanzibar has remained low. Surveillance data provide evidence that unlike mainland Tanzania, which has a relatively high HIV prevalence of 5.3% in the general population, an estimated 1% of the general population of Unguja and Pemba islands is infected with HIV (THMIS, 2012). Furthermore, periodic HIV surveillance activities among pregnant women in Zanzibar also indicate low prevalence. In antenatal care (ANC) sentinel surveillance, the prevalence of HIV infection among ANC attendees was 1% in 2002, 0.9% in 2005 and 0.6% in 2008. Among pregnant women accepting HIV testing through prevention of mother to child transmission of HIV (PMTCT) services in 2009, 0.8% were HIV positive (n=40,646). HIV prevalence among blood donors has also remained low, ranging from 0.4% to 1.0% between 2004 and 2008.

While HIV prevalence in the general population remains low, it is known that certain populations, referred to as key populations at risk (KPAR), are at increased risk for HIV infection, including people who inject drugs (PWID), men who have sex with men (MSM), and sex workers (SWs). Data from integrated behavioural and biological surveys (IBBS) conducted among KPAR in 2007 support this knowledge, having found HIV prevalence rates of 16.0%, 12.3% and 10.8% among PWID, MSM and female sex workers (FSW), respectively. These surveys also identified some of the key risk behaviours putting these groups at increased risk of infection with HIV.

Since 2007, the Ministry of Health (MOH) of Zanzibar through the Zanzibar AIDS Control Programme (ZACP), in collaboration with development partners and local agencies, has been spearheading a number of interventions targeting PWID, MSM and SWs. Interventions include targeted information and communication through trained peer educators and health care providers, HIV testing and counselling conducted through mobile outreach services, condom promotion, screening and referral for STIs, voluntary counselling and testing (VCT) and tuberculosis (TB), and harm reduction through the distribution of hypochlorite disinfection kits.

HIV Surveillance

ZACP is the national coordinator of all HIV surveillance and program activities in Zanzibar. HIV surveillance data in Zanzibar are obtained primarily through two methods: 1) sero-surveys conducted every two years in sentinel sites to monitor trends in HIV prevalence among ANC attendees and 2) surveillance activities conducted in KPAR in alternate years. HIV data are also collected via passive surveillance activities through programs offering HIV testing, such as VCT services, sexually transmitted infection (STI) clinics, and PMTCT programs, as well as smaller special studies and surveys.

In 2007, ZACP conducted a baseline IBBS using respondent driven sampling (RDS) among MSM, PWID and FSW in Unguja in order to estimate the burden of disease

among these populations and to inform the development and implementation of HIV prevention and care programmes for these high risk groups.

Key Populations at Risk (KPAR)

PWID

Sharing syringes and other injecting equipment is a well-known route for HIV transmission among PWID. It is estimated that there are 16 million individuals who inject drugs worldwide, 3 million of whom are infected with HIV [1]. In 2005 evidence of injection drug use emerged in 23 sub-Saharan African countries, and HIV was reported among PWID in five of those countries [2]. As in other parts of the world, sharing needles and unprotected sex are common practices among African PWID and are associated with a high prevalence of HIV infection [3, 4].

The first cases of HIV related to drug injection were documented in Zanzibar in 2005. At that time, PWID were found to have a substantially higher HIV prevalence rate (26.2%) compared to drug users who did not inject drugs (4.1%) [5]. Risky injection practices and sexual behaviours were reported, including using non-sterile needles, the practice of “flashblood” (injecting blood from someone who had injected drugs [6]),having multiple sexual partners, and unprotected sex.

However, prior to 2007 there was no data that represented the entire PWID population in Zanzibar. The RDS conducted in 2007 found that PWID in Unguja had an HIV prevalence of 16.0% (CI 11.4-21.2%) and a Hepatitis C virus (HCV) prevalence of 26.9% (CI 21.3-33.3%). Only 17.5% (CI 13.3-21.9%) of PWID reported using a condom at last sex with a non-paying partner, and 13.3% (CI 9.6-17.3%) had tested for HIV and received their results within the past one year. The study also investigated needle-sharing and found that more than half of PWID reported using a new (unused) needle at their last injection (62.9%, CI 57.1-68.9%) [7].

MSM

In Africa, heterosexual intercourse is recognized as the main mode of HIV transmission in the general population. However, there is a small but growing body of literature suggesting MSM are highly vulnerable to HIV and other STIs in Africa [8-13]. A systematic review of the literature on HIV among MSM in low- and middle-income countries found that MSM in Africa were 3.8 times more likely to be HIV-positive when compared with the general population [8]. In addition to the risk of HIV transmission through unprotected anal sex, the vulnerability of MSM in Africa is enhanced by legal and social exclusion, stigma and discrimination that may impede access to prevention, care and treatment services for HIV [9, 12].

The RDS survey conducted among MSM in Unguja, Zanzibar in 2007 found an HIV prevalence of 12.3% (CI 8.7-16.3%) in the MSM population. Approximately one-fourth of MSM (25.6%, 95%CI 20.6-31.7%) reported using a condom at last insertive sex with a non-paying male partner, while only 15.6% (CI 10.6-21.1%) reported using a condom at last receptive sex with a non-paying male partner.

More than sixty percent of MSM (62.7%, CI 57.4-68.7%) perceived themselves to be at high risk for HIV, primarily due to inconsistent condom use (64.8%, CI 59.2-70.8%). Still, only 18.8% (CI 15.2-23.1%) reported ever having had an HIV test [7].

SWs

In many countries around the world and throughout sub-Saharan Africa, SWs and their clients are considered a core group contributing to the transmission of HIV. As a result, SWs often have a disproportionately high prevalence of HIV infection compared to the general population [14-16]. By definition, SWs are likely to have multiple concurrent partners and are often at a social and economic disadvantage in negotiating safe sexual practices with their clients and other partners. Emerging evidence shows that HIV infection among SWs is also transmitted through their own injection drug and that of their non-commercial partners [17]. Several countries with low HIV prevalence have shown rapid increases in HIV infection among FSW well before similar increases are seen in the general population [18].

A limited number of studies have been conducted among SWs in Mainland Tanzania and Zanzibar. A study conducted in 2010 in Dar es Salaam using RDS found an HIV prevalence of 31.4% among FSW [17]. Among female bar workers (a group who often engages in informal commercial sex work) in Mainland Tanzania, studies found HIV prevalence rates ranging from 19% – 68% [19-21].Research on injection drug use in Dar es Salaam found that many female drug users practice sex work to support their addiction, placing these women in overlapping risk groups [22].

The RDS survey conducted among FSW in Unguja, Zanzibar in 2007 found an HIV prevalence of 10.8% (CI 7.2-15.6%). Just over half (55.7%, CI 48.3-63.1%) of FSW in this study reported using a condom with their most recent client, with the primary reason for not using a condom being client objection. Even though 83.8% (CI 78.7-88.7%) of FSW considered themselves to be at risk of HIV infection, only one third (32.9%, CI 27.3-38.6%) reported ever having been tested for HIV [7].

RATIONALE AND OBJECTIVES

In 2007, the Government of Zanzibar conducted IBBS behaviour among three known high risk groups: MSM, FSWs, and PWID in Unguja, Zanzibar. These surveys provided a baseline assessment of HIV and STI prevalence as well as risk behaviours among these KPAR in Unguja, groups who were not a focus of routine surveillance activities prior to that time.

In 2011 to 2012, the Government of Zanzibar conducted similar IBBS behaviour among MSM, SWs and PWID in Unguja in order to further build on the data that had been collected in 2007 and to look for changes in prevalence and risk behaviours among these three KPAR. Surveillance activities were also conducted among these same three populations in Pemba, Zanzibar, to rapidly assess the context of risk and to measure basic risk indicators. Results from these activities informed intervention programs targeted at KPAR and the feasibility of different quantitative methods to further research these populations.

The specific objectives of the 2011/2012 biological and behavioural surveillance activities in Pemba were:

I. To understand the feasibility of conducting bio-behavioural surveillance in Pemba
II. To understand the characteristics and risk behaviours of FSW, MSM, and PWID in Pemba.
III. To estimate the size of the three populations (MSM, PWID, FSW) in Pemba.

The specific objectives of the 2011/2012 biological and behavioural surveillance activities in Unguja were:

I. To determine the sero-prevalence of HIV, syphilis and Hepatitis B (HBV) and Hepatitis C (HCV) infections among SW, PWID and MSM in Unguja.
II. To assess sexual risk behaviours associated with HIV infection in the three sub-populations and document changes in these behaviours that have occurred since the first round of surveillance in 2007.
III. To assess non-injection and injection drug use behaviours in these three sub-populations and document changes in these behaviours that have occurred since the first round of surveillance in 2007.
IV. To assess STI treatment-seeking behaviours in these three sub-populations and document changes in these behaviours that occurred since the first round of surveillance in 2007.
V. To estimate the size of the three populations (MSM, PWID, SW) in Unguja.
VI. To assess the uptake of interventions targeting these three sub-populations that were implemented after the first round of surveillance in 2007.

METHODS

Methods Used in Pemba

1. Rapid Assessment (RA)

RAs with MSM, FSW and PWID were conducted in Pemba since much less is known about the behaviours and relationships among KPAR in Pemba when compared to Unguja. The RA methodology is designed to rapidly and flexibly use qualitative research tools including key informant interviews (KIIs), in-depth interviews (IDIs) and focus group discussions (FGDs) to better understand the context of risk for vulnerable and hidden populations. These qualitative methods are combined with quantitative surveys and testing to measure basic risk indicators, HIV prevalence and the population size. RAs have been conducted worldwide and have been effective in documenting emerging trends in behaviour and developing and tailoring HIV prevention interventions for KPAR including MSM and FSW [23, 24].

2. Sample Size Calculation

The sample sizes for the qualitative assessments in this study were based on a theoretical saturation approach. In theoretical saturation, data are compared continuously to determine if information contained in the qualitative interviews is consistent and recurrent. When new interviews fail to provide new information, saturation has been reached. While this approach emphasizes commonalities among the respondents and across multiple qualitative data collection techniques, it also helps to identify subsets of respondents that may have different perspectives or experiences. Research shows that the recommended minimum number of qualitative interviews collected on a stratum of interest is 10, and the maximum for productive analysis is 40 [25].

3. Data Collection

Data were collected through a variety of RA methods in three different towns in Pemba: Wete, ChakeChake and Mkoani. The data collection methods included mapping and observation, KIIs, FGDs and a brief demographic and risk behaviour survey with HIV, HBV, HCV and syphilis rapid testing. One-on-one IDIs were offered to those who wished to participate in the survey but did not feel comfortable in a FGD setting.

Interviews collected data on population characteristics, including social network connections, population behaviours related to HIV risk, geographic hot spots, acceptability of HIV testing, health service access and utilization, and acceptability of prevention interventions. FGDs and IDIs lasted approximately 90 minutes and participants were provided with snacks as well as compensation for transport to the interview site.

No personal identifying information was collected or recorded during interviews and notes taken during interviews were only accessible to the study team.

The eligibility criteria for the three populations are shown in the below table.

MSM	FSW	PWID

a) engaged in anal sex with other males in the past three months b) liberated minors, male, aged 15 or older c) lived in Pemba for the past three months d) able to adequately grant informed consent e) in possession of a valid recruitment coupon	a) exchanged sexual intercourse for money in the past one month b) liberated minors, female, aged 15 or older c) lived in Pemba for the past three months d) able to adequately grant informed consent e) in possession of a valid recruitment coupon	a) injected illicit drugs in the past three months b) liberated minors, female or male, aged 15 or older c) lived in Pemba for the past three months d) able to adequately grant informed consent e) in possession of a valid recruitment coupon

4. Tools Development and Staff Training

All study investigators were provided training on RA methods including different interview techniques, field methods, research ethics, and safety.

5. Laboratory Procedures

Participants who consented received pre-test counselling by a trained counsellor and were tested for HIV, HBV, HCV and syphilis using rapid tests. Qualified staff collected whole blood specimens in plain 5 ml vacutainer tubes and conducted rapid testing onsite. Participants received results immediately in conjunction with post-test counselling and referrals for treatment as appropriate.

6. Data Management and Analysis

All confidential study-related materials remained in the possession of study staff at all times while in the field. Once data collection was completed, data were kept in a locked cabinet and on password-protected computers in the ZACP office. The survey team did not record names or other personal identifiers in their notes or on any of the laboratory specimens or results.

Analysis of qualitative data was done through an iterative process. The study team kept detailed notes of all interviews and FGDs, and, at the end of each day and again upon completion of all interviews, reviewed their notes to look for common and divergent themes among focus group participants and across groups or individual interviews.

7. Population Size Estimate

During KIIs, staff from international and local Non-governmental Organizations (NGOs) working with KPAR were asked to estimate the numbers of MSM, FSW and PWID in Pemba. The responses were recorded and the ranges of those responses are reported here.

8. Ethical Considerations

Study participation was strictly voluntary and participants were informed that they could withdraw from the study at any point in time. Following careful explanation of the survey, study staff gave eligible participants the consent form to read or, if necessary, project staff read the consent form to the survey participant. All participants verbally stated that they understood and agreed to all of the items contained in the consent and signed the informed consent form in order to be enrolled in the survey. The participants were given the option to complete the interview only and decline the biological tests.

All study data including behavioural and laboratory information were kept confidential. The survey team did not record names or other personal identifiers on the survey questionnaires, laboratory specimens or results. After data collection, forms and test results were kept in a locked metal cabinet at the ZACP office.

The study protocol, including questionnaires and consent forms, received approvals from the Zanzibar Medical Research Ethical Committee (ZAMREC) and the ethical review board at University of California, San Francisco (UCSF), and was approved as non-engaged research by the Centers for Disease Control and Prevention (CDC).

9. Limitations

This study was subject to several limitations. Because behavioural data were self-reported, social desirability bias may have resulted in underreporting of sexual practices and drug use and over-reporting of condom use. In addition, the sample may not have been representative of all MSM, SW, and PWID in Pemba. Many of the members of these populations are still very hard to reach since the behaviours they engage in are illegal and highly stigmatized, particularly in Pemba's conservative Muslim society.

Methods Used in Unguja

1. Respondent Driven Sampling (RDS)

The study in Unguja used respondent-driven sampling (RDS) to recruit participants from all three study populations. RDS is a chain referral sampling method designed to reduce the biases generally associated with chain referral methods in order to yield a probability-based sample. It is specifically designed to sample hard-to-reach and hidden populations such as SWs, PWID, and MSM.

Recruitment in RDS is initiated with a number of purposefully selected members of the study population referred to as "seeds." Each seed is given a fixed number of uniquely coded coupons which they use to recruit peers into the study. Any recruited peers who enrol in the study are considered the first wave of participants. Each participant in the first wave who completes the survey is then provided a fixed number of coupons with which to recruit their peers into the study. Successive waves of recruitment continue until the sample size is reached.

The unique codes on each coupon link recruiters to their recruits and each participant to their questionnaire and biological test results.

2. Sample Size Calculation

Power and sample size estimates were based on achieving desired precision around point estimates for HIV infection in each KPAR. According to 2007 estimates for Unguja, the prevalence of HIV infection was 16.0% among PWID, 12.3% among MSM and 10.8% among SWs. Sample sizes for each study population based on these prevalence estimates (P) are provided below (Table A). Sample sizes were corrected for an expected design effect (DEFF) of 1.8, based on the median DEFF found for key variables in similar RDS surveys of MSM in South Africa and Uganda. As highlighted in the table below, survey sample sizes differed for each sub-population.

Table A. Numeric Results for Two-Sided Confidence Intervals for One Proportion Confidence Interval Formula: Score with Continuity Correction (Fleiss, 2003) (Newcombe, 1998)

Population	Estimated HIV prevalence %	Sample size at alpha =0.05	95% CI	Sample size with DEFF of 1.8
MSM	12.3	186	8.1-18.1	335
PWID	16.0	226	11.6-21.6	407
SW	10.8	169	6.7-16.7	304

3. Data Collection

Seeds were identified during formative FGDs and through key contacts, and were selected to reflect diversity on a number of key characteristics. Seeds identified for each study population were each given a fixed number of coded coupons with which to recruit their peers into the study. Participants who presented a valid recruitment coupon to the study site were screened for eligibility (Table B) and then consented for a face-to-face interview and blood draw for HIV, syphilis, HBV and HCV testing. Interviews were conducted face-to-face in Kiswahili using a standard questionnaire, and took

approximately 45 minutes to complete. The questionnaire collected data on participants' socio-demographic characteristics, sexual and drug risk behaviours, STI and HIV knowledge, information on participants' social networks, and information on their access to and utilization of HIV-related services. Following the interview, participants met with a trained nurse counsellor who provided them with standard pre-test counselling information and confirmed their consent to provide a biological specimen for testing. Finally, each participant was provided three coupons with which to recruit eligible peers. All biological and behavioural data collection took place at ZACP offices in Stonetown, Zanzibar.

Participants received a primary compensation for completing the survey as well as for providing a biological specimen, and an additional secondary compensation for each individual they recruited who was eligible and consented to participate in the survey (Table B). Participants who consented to testing also received a voucher to return to the interview site after one to two weeks to receive their test results accompanied by post-test counselling. Those with positive test results for HIV, HBV, HCV, and/or syphilis infection were referred to the HIV/STI care and treatment centre at Mnazi Mmoja Hospital for further management. Participants who tested negative for HBV were offered an HBV vaccine injection and were provided with the necessary information to receive the other two vaccinations in the series.

No personal identifying information was collected. To ensure confidentiality, participants' questionnaires and biological tests were identified using a unique study identification number provided on the recruitment coupons.

Table B. RDS survey parameters by key population

	MSM	SW	PWID
Dates of survey	October – December 2011	December 2011 – March 2012	March – May 2012
Eligibility criteria	a) engaged in anal sex with other males in the past three months b) liberated minors, male, aged 15 or older c) lived in Unguja for the past three months d) able to adequately grant informed consent e) in possession of a valid recruitment coupon	a) exchanged sexual intercourse for money in the past one month b) liberated minors, male or female, aged 15 or older c) lived in Unguja for the past three months d) able to adequately grant informed consent e) in possession of a valid recruitment coupon	a) injected illicit drugs in the past three months b) liberated minors, female or male, aged 15 or older c) lived in Unguja for the past three months d) able to adequately grant informed consent e) in possession of a valid recruitment coupon
Number of seeds	9	11 (1 with no recruits)	9
Final sample size[1]	344	316	408
Compensation	$3.96 US for completing the survey $1.70US for providing a biological specimen $1.13US for each successful recruit	$6.19 US for completing the survey $3.10US for providing a biological specimen $1.24US for each successful recruit	$2.50 US for completing the survey $1.24US for providing a biological specimen $1.24US for each successful recruit
Number of coupons given to recruit peers	3	3	3

4. Tools Development and Staff Training

All study investigators received training on behavioural surveillance with a focus on RDS methodology. This training provided an introduction to all aspects of RDS including identification and recruitment of seeds, selection and management of interview sites, questionnaire development, the interview and incentive claim process, study documentation and management, methods for controlling sample growth and ending

[1] Final sample size may have exceeded the calculated sample size as recruits continued to redeem valid coupons after RDS recruitment ended.

recruitment, data management, and data analysis. Investigators were also introduced to a generic RDS protocol and asked to adapt the protocol to the local Zanzibari context. Following these trainings, the 2007 protocol and tools were adapted and improved based on experiences from the previous round of IBBS.

A second training was conducted immediately prior to survey implementation in September 2011 in order to train all study personnel on the procedures for the survey at the study site. This included training on seed recruitment, participant recruitment, coupon and participant tracking, the incentive process, administration of the behavioural questionnaire, collection of biologic samples, sample processing and transport, specimen testing, and provision of biologic test results and referrals. Immediately following the training, the survey was launched for the first key population.

Additional trainings were held for screeners and interviewers prior to the launches of the surveys for the second and third key populations, as these were the only study staff that changed from survey to survey. These trainings included general information on study procedures, but were primarily focused on participant screening, administration of informed consent, and administration of the behavioural questionnaires.

5. Laboratory Procedures

Venous blood draws were conducted at the study site by nurse counsellors and samples were transferred daily to Mnazi Mmoja Hospital Laboratory. Biological samples were coded with a unique laboratory code that was linked to a participant's unique coupon ID number.

At the laboratory, samples were centrifuged and serum was aliquoted into one or two tubes of approximately 1 ml by laboratory technicians. Staff used one tube for testing and External Quality Assessment (EQA) and banked the other for future use if consent had been given by the participant for long term storage and future testing.

Each sample was tested according to the following procedures:

a. **HIV serostatus** was assessed using a serial algorithm in accordance with the national testing guidelines for HIV. All specimens were screened using SD Bioline HIV-1/2 3.0 test (Standard Diagnostics, Kyonggi-do, South Korea) and reactive specimens were confirmed using Determine HIV1/2 test (Abbott Diagnostic Division, Hoofddorp, Netherlands). Discordant results were tested with Unigold (Trinity Biotech, Bray, Ireland) as the tie breaker. All three tests are assays for the detection of antibodies to HIV types 1 and 2.

b. Presence of **Hepatitis B surface antigen (HBsAg)** was detected with ACON HBsAg virus test strips (ACON Laboratories, Inc., Hangzhou, China), a qualitative lateral flow immunoassay for detection of HBsAg in serum or plasma.

c. Antibodies to HCV were detected using the ACON Hepatitis C virus test strips (ACON Laboratories, Inc., Hangzhou, China), a qualitative, membrane-based immunoassay for the detection of antibody to HCV in serum or plasma.

d. **Syphilis infection** was tested using the SD Bioline Syphilis Test (Standard Diagnostics, Kyonggi-do, South Korea), a qualitative membrane strip based immunoassay for detection of *Treponemapallidum* antibodies (IgG and IgM) in whole blood, serum or plasma. Reactive specimens were retested using quantitative rapid plasma regain (RPR).

EQA of biological specimens was conducted in order to assure the accuracy of test results. For HIV, all reactive and 10% of non-reactive samples were retested by the National Health Laboratory Quality Assurance and Training Centre, the national reference laboratory in Dar es Salaam. Samples were retested using the last test that was used in the field (e.g. for a non-reactive specimen screened only with SD Bioline, the test used was SD Bioline; for a reactive sample screened first with SD Bioline and then with Determine, Determine was be used), followed by enzyme-linked immunosorbent assay (ELISA).

A total of 260 samples were retested for HIV. Results showed that all runs of the test were concordant with the initial tests done during data collection at Mnazi Mmoja laboratory in Zanzibar.

6. Data Management and Analysis

All data, including hard copies of completed questionnaires, were stored and entered at the ZACP office. Data from the behavioural surveys were double entered using Questionnaire Development System software, and the datasets were compared using Microsoft Access. Final datasets were converted to SPSS for further cleaning. Staff performed consistency checks and frequencies to check validity and logic of all variables. Final datasets were kept at ZACP and only authorized staff members were allowed access.

Data management and recoding were conducted in SAS. Estimates and 95% confidence intervals (CI) were calculated using the RDS Analysis Tool 6.0.1 (RDSAT).

7. Population Size Estimates

Six different population size estimation methods were used to determine the number of PWID, SW and MSM living in Unguja in 2011/2012, each of which are described in detail below. A panel of experts for each of the three key populations convened during analysis of the RDS survey data and reviewed the results of each of the estimation methods. During this review, they came to a consensus of the “best” estimate of the key population size for all three KPAR.

Unique object multiplier

Two weeks prior to the launch of the 2011/2012 RDS surveys for each key population, unique objects created especially for this activity (blue bags for MSM, green bags for PWID and yellow bags for SWs) were distributed over the span of 5-7 days to members of the populations by trained peer educators from local NGOs and ZACP. Locations for distribution of the unique objects (hotels, bars, homes for MSM and SWs and hot spots for PWID) were selected prior to the study launch based on information obtained during the formative assessment. The selected locations were known to be places where members of the key populations congregate. The peer educators verified that individuals met the study inclusion criteria and that they had not received a bag from a different peer

educator before giving them a unique object. Each individual from the key population received exactly one bag and was asked not to give the bag to anyone else because he or she might be asked about it in the near future by another study staff member. Peer educators distributing the unique objects recorded the number and location of each object distributed and the age and sex of the recipient using a standardized log sheet. During the 2011/2012 RDS surveys, study participants were asked if they had received the specific coloured bag. The population size was calculated by using the RDSAT-adjusted percent of those who had received the object prior to the 2011/2012 survey divided by the number of objects distributed.

Service multiplier

Counts of key population members utilizing specific services were available from a variety of government service outlets and NGOs in Zanzibar who provide services to one or more KPAR. Data used for this multiplier method were taken from VCT services provided specifically for MSM and FSW by ZACP during the 12 months prior to the 2011/2012 RDS survey. For MSM, data were from October 2010 to September 2011 and for FSW, data were from December 2010 to November 2011. An assumption was made that each test represented a unique individual as it was considered unlikely that clients tested multiple times in 12 months. During the survey, the participants were asked if they had received this specific service in the past 12 months. The population size was calculated by dividing the number tested according to the VCT service data by the RDSAT-adjusted number of those who had been tested in the past 12 months from the 2011/2012 survey.

Recapture of 2007 RDS survey participants

During the 2011/2012 RDS survey, participants were asked if they had also participated in the 2007 round of the RDS survey. The total number of members of the population recruited in the 2011/2012 survey was then divided by the RDSAT-adjusted percent of participants who had also participated in the 2007 survey to get an estimate of the population size.

Wisdom of the crowds

This method of size estimation relies on the knowledge of members of the population and asks them to estimate how many people are in their population [8]. During the 2011/2012 RDS survey, each participant was asked to provide an estimate of the number of their population living in Unguja Island, Zanzibar. The median of these responses was used as the population size estimate for this method.

Literature review

A search of literature was done to find a number that accurately describes the proportion of adults in Zanzibar who inject drugs; the proportion of adult females who engage in sex work; and the proportion of adult males who have sex with other males. One report stated that there were 4,000 PWID in Unguja, Zanzibar [28]. No specific literature for Zanzibar could be found for the number of MSM and SWs and therefore an estimate within the range of published proportions was approximated for the Zanzibar context. A review of the literature on the proportion of males in low and middle income countries who have sex with other males suggested a range of 1% to 4% in sub-Saharan Africa [29]. For SW, the literature for urban areas of sub-Saharan Africa showed the proportion of females who engage in sex work ranging from 0.4% to 4.3% [30]. Each of the panels

of experts for the three sub-populations reviewed this available literature and reached a consensus on the following estimates as plausible for Zanzibar: 1.2% of adult males are MSM, 0.5% of adult females are FSW and 0.8% of the adult population are PWID. These percentages were multiplied by the 2011 projections of the Zanzibar population over the age of 15 (245,000 females and 231,254 males) [27] to calculate the population size estimate for this method.

Modified Delphi

A panel of experts for each of the three key populations made up of ZACP staff, Zanzibar AIDS Commission staff, Zanzibar Drug Control Commission staff, staff from international and local NGOs working with KPAR, and current or former members of the three populations was asked how many MSM, SWs and PWID were living on Unguja Island. The responses were recorded and the median of these responses was considered to be the estimate for this modified Delphi method.

8. Ethical Considerations

In order to minimize any social risks, consultations with the local authorities were held prior to the start of the survey, including the Zanzibar Regional Commissioners Office, police and county level government and community leaders, local Research Council, NGOs, Chief Ministers Office, Office of Chief Government Statistician and local anti-narcotics authorities. The background, purpose, and procedures of the survey, the measures taken by the investigators to ensure confidentiality and privacy of the participants, and applicability of study findings were explained at these meetings. The outcomes of these discussions were used to adjust and guide the execution of the survey.

Study participation was strictly voluntary and participants were informed that they were free to withdraw from the study at any point in time. Following careful explanation of the survey, study staff gave eligible participants the consent form to read or, if necessary, project staff read the consent form to the survey participant. All participants verbally stated that they understood and agreed to all of the items contained in the consent and signed the informed consent form in order to be enrolled in the survey. The participants were given the option to complete the interview only and decline the biological tests, as well as the option to agree to have a portion of their biological specimen anonymously stored for future testing or studies. Participants could refuse to answer any specific question in the course of the interview. All participants were given the name and telephone number of the local study coordinator should they have any questions about the study or if they believed they had been injured or mistreated as a result of being or not being part of the survey.

To minimize any discomfort due to the sensitive nature of the questions asked, the questionnaire was administered in a private, confidential setting by study personnel who had experience working with the study population. Study staff provided referrals to local services for care and treatment, as appropriate.

All study data were kept confidential. The survey team did not record names or other personal identifiers on the survey questionnaires, laboratory specimens or results. In this survey, coupon identification numbers were assigned to each of the participants and used to link questionnaire responses to behavioural and laboratory test results. After

data collection, forms and test results were kept in a locked metal cabinet at the ZACP office.

The study protocol, including questionnaires and consent forms, received approvals from the ZAMREC and the ethical review board at UCSF, and was approved as non-engaged research by CDC.

9. Limitations

This study was subject to several limitations. Because behavioural data were self-reported, social desirability bias may have resulted in underreporting of sexual practices and drug use. In addition, respondents were asked to recall periods of up to twelve months when reporting on sexual and drug use behaviours; therefore, the accuracy of responses may have been affected by recall bias.

Compensation for participants is a crucial element of recruitment in RDS but it can be challenging to determine the appropriate amount for each unique population. If the compensation offered is too high, there is a risk of double-enrolment or of encouraging recruits to fake eligibility requirements. If the amount is too low, recruitment will not be successful. For these surveys, compensation amounts were set based on formative research and feedback from the study populations and were carefully adjusted to reach appropriate levels. In order to prevent double-enrolment and ensure all participants met eligibility criteria, recruits attending the study site were carefully screened by peers and study staff who had experience working with the study population.

Ensuring that only true members of the key population are able to enrol in the survey is critical for RDS but can be difficult when dealing with members of hidden or stigmatized populations. While all study participants received a short training on how to recruit eligible peers, around 20% of recruits were found to be ineligible for the study for all three populations. Having so many potential participants found to be ineligible may have affected recruitment patterns as well as the ability of the RDS methodology to successfully reach all sub-groups within the KPAR.

KPAR can be made up of a variety sub-populations and RDS attempts to capture and represent them all. However, some sub-populations may be more difficult to reach than others. This study attempted to capture female PWID but was only able to recruit a small number. Similar challenges have been documented in other IBBS [31]. In addition, SWs recruited into the Unguja RDS were not limited to FSWs. Male seeds were planted and participants were told that they could recruit either men or women who sold sex. However, very few men participated, and it seemed that male SWs were more closely linked with the MSM population than with the FSW population.

During data analysis, drug use behaviour data, small sample size for some variables and missing values added to the limitations of the study. Analysis of drug use behaviour was limited to recent use in the past three months therefore, a causal relationship between drug use and disease prevalence is not possible to determine. Although the estimates presented here may be considered representative of the populations from which respondents were recruited, the small number of values for certain variables may limit our ability to detect statistically significant differences between groups. In some cases, confidence intervals were too wide for meaningful interpretation. Furthermore, as analysis in RDSAT depends on the integrity of recruitment chains to determine and

adjust estimates for the probability of recruitment, missing values may distort adjusted proportion estimates. We have attempted to correct for this in the analysis by taking special care with missing values and skip patterns.

Lastly, large changes in HIV prevalence were found between the 2007 and 2011/2012 rounds of surveys, specifically among the MSM and SW populations. In addition, significant differences were noted in the demographic characteristics of these populations between the two studies. Zanzibar is one of the first places in Africa to conduct consecutive rounds of RDS among KPAR therefore very few other studies exist to provide explanation for these wide disparities. The large differences in the demographics of the samples may indicate that the two rounds of RDS sampled different subsets of these KPAR, making it difficult to compare the findings or assess trends over time. These results also call into question the reliability of consecutive surveys using RDS for surveillance among KPAR. Despite efforts to ensure that methods were rigorously applied, this study emphasizes the need for continuous improvement and consideration of alternative methods to obtain accurate surveillance data.

RESULTS FOR PEMBA

This chapter presents biological and behavioural findings for PWID, MSM and FSWs in Pemba. It is divided into separate sub-sections for each population that describe socio-demographic characteristics, risk behaviours, HIV prevalence, access to HIV related services and the programmatic and policy implications of these findings for HIV prevention and services among KPAR in Pemba.

People who inject drugs (PWID)

A total of 37 PWID participated in six FGDs, an additional seven PWID were interviewed one-on-one IDIs, 35 completed the socio-demographic survey and 34 agreed to test. In addition, 15 KIIs were conducted.

1. Socio-demographic Characteristics

Key informants estimated that between 50 and 200 PWID live in Pemba. Focus group participants estimated that members of the PWID population in Pemba range in age from 18 to 50 years; the median age of those who completed the socio-demographic survey was 30 years. The majority of participants stated that PWID in Pemba are from Pemba, and that few come from Unguja and even fewer from mainland Tanzania.

Most PWID reported knowing 10-20 other PWID and that they communicate by phone or when they see each other up to two or three times per day where drugs are sold, by the harbour or in their hangout spots. Bus conductors were identified as sources of information on when people have come from Unguja with drugs and where good drugs can be found. PWID reported that they cooperate with each other regardless of age by injecting together, lending each other pipes, sharing water for mixing drugs, working together to steal for money, and by injecting those who can't inject themselves. PWID are known by a variety of different names in Pemba, including: wateja, masai, ngawa, mkuki, warushandege, and fungo.

2. Risk Behaviours and HIV Prevalence

Participants reported their high risk behaviours to be: engaging in unprotected vaginal, anal and oral sex; sharing needles and pipes; and having several PWID wash their pipes in the same water. While many of the participants requested condoms, one group said that they do not need many because they prefer drugs over women. Two groups reported that there are no women in Pemba who inject but women who drink instead.

According to the socio-demographic survey, HIV testing rates were high with 86.0% of respondents reporting that they had ever tested. Among those PWID who were tested as part of this survey, HIV prevalence was 8.8% (n=34).

, HBV and HCV prevalence were 5.9% and 20.6%, respectively, and no cases of syphilis were identified among study participants.

3. Access to Services

Almost all participants mentioned that harm reduction, VCT and STI services are available from various institutions and some mentioned that ZAYEDESA, ZANGOC, ZAIADA, and ZYF NGOs helped PWID get Jik (bleach), cotton, brochures, education and condoms. Sober houses were also mentioned as an available service. One group reported that Chake Chake Hospital only helps PWID if they are very sick or brought in by someone known to the hospital. Otherwise doctors refused to help for fear of ruining their equipment looking at them.

Very few participants reported that no institutions provide PWID with services and that they wish institutions would reach out to them; not having access to services makes them feel like they do not matter or are not liked.

4. Discussion and Recommendations

PWID population is well networked: The PWID population in Pemba is speculated to be between 50 and 200 people, aged 18 to 50 years and from Pemba. The PWID population seems to be cohesive with very good social linkages.

- Explore the possibility of using new surveillance methods being developed for small, insular populations in order to continue surveillance among PWID in Pemba.

High levels of risky injection and sexual practices: Most PWID reported engaging in risky injection practices such as using non-sterile needles and pipes. They also reported engaging in unsafe sexual practices, including unprotected vaginal and anal sex, showing that more needs to be done to enhance safe injection and safe sexual practices within this population.

- Further strengthen capacity of NGOs working with PWID to reduce needle-sharing and promote effective needle-cleaning within this population.
- Prioritize promotion of condom use, as well as behaviour change interventions and communications aimed at promoting safer sexual practices.

High HIV and HCV prevalence: This study found high HIV prevalence among participating PWID (8.5%) compared to the general population prevalence of 0.6%. In addition, one in five (20.6%) of PWID sampled were found to be infected with HCV.

- Emphasize reduction of needle sharing and promotion of safe injection practices in order to prevent the continued transmission of these viruses.

Services targeting PWID available and accessible: The majority of respondents reported that services are accessible whenever they are needed and many stated that they received services including VCT, STI and harm reduction through organizations such as ZAYEDESA, ZANGOC, and ZYF.

- Continue to strengthen harm reduction programs, HIV prevention interventions and facility-based health-related services aimed at the PWID population through these recognized channels.

Men who have Sex with Men (MSM)

A total of 19 MSM participated in three FGDs, an additional six MSM were interviewed one-on-one (IDIs) and 21 completed the socio-demographic survey although only 20 agreed to testing. In addition, five KIIs were conducted with people familiar with this population.

1. Socio-demographic Characteristics

Qualitative interviews and a short demographic survey found that there is an MSM population in Pemba but that the members of this population are very hidden making the size of the population difficult to estimate. Key informants estimated that there are between 30 and 60 MSM in Pemba, while most MSM who participated in this survey reported knowing between 5-16 other MSM. The maximum number of MSM an individual reported knowing was 40.

Participants estimated that MSM in Pemba range in age from young teenagers to 70 years with the majority of participants estimating that MSM are older teenagers up to 30 years of age. Of the 21 men who completed the short socio-demographic survey, the median age was 24 years. The majority of MSM in Pemba are from Pemba with a few coming from Unguja and mainland Tanzania (Tanga and Dar es Salaam). In Pemba MSM are referred to as Mahanisi, wasenge, mabasha, and ma-anti.

The MSM network in Pemba does not appear to be cohesive, but rather made up of smaller subgroups divided into those who engage in sex with other men for pleasure or out of necessity, and those who are receptive or insertive partners. MSM in Pemba communicate by phone and see each other multiple times per day or week during the evenings or at night. The most commonly reported meeting places were around the streets and at bars and other venues.

2. Risk Behaviours and HIV Prevalence

Sex work among MSM in Pemba seems to be relatively common, with nearly half (47.0%) of those who completed the socio-demographic survey (n=21) reporting having engaged in sex work.

MSM in Pemba reported low and inconsistent condom use. Trust was mentioned as the main factor influencing condom use. One participant said he uses condoms with clients but not his wife, while another said he uses condoms with clients because he does not trust them. Participants in one FGD said condoms are available but if you use them it shows you do not trust your partner. Several participants reported never having used a condom.

HIV prevalence among the MSM tested in Pemba was 5.0%. No cases of HBV, HCV or syphilis were found.

3. Access to Services

Key informants from supportive institutions reported that they do not have a lot of information on MSM in Pemba, in part due to the fact that connecting with clients is very difficult. One Mkoani-based organization said they operate by networking through a

single MSM client who has accessed their services; currently they only have one MSM client.

Institutions that provide services to MSM estimated that they have served between 10% and 40% of the MSM in their respective districts. Of the MSM who participated in the socio-demographic survey, 57% said they had been tested for HIV in the last 12 months. Fear of being exposed as MSM or of being suspected to have HIV were reported as barriers to uptake of services targeting MSM.

4. Discussion and Recommendations

MSM are very hidden in Pemba: MSM exist in Pemba however they are more hidden and their network is not as cohesive as that of the MSM population in Unguja. This may be attributed to the more conservative culture in Pemba and the fact that there is very little outside influence on the social, religious and cultural norms of the island.

- A repeat rapid assessment among MSM should be considered for the next surveillance round since most other surveillance activities would be difficult to conduct among the largely hidden MSM population in Pemba.

High levels of risky sexual practices: Use of condoms among MSM in Pemba seems to be low and inconsistent. This could be due to the MSM population having inadequate knowledge about HIV and the protective nature of condoms. In addition, there are no outreach services targeting MSM specifically, as most of the outreach services that have been implemented thus far target the more accessible PWID population.

- Scale up condom outlets in Pemba, considering both the public and private sectors.
- Use peer education and outreach programs to disseminate HIV prevention messages and to promote condom use among MSM.

Services targeting MSM are very limited: The stigmatizing nature of being exposed as an MSM in Pemba impacts this population's ability to access services. In addition, there are very few organizations on the island that are attempting to provide MSM with HIV and health-related services.

- Encourage organizations working with other KPAR on Pemba to expand their services to include MSM.
- Enhance HIV knowledge of the community, including the drivers of HIV in Zanzibar.

Female sex workers (FSWs)

A total of 37 FSW participated in four FGDs, an additional seven FSW were interviewed one-on-one (IDIs), 32 completed the socio-demographic survey and agreed to testing. In addition, eight KIIs were conducted.

1. Socio-demographic Characteristics

Key informants estimated that there are between 300 and 800 FSW in Pemba. Focus group participants estimated that SWs in Pemba range in age between 15 and 50 years; the median age of those who completed the socio-demographic survey was 30 years.

The FSW who participated in this study are very well networked and reported knowing between 20 and 300 FSW across different age groups and towns. According to those who were interviewed, the majority of FSW in Pemba are from Pemba. However, some (approximately 30%) reported coming from elsewhere, including mainland Tanzania and Kenya. Participants reported that some men prefer the non-native FSW because they are more open.

FSW reported meeting their clients on the street, at the beach, in bars, and at other venues; a very common meeting place was recently closed down due to police activity. FSW reported serving their clients at discrete hotels or in their homes rather than in more established locations to avoid discrimination.

2. Risk Behaviours and HIV Prevalence

Knowledge about HIV among respondents was relatively high, with 74% of the questions on HIV knowledge in IDIs being answered correctly. However, condom use was reported to be relatively low. Among those interviewed, the majority reported not using a condom with their most recent client because the client did not like condoms and paid extra to not use them. Respondents also reported that condoms are a barrier to building trust with clients and that they are not readily accessible.

Some respondents reported that FSW use or inject drugs and that about half use alcohol.

HIV prevalence among FSW participants tested in Pemba was 18.8%. No cases of HBV, HCV or syphilis were found.

3. Access to Services

Respondents had conflicting opinions about the availability and accessibility of services for FSW in Pemba. However, almost two-thirds (62%) of focus group respondents reported being tested for HIV in the last 12 months and others reported having access to condoms and education on HIV and safe sex, which provides evidence that services are available. Institutions identified as providing services to FSW in Pemba were UMATI, WAMATA, ZAPHA, ZACP, and Wete hospital.

4. Discussion and Recommendations

FSW in Pemba are well networked but difficult to reach: Although high numbers of FSW have been reported in Pemba, there is some difficulty in reaching them since common places for FSW to meet clients include public places that are also frequented by non-SWs. In addition, some FSW serve clients in discrete hotels or in their homes, making them less visible. Harassment by police and conservative Muslims further complicates access to this population.

- Use peer intervention approaches to reach more FSW.
- Sensitize influential people, including religious leaders and police, on the importance of HIV interventions for KPAR.

High levels of risky sexual practices:
Most FSW reported low condom use and some reported drug and alcohol use. This may be the result of a variety of factors including the inability of FSW to negotiate condom use with their clients, limited access to condoms, and FSW clients paying more to not use a condom.

- Organizations working with FSW need to educate FSW about HIV transmission and the importance of condom use, as well as build their capacity to negotiate condom use.
- Currently, FSW in Pemba have limited access to condoms. Condoms need to be made more widely available and accessible.
- Prevention messaging and condom promotion targeting FSW clients must also be implemented.

High HIV prevalence: This study found a very high HIV prevalence among participating FSW (18.8%) compared to the general population prevalence of 0.6%, and the highest among all three populations studied.

- Encourage condom use to prevent the continued transmission of the viruses.

Services targeting FSW are very limited: There were no services designed specifically for SWs in Pemba. Although FSW have benefited from services organized by NGOs and public institutions for other groups, such as PWID, additional services are required to meet this population's specific needs.

- Initiate interventions for SWs in the institutions that already work with other KPAR to include condom negotiation skills and condom distribution.

RESULTS FOR UNGUJA

This chapter presents biological and behavioural findings for PWID, MSM and SWs in Unguja. The chapter is divided into separate sub-sections for each population that present:

- the population size estimate;
- socio-demographic characteristics;
- risk behaviours;
- experiences with stigma and violence;
- access to and uptake of HIV prevention and other HIV-related services,
- prevalence of HIV, HBV, HCV, and syphilis;
- risk factors associated with HIV;
- comparison of 2007 and 2011 key findings
- a brief discussion of the findings and their programmatic and policy implications for HIV prevention and services among the KPAR.

The text and most figures provide the weighted proportion estimates as percentages, while tables additionally show the number of respondents and 95% confidence intervals around each weighted proportion estimate.

People who inject drugs (PWID)

From March to May 2012, 408 PWID enrolled in the survey. Of these, only 7 (1.5%) were female. Unless otherwise stated, results presented in this section combine responses from both male and female participants.

1. Population size estimate

Table 1 below describes the different methods used to estimate the size of the PWID population in Unguja. The panel of experts presented with all the results adopted the estimate of 3,000 as the most plausible estimate of PWID in Unguja Island. The estimate represents 0.6% of the population of Zanzibar over the age of 15 years.

Table 1. Population size estimates of PWID living in Unguja, Zanzibar by estimation method.

	Estimate	Notes
Unique object multiplier	3,381	• 95% CI 2,623 – 4,138 • 453 green bags distributed • 13.4% (RDSAT-adjusted) reported receiving a bag during the 2011/2012 survey
Services multiplier	-	• Service data not available
Recapture of 2007 RDS survey participants	2,819	• 95% CI 2,122 – 3,516 • 17.7% (RDSAT-adjusted) reported during the 2011/2012 survey that they had participated in the 2007 survey
Wisdom of the crowds	475	• Min 15 • Max 1,500,000
Literature review	4000	
Modified Delphi	3000	• Min 200 • Max 5,000

2. Socio-demographic characteristics

The median age of PWID was 32 years. The age distribution of the study population is show in figure 1 below.

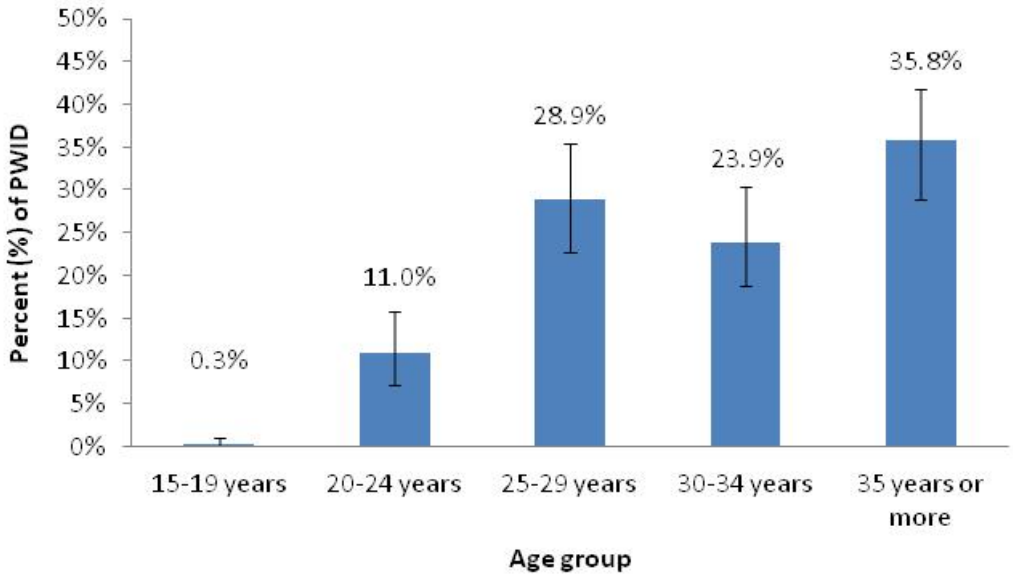


Figure 1. Age distribution of PWID, Unguja, 2011/2012

More than half of PWID (55.7%) completed at least some primary school education while 39.2% completed at least some secondary school education (Figure 2).

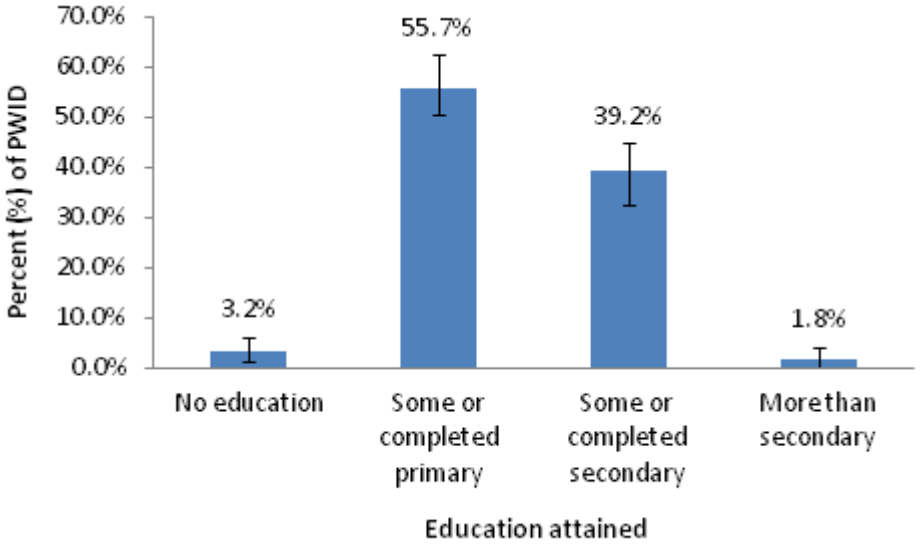


Figure 2. Education levels among PWID, Unguja, 2011/2012

More than half of PWID (58.0%) had never been married and the majority (63.1%) reported that they were living with their families (Figure 3).

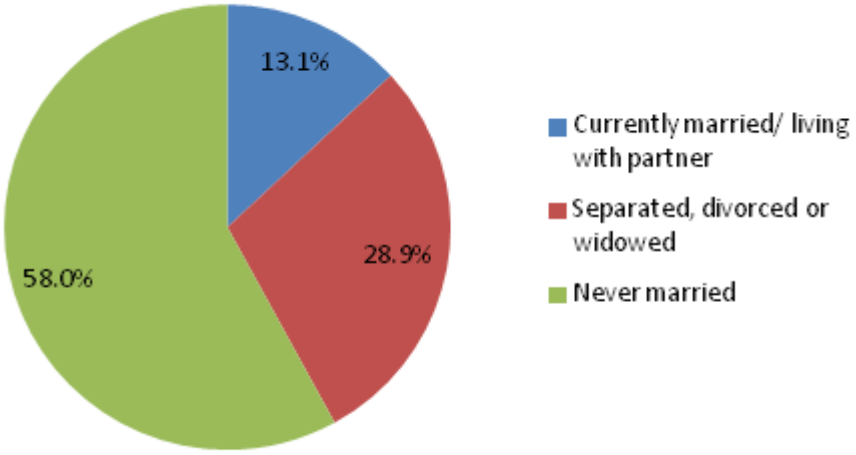


Figure 3. Marital status among PWID, Unguja, 2011/2012

About one-fifth (19.4%) of PWID lived alone and 11.8% reported living with a spouse or partner. Only a small proportion (1.7%) reported having no fixed address (Figure 4).

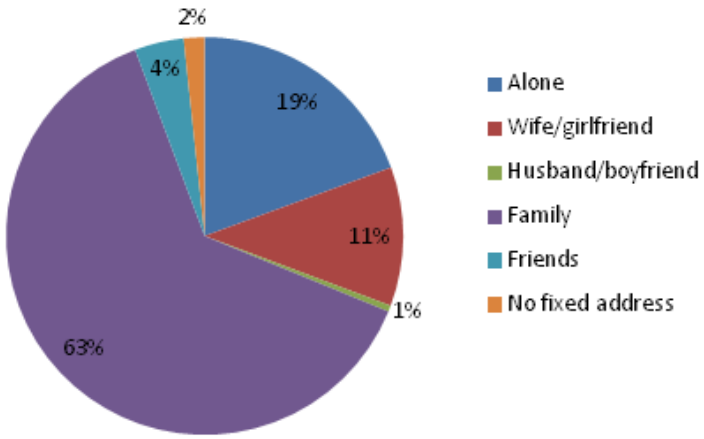


Figure 4. Living situation among PWID, Unguja, 2011/2012

PWID reported earning a median monthly income of 450,000 Tanzanian Shillings (TZS), ranging from 3,500 TZS to 12,000,000 TZS. The majority of PWID (89.9%) reported earning money through self-employment (e.g. private business, service or tourism, petty trade or working as a driver or musician). Approximately, one-tenth (9.4%) of PWID reported earning money through illegal activities such as selling sex or drugs,5.4% reported being formally employed (e.g. private business, government sector, teaching),and 1.2%were currently studying or unemployed (Table 2).

Table 2. Socio-demographic characteristics of PWID, Unguja, 2011/2012

Socio-demographic characteristics	Crude N	Percent[≠]	95% CI[≠≠]

Age			
15-19 years	1	0.3	0.0, 1.0
20-24 years	38	11.0	7.1, 15.7
25-29 years	100	28.9	22.7, 35.5
30-34 years	103	23.9	18.8, 30.4
≥ 35 years	166	35.8	28.9, 41.7
Median age in years (Inter-quartile range (IQR)		32 years(IQR: 28-38) Min. 18 – Max. 54 years	
Education			
No education	14	3.2	1.2, 5.9
Some or completed primary	211	55.7	50.3, 62.5
Some or completed secondary	179	39.2	32.3, 44.8
More than secondary	4	1.8	0.2, 3.9
Sex			
Male	401	98.5	97.6, 99.8
Female	7	1.5	2.0, 2.4
Marital Status			
Currently married/living with partner	47	13.1	9.0, 18.1
Separated, divorced or widow	142	28.9	22.8, 33.9
Never married	219	58.0	52.3, 64.9
Current living situation			
Alone	86	19.4	14.7, 23.9
Wife/girlfriend	43	11.3	7.3, 16.1
Husband/boyfriend	3	0.5	0.0, 1.2
Family	252	63.1	56.9, 69.1
Friends	14	4.0	1.8, 6.8
No fixed address	10	1.7	0.7, 3.1
Ways of earning money			
Employed	25	5.4	3.1, 8.4
Self-employed	362	89.9	86.2, 93.7
Studying or currently not working	5	1.2	0.1, 1.7
Engaged in illegal activities	48	9.4	6.1, 13.2
Monthly Income TZS			
≤ 50,000	2	2.0	0.0, 5.6
50,001 – 120,000	16	10.9	6.3, 16.4
120,001 – 200,000	18	10.4	6, 16.5
≥ 200,001	187	76.7	68.1, 83.5
Median income		450,000 TZS Min. 3,500 TZS – Max. 12,000,000 TZS	

≠ RDSAT Weighted Population Estimate
≠≠ RDSAT Weighted Population Estimate 95% Confidence Interval

3. Drug use and injection practices

Initiation and duration of injection drug use

The median age at first injection among PWID was 26 years, with age at first injection as young as 12 years and as old as 51 years. Approximately half (47.2%) of PWID reported being introduced to injecting drugs by a friend, while about a quarter (23.8%) were introduced by another drug user who was not a friend. At the time of the survey, 48.0% of PWID had been injecting for 3 years or less, 15.1% had been injecting for 4-6 years and 36.9% had been injecting for 7 years or more. The large majority of PWID (81.9%) reported that at least one family member knows of their injection drug use (Table 3).

Non-injection drug use

Three-quarters of PWID (74.7%) reported using drugs that they did not inject, other than alcohol, within the past three months. Among those who reported non-injection drug use, the most common drug used was smoking marijuana or hashish (56.3%), followed by mixed cocktail (39.0%), taking valium (37.6%), chase the dragon (inhaling heroin) (21.0%), and inhaling cocaine (18.6%). Smaller proportions of PWID reported smoking heroin (13.0%), taking painkillers or prescription drugs (9.0%), smoking crack cocaine (6.2%), and sniffing petrol or glue (2.3%, Table 3).

Injection drug use

In the past three months, the most commonly reported injectable drug used by PWID was white heroin (99.4%). Additionally, 11.2% reported injecting brown heroin. The median amount PWID spent for their last injection (estimated per *kete*[2]) was 1,000 TZS (Table 3).

Nearly all PWID (96.4%) reported injecting several times a day during the past month, although 75.6% reported that they did not prepare drugs with another person in the past month. Only 4.8% of PWID reported practicing “flashblood” or injecting the blood of another user who has drugs in their bloodstream (Table 3).

Using non-sterile needles and access to clean needles

More than half (55.9%) of PWID reported ever having used or provided someone else with a non-sterile needle (e.g., shared a needle). Less than a third (29.1%) injected in the past month with a needle that had previously been used by someone else and at last injection, 71.4% of PWID reported that they had used a new, unused needle (Table 3).

Among those PWID who injected with non-sterile needles in the past month, 52.2% reported always cleaning needles prior to use, 21.9% cleaned needles most of the time, and 23.6% cleaned needles occasionally. Only 2.4% never cleaned used needles (Table 3). Among those PWID who reported ever using a non-sterile needle, three-quarters (76.6%) cleaned the needle with cold water prior to last use of a non-sterile needle. Few PWID reported cleaning the needle with bleach (4.9%) or other substances such as hot water, soap or alcohol (4.3%) the last time they used a non-sterile needle, whereas 14.1% did not clean the needle (Figure 5).

[2] *Kete* is the unit in which drugs for injection are sold in Zanzibar.

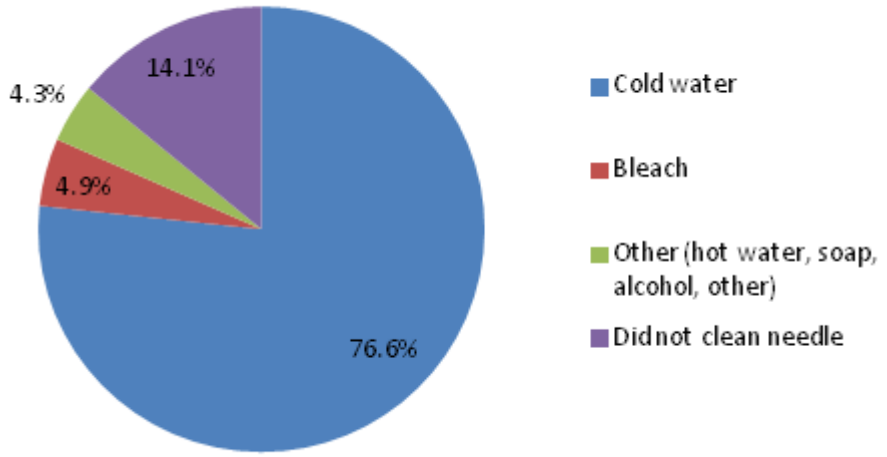


Figure 5. Needle cleaning the last time a contaminated needle was used among PWID Unguja, 2011/2012

The majority (82.9%) of PWID obtained needles from pharmacies, while approximately one in ten (10.5%) obtained needles from private homes known to have clean needles available (Table 3). Just over half (52.1%) of PWID reported being able to obtain a clean needle and syringe whenever needed (Table 3), with the most common barriers to obtaining clean needles being cost (17.6%), vendors being closed or not around when a needle was needed (12.9%), retailers refusing to sell (9.1%) and not needing to obtain a clean needle (8.7%, Figure 6)

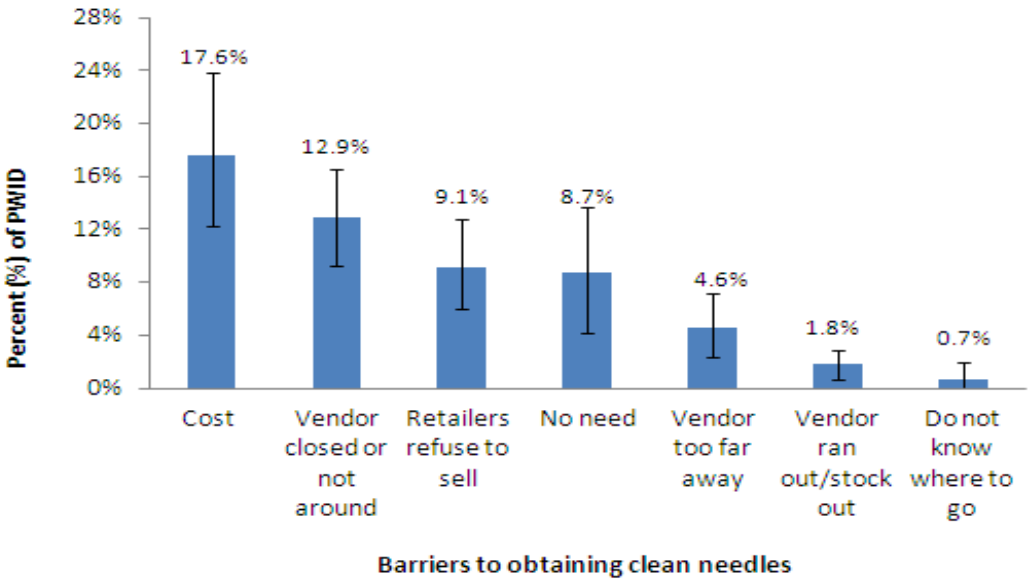


Figure 6. Barriers to accessing clean needles among PWID, Unguja, 2011/2012

Table 3. Drug use and injection practices among PWID, Unguja, 2011/2012

Drug use and injection practices	Crude N	Percent[≠]	95% CI[≠≠]
Non-injection drug use			

Non-injection drug use, other than alcohol, in the past 3 months	316	74.7	68.0, 79.2
Types of non-injection drugs used			
Smoked marijuana/hashish	243	56.3	48.5, 62.2
Inhaled cocaine	65	18.6	13.7, 24.7
Painkillers (prescription drugs)	36	9.0	5.7, 11.8
Smoked heroin	47	13.0	8.4, 18.5
Sniffed petrol or glue	4	2.3	0.1, 3.6
Valium	163	37.6	30.5, 42.9
Smoked crack cocaine	25	6.2	3.5, 9.2
Mixed cocktail	161	39.0	32.6, 45.0
Chase the dragon	87	21.0	16.4, 26.5
Duration of injection drug use			
3 years or less	167	48.0	41.7, 53.8
4-6 years	76	15.1	11.9, 19.0
7 years or more	165	36.9	31.5, 42.5
Median age at first injection		26 years (IQR: 21-30) Min. 12 – Max. 51 years	
Types of drugs injected in the past 3 months			
White heroin	404	99.4	98.3, 100
Brown heroin	49	11.2	7.3, 15.9
Opium	0	NC	NC
Amphetamines	0	NC	NC
Prescription drugs	1	0.3	0.0, 0.5
Ever used or provided someone with a non-sterile needle			
Yes	224	55.9	49.1, 62.8
Injected in the last month with a needle previously used by someone else			
Yes	112	29.1	23.6, 36.2
Used an unused (new) needle at last injection			
Yes	280	71.4	65.9, 76.9
No	128	28.6	23.1, 34.1
Substance used to clean needle at last use of a non-sterile needle (among those who have ever used a non-sterile needle)			
Cold water	159	75.3	66.0, 84.5
Bleach	8	5.3	1.0, 9.7
Other (hot water, soap, alcohol, other)	8	4.9	1.0, 7.9
Did not clean needle/don't know	28	14.6	7.4, 25.5
Frequency of needle cleaning among those who used a needle that had been previously used by someone else in the past 1 month			
Always	60	52.2	39.6, 64.4
Most of the time	29	21.9	11.9, 32.0
Occasionally	30	23.6	13.8, 35.8
Never	3	2.4	0.0, 5.8
Injected blood from someone who had taken drugs in the past one month (flashblood)			
Yes	19	4.8	2.4, 7.6

No	388	95.2	92.4, 97.5
During the past month, injected several times per day			
Yes	394	96.4	93.5, 98.3
Introduced to injectable drugs by			
A friend	223	47.2	41.2, 53.5
Another drug user who was not a friend	72	23.8	19.3, 28.9
Self	70	18.8	13.8, 23.3
Median amount per kete spent on drugs at last injection (TZS)			
		1,000 TZS (IQR: 1,000 – 1,000) Min. 1,000 – Max. 2,000 TZS	
Preparation of drugs			
Did not prepare drugs with another person in the last month	307	75.6	69.6, 81.1
Most common place for obtaining needles in the past month			
Pharmacy	332	82.9	78.6, 87.9
Health establishment	0	NC	
Drug seller	13	3.2	1.3, 5.6
Fellow drug user	9	2.3	0.9, 3.9
Outreach health workers/peer educators	3	1.1	0.0, 2.6
Private home known to have clean needles	51	10.5	6.7, 13.9
Able to obtain a clean needle and syringe whenever needed			
Yes	219	52.1	45.2, 58.4
Barriers to obtaining clean needles			
Cost	67	17.6	12.3, 23.8
Vendor was either closed or not around when needle was needed	71	12.9	9.2, 16.5
Preferred size not available	1	0.1	0.0, 0.2
Vendor ran out/stock out	13	1.8	0.7, 2.9
Vendor too far away	20	4.6	2.4, 7.2
Do not know where to go	2	0.7	0.0, 1.9
No need	21	8.7	4.2, 13.7
Retailers refuse to sell	31	9.1	6.0, 12.8
Family member knows of respondent's injection drug use			
Yes	342	81.9	76.1, 86.8

≠ RDSAT Weighted Population Estimate
≠≠ RDSAT Weighted Population Estimate 95% Confidence Interval

4. Sexual risk behaviours

PWID were asked about their sexual practices with three different types of sex partners: non-paid sexual partners, paid partners, and partners who paid PWID for sex. Questions about sexual risk were generally asked about anal or vaginal sex with male and/or female partners; therefore, responses were not disaggregated by gender or sexual preference. Among male respondents, only 3.0% (N=9) reported they had also participated in the survey of MSM, and six of the respondents reported also participating in the SW survey (Table 4).

Sexual partners

Over half (52.7%, Figure 7) of all PWID reported having any sexual partner in the past month (male or female, paid or non-paid), with 20.9% of those reporting two or more sexual partners in the past month (Table 4). Approximately one-third (34.9%, Figure 7) of PWID reported having sex with a non-paid partner in the past one month. Among those, 30.2% reported only one non-paid partner, 4.8% reported two or more non-paid partners and all reported having sex with a steady partner (Table 4). Among PWID who had sex with a steady partner in the past month, 21.5% also paid for sex and 14.3% sold sex in that time period (Table 4). One-fifth of all PWID (22.2%) reported paying a man or a woman for sex in the past one month, and 8.4% reported selling sex (Figure 7).

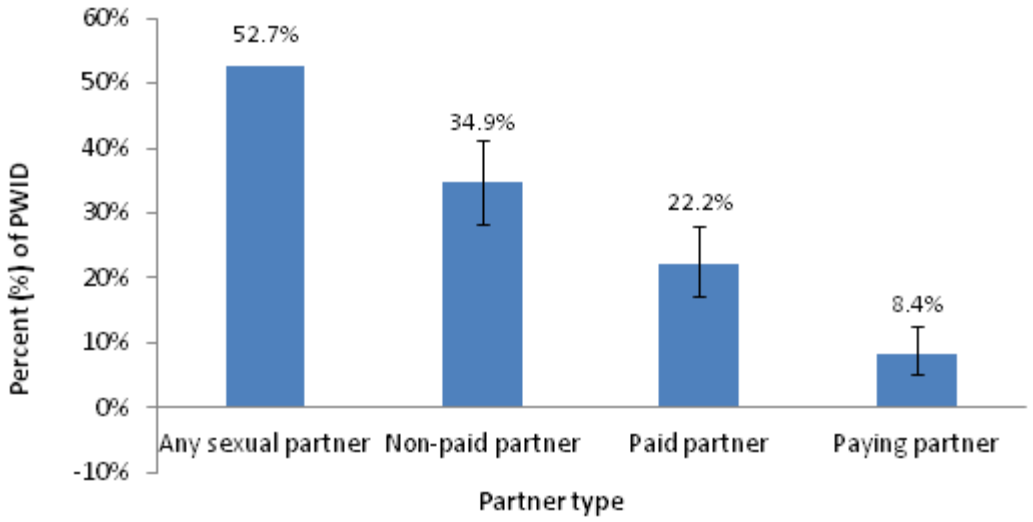


Figure 7. Reported sexual partners among PWID in the past month, Unguja, 2011/2012

Condom use

Less than two-thirds of PWID (60.3%) had ever used a male condom and among those, condom use varied by partner type (Table 4). Among PWID who reported having sex with a non-paid partner in the past month, 71.0% never used a condom. Condoms were always or inconsistently used 53.0% and 65.6% of the time with paid partners and paying partners, respectively (Figure 8).

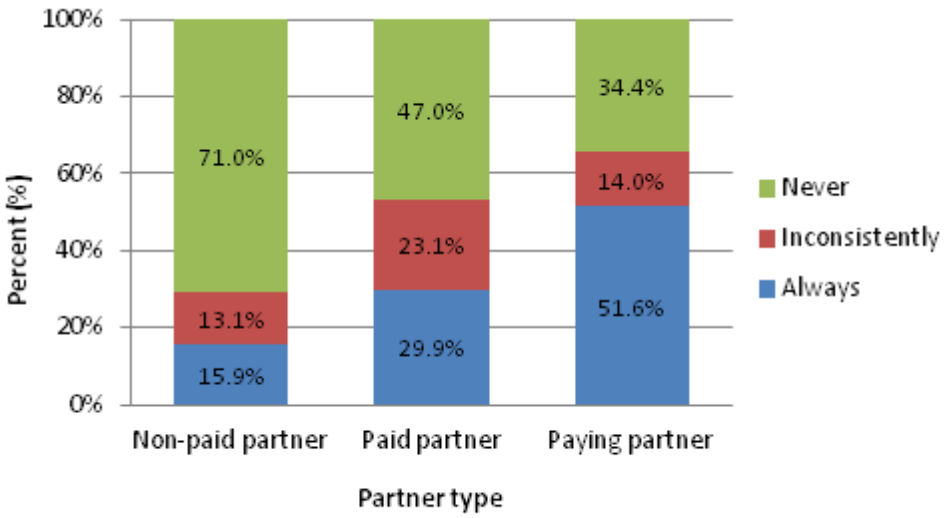


Figure 8. Frequency of condom use among PWID in the past month, by partner type, Unguja, 2011/2012

Nearly three-quarters of PWID (71.9%) reported they were able to get a male condom when needed. However, more than a quarter (26.1%) of PWID stated that they "never needed" a male condom (Table 4).

In the past month, PWID most frequently obtained condoms from shops (12.6%), pharmacies (11.6%), friends (8.1%) and bars/guest houses/hotels (7.4%). Only 5.7% and 1.0% of PWID reported obtaining condoms from NGOs and from health facilities, respectively. Very few (1.8%) PWID had ever used a female condom (Figure 9).

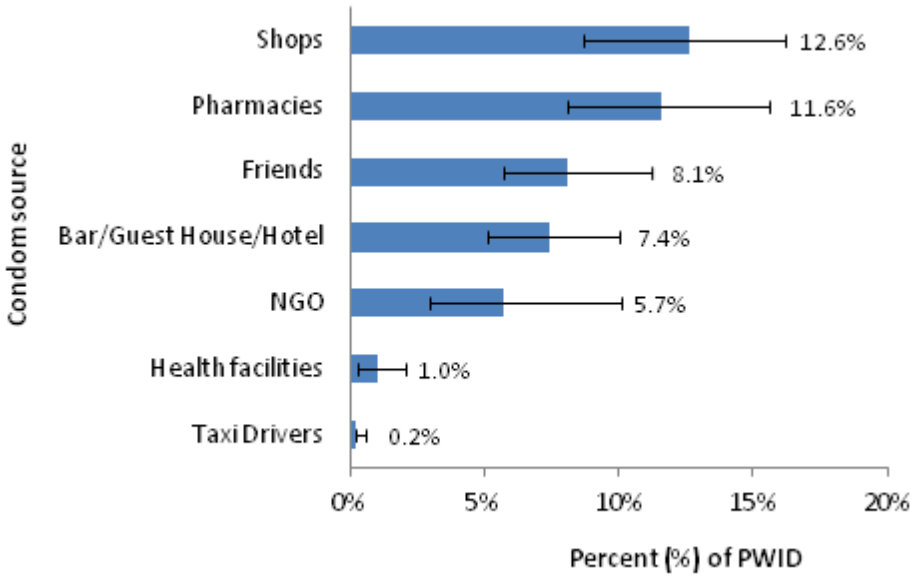


Figure 9. Sources of condoms in past month among PWID, Unguja, 2011/2012

Table 4. Sexual risk behaviours among PWID, Unguja, 2011/2012

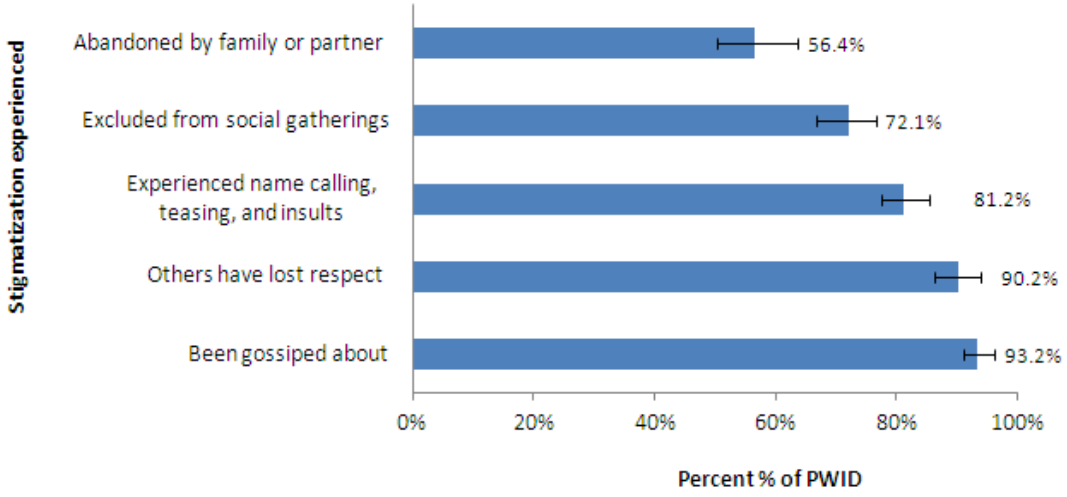
Sexual behaviours	Crude N	Percent[≠]	95% CI[≠≠]
Non-paid sex in past month with a man or woman			
Yes	147	34.9	28.4, 41.4
No	261	65.1	58.7, 71.6
Condom use at last sex with a non-paying partner among those who had a non-paying partner			
Yes	68	14.4	10.2, 18.2
No	297	75.6	70.9, 80.7
Never had sex with a non-paying partner	42	10.0	6.5, 14.0
Number of non-paid partners in past month			
0	26	65.0	58.4, 71.5
1 partner	117	30.2	24.1, 36.3
2 or more partners	29	4.8	2.9, 7.3
Median number of past month non-paid sex partners		1 partner (IQR: 1 – 1) Min. 1 – Max. 5 partners	
Frequency of condom use with non-paid partners in past month			
Always	23	15.9	8.3, 23.0
Inconsistently	24	13.1	7.4, 20.3
Never	100	71.0	62.4, 80.0
Among those who had sex with a steady partner in the past month			
Also paid for sex	34	21.5	14.9, 29.2
Also sold sex	29	14.3	18.1, 21.6
Paid a man or woman for sex in past month			
Yes	93	22.2	17.1, 28.1
No	315	77.8	71.9, 82.9
Number of women paid for sex in past month			
0	318	78.5	72.4, 83.5
1	41	10.3	6.8, 14.2
2 or more	48	11.2	7.3, 16.5
Number of men paid for sex in past month			
0	393	97.2	94.7, 98.9
1	7	1.7	0.3, 3.5
2 or more	7	1.2	0.3, 2.5
Frequency of condom use with paid sex partners among those who paid for sex in the past month			
Always	26	29.9	18.3, 41.5
Inconsistently	24	23.1	14.3, 34.0
Never	42	47.0	34.7, 59.0
Sold sex in the past month			
Yes	44	8.4	5.3, 12.5
No	364	91.6	87.5, 94.7
Number of women who paid participant for sex in past month			
0	385	96.0	92.7, 98.2
1	14	3.3	1.1, 6.3

2 or more	4	0.7	0.0, 1.8
Number of men who paid participant for sex in past month			
0	376	94.4	92, 96.8
1	21	4.1	2.2, 6.2
2 or more	10	1.5	0.5, 2.6
Frequency of condom use with paying sex partner among those who sold sex			
Always	17	51.6	31.3, 71.8
Inconsistently	10	14.0	3.8, 26.3
Never	17	34.4	17.9, 52.3
Ever used a male condom			
Yes	249	60.3	53.7, 66.4
No	158	39.7	33.6, 46.3
Can always get a male condom when needed			
Yes	299	71.9	66.2, 77.7
No	10	1.9	0.6, 3.8
Never needed one	99	26.1	20.5, 31.6
Ever used a female condom			
Yes	6	1.8	0.3, 3.8
No	401	98.2	96.2, 99.7
Where condoms were obtained from in the past month			
Shops	50	12.6	8.7, 16.2
Pharmacies	41	11.6	8.1, 15.6
Health facilities	4	1.0	0.3, 2.1
Bar/Guest House/Hotel	25	7.4	5.1, 10.0
Friends	32	8.1	5.7, 11.2
Taxi Drivers	1	0.2	0.0, 0.6
NGO	23	5.7	3.0, 10.1

≠ RDSAT Weighted Population Estimate
≠≠ RDSAT Weighted Population Estimate 95% Confidence Interval

5. Stigma and physical abuse

More than half (56.4%) of PWID reported that they had been abandoned by their family or partner as a result of their drug use (Figure 10). The majority of PWID had also experienced other forms of stigma including being the subject of gossip (93.2%), others having lost respect for them (90.2%), name calling, teasing and insults (81.2%), and being excluded from social gatherings (72.1%, Figure 10).



]

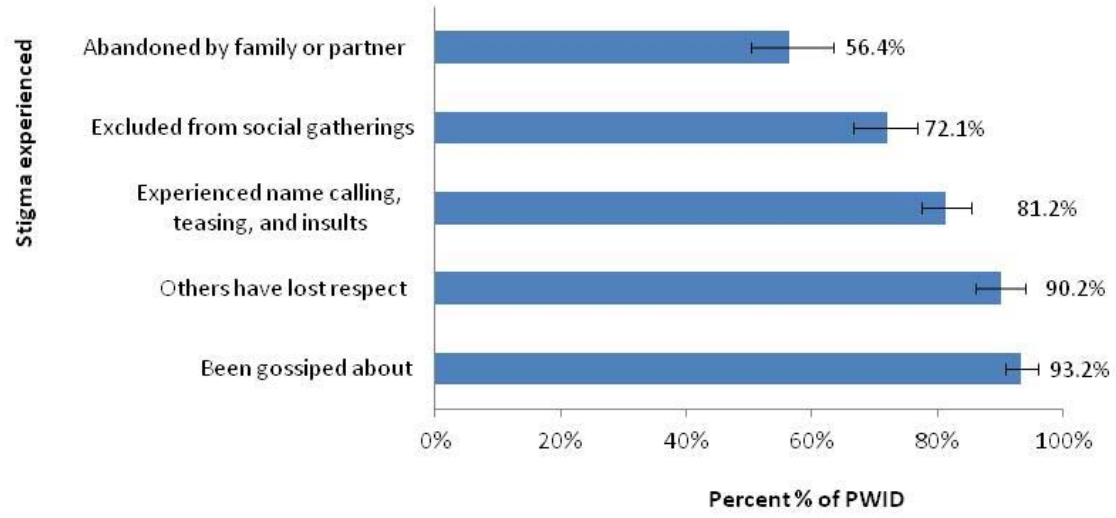


Figure 10. Forms of stigma reported by PWID, Unguja, 2011/2012

More than half of PWID (59.7%) reported being physically abused in the past 12 months (Table 5),Of these, 38.9%of PWID stated that an unknown person beat them, 21.3% stated friends beat them and 21.3% stated police beat them (Figure 11).

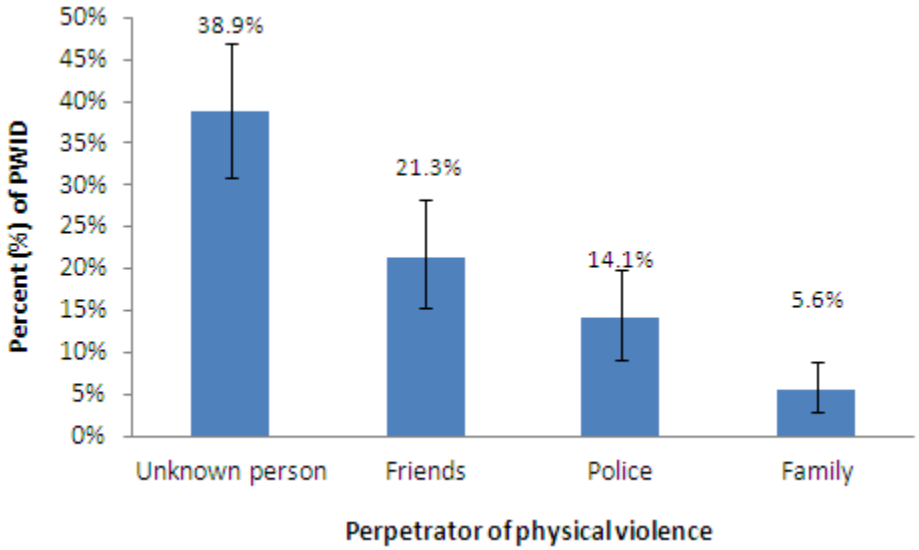


Figure 11. Proportion of PWID who were physically abused by perpetrator type, Unguja, 2011/2012

Two-thirds of PWID (66.1%) had been arrested in the past year (Table 5). Among these, 43.2% reported drug use as the reason for their arrest followed by 14.8% reporting theft and 9.6% reporting loitering as reasons for being arrested (Figure 12).

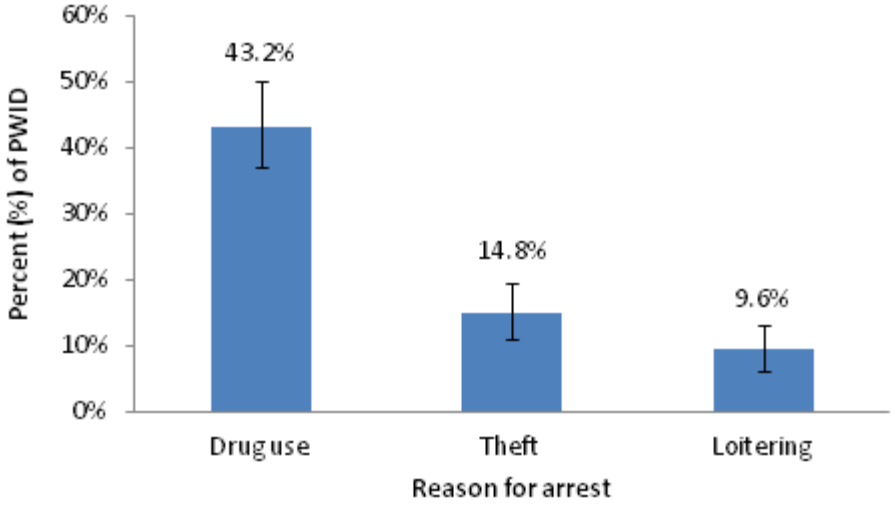


Figure 12. Reasons for arrest among PWID arrested in the past year, Unguja, 2011/2012

Table 5. Physical abuse, incarceration and stigma among PWID in Unguja, 2011/2012

Physical abuse, incarceration and stigma	Crude N	Percent≠	95% CI≠≠
Physically beaten in the past 12 months			
Yes	234	59.7	53.5, 65.7
Physically beaten by type of perpetrator			
Police	51	14.1	9.1, 20.0
Friends	57	21.3	15.3, 28.2
Family	17	5.6	2.9, 8.9
Unknown person	77	38.9	30.9, 47.0
Was arrested in the past year			
Yes	269	66.1	60.3, 72.4
Reason for being arrested among those arrested in the past year			
Drug use	171	43.2	36.9, 50.2
Theft	66	14.8	11.0, 19.4
Loitering	39	9.6	6.2, 13.1
Experiences of stigma as a PWID			
Experienced name calling, teasing and insults	337	81.2	77.5, 85.3
Excluded from social gatherings	298	72.1	66.7, 76.7
Been gossiped about	383	93.2	90.9, 96.0
Others have lost respect	369	90.2	86.1, 93.9
Abandoned by family or partner	253	56.4	50.4, 63.5

≠ RDSAT Weighted Population Estimate

≠≠ RDSAT Weighted Population Estimate 95% Confidence Interval

6. Access to PWID-focused services

Almost a third (28.1%) of PWID reported visiting a clinic or drop-in centre that specifically provides health services to PWID in the past 12 months. Among these, 99.2% reported staff were friendly and non-judgmental (Table 6).

The most common service received at a clinic or drop-in centre was an HIV test (20.2%), followed by information on STI or HIV transmission or prevention (18.4%), general counselling from a peer or professional counsellor (14.2%) and receiving condoms (11.9%). A smaller percentage of PWID (7.5%) reported receiving bleaching kits from clinics or drop-in centres (Figure 13).

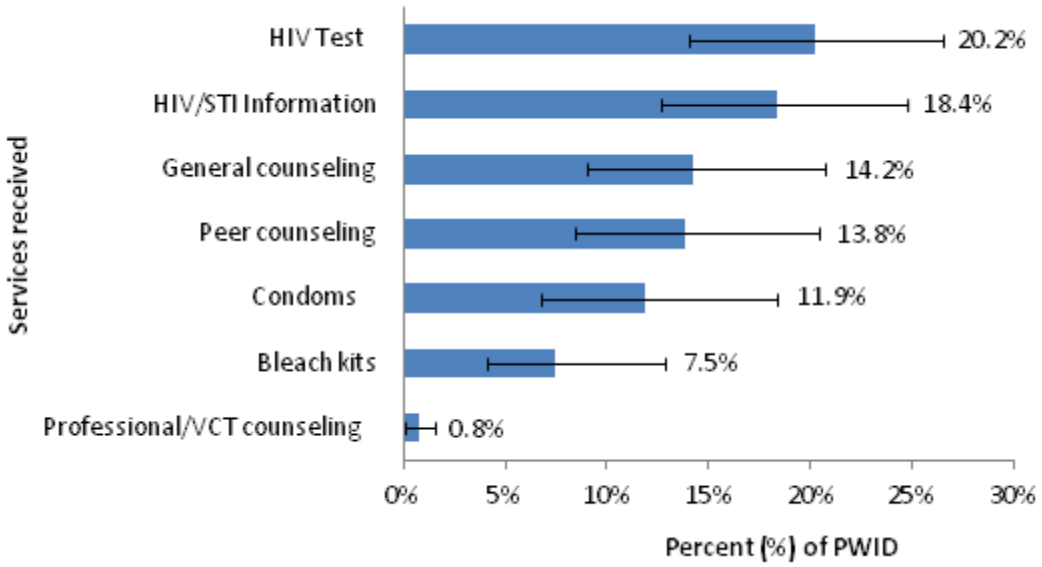


Figure 13. Services received from clinics or drop-in centres among PWID, Unguja, 2011/2012

More than two-thirds (70.8%) of PWID reported some contact with a health peer educator in the past 12 months and of these, 98.7% indicated that the peer educator was friendly and non-judgmental (Table 6). More than half (57.0%) of PWID received general STI or HIV transmission or prevention information from a peer educator and almost one-third (31.7%) received condoms. Other services PWID received include home HIV tests (15.5%), bleach kits (14.0%), and referrals for VCT (11.5%). A very small percentage of PWID reported receiving a referral for TB screening or receiving lubricant (1.0% and 0.2%, respectively, Figure 14).

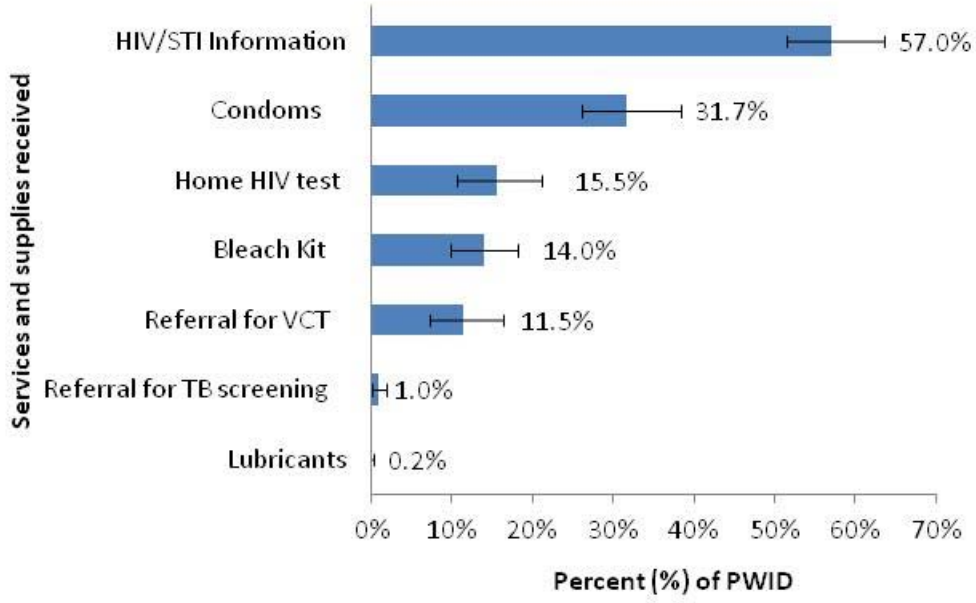


Figure 14. Services and supplies received from peer educators among PWID, Unguja, 2011/2012

Table 6. Access to services among PWID in Unguja, 2011/2012

Access to Services among PWID	Crude N	Percent≠	95% CI≠≠
Visited a clinic or drop-in centre in the last 12 months			
Yes	110	28.1	21.6, 34.7
No	296	71.9	65.3, 78.4
Services received at clinic or drop-in centre among all respondents			
Received Condoms	48	11.9	6.8, 18.4
Information on STI or HIV transmission or prevention	75	18.4	12.7, 24.8
HIV Test	67	20.2	14.0, 26.5
Bleach Kit	36	7.5	4.1, 12.9
General counselling from a peer counsellor and/or professional/VCT counsellor	52	14.2	9.0, 20.7
Staff were friendly and non-judgmental among respondents who visited a clinic or drop-in centre in the past 12 months			
Yes	110	99.2	97.6, 100
No	2	0.8	0.0, 2.4
In contact with a health peer educator in the past 12 months			
Yes	293	70.8	65.3, 76.8
No	114	29.2	23.2, 34.7
Services and supplies received from peer educator among all respondents			
General STI or HIV transmission or prevention information	248	57.0	51.5, 63.6
Condoms	151	31.7	26.1, 38.5
HIV test at home	55	15.5	10.7, 21.1
Lubricant	1	0.2	0.0, 0.4
Referral for STI Treatment	0	NC	NC
Referral for VCT	44	11.5	7.3, 16.4
Referral for PMTCT or Family Planning	0	NC	NC
Referral for TB screening	6	1.0	0.2, 2.0
Bleach Kit	71	14.0	9.9, 18.1
Peer educators friendly and non-judgmental among respondents who met a peer educator in the past 12 months			
Yes	279	98.7	97.0, 100
No	4	1.3	0.0, 2.7

≠ RDSAT Weighted Population Estimate

≠≠ RDSAT Weighted Population Estimate 95% Confidence Interval

7. HIV and STIs

STI History

In regards to STI history, 16.8% of PWID reported having genital or anal sores or ulcers in the past six months (Table 7).

HIV knowledge, risk perception and testing

All survey respondents reported having heard of HIV prior to the survey and 91.3% disagreed that one can tell that an individual is HIV-infected just by looking at them. Knowledge about sexual risks for HIV transmission varied: 88.0% of PWID agreed that having one faithful, uninfected partner reduces the risk of HIV; 78.3% agreed that using condoms during vaginal sex prevents HIV; and 69.2% agreed that using condoms during anal sex prevents HIV. While nearly all PWID (99.2%) agreed that sharing needles increases HIV risk, only two-thirds (66.0%) agreed that cleaning needles reduces HIV risk (Table 7).

More than half (56.9%) of PWID believed themselves to be at high risk for HIV infection based on their current behaviours. However, 30.1% reported themselves to be at no risk for HIV infection (Figure 15).

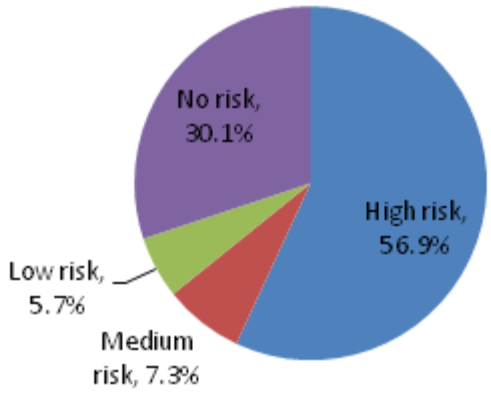


Figure 15. Risk perception among PWID, Unguja, 2011/2012

Among those who believed themselves to be at some risk, the majority (70.9%) attributed their risk to the fact that they inject drugs while 26.2% attributed their risk to the fact that they use contaminated needles. Fewer PWID felt at risk for HIV because of their sexual behaviours: 17.5% felt they were at risk for HIV infection because they do not always use a condom, 12.2% believed they were at risk because they have sex with other PWID and 7.1% attributed their risk to frequently changing sex partners (Figure 16).

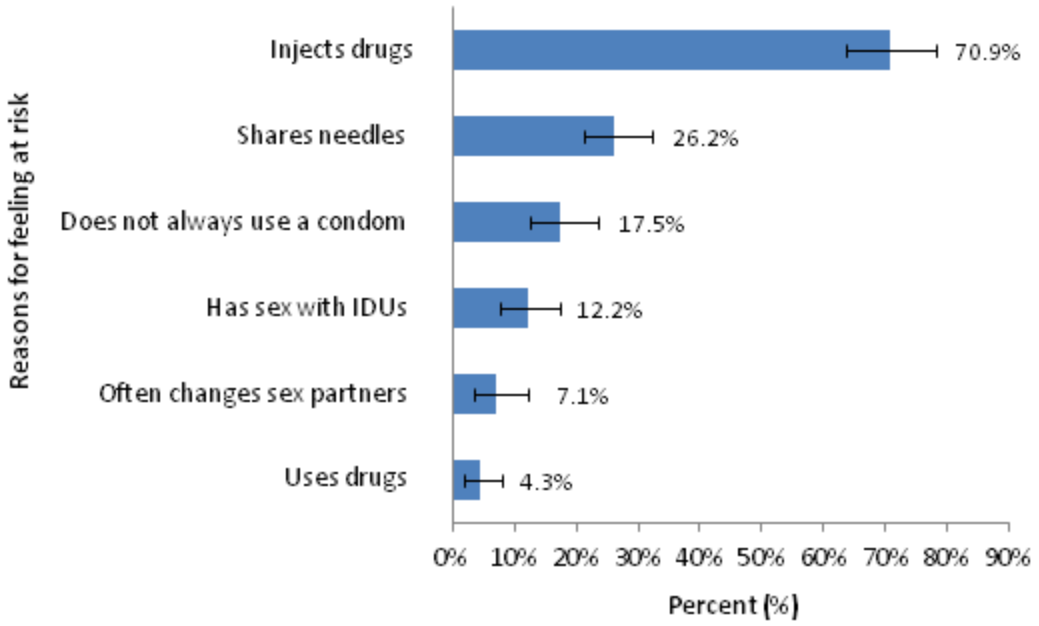


Figure 16. Reasons for feeling at risk of HIV infection among PWID who felt they had some risk, Unguja, 2011/2012

The majority of PWID (85.8%) reported that they know where to go for a confidential HIV test. More than two-thirds (68.3%) had ever been tested prior to the survey and 38.0% of PWID had been tested and received their results in the past one year (Table 7).

Table 7. HIV knowledge, risk perception and testing among PWID, Unguja, 2011/2012

HIV knowledge, testing and risk perception	Crude N	Percent≠	95% CI≠≠
HIV knowledge			
Ever heard of HIV	408	100	
Agrees having one faithful uninfected partner reduces HIV risk	367	88.0	83.5, 92.0
Agrees that using a condom during vaginal sex prevents HIV	326	78.3	73.4, 83.3
Agrees that using condoms during anal sex prevents HIV	294	69.2	63.9, 75.6
Agrees that using a contaminated needle increases HIV risk	405	99.2	98.0, 100
Agrees that cleaning needles reduces risk	282	66.0	59.4, 72.4
	375	91.3	87.6, 94.8
Disagrees that mosquitoes and other insect bites will transmit HIV	299	73.7	67.9, 79.5
Disagrees that one can get HIV from public toilets Disagrees that one can get HIV from public toilets	282	69.4	63.8, 74.8
Risk perception based on current behaviour			
High risk	232	56.9	50.0, 63.7
Medium risk	42	7.3	4.6, 10.4
Low risk	31	5.7	3.5, 8.2
No risk	99	30.1	23.7, 36.5
Reasons for feeling at risk of HIV infection among those who felt at risk			
Multiple sex partners	24	7.1	3.3, 12.3
Inconsistent or infrequent condom use	88	17.5	12.4, 23.6
Uses drugs	14	4.3	1.7, 8.1
Injects drugs	216	70.9	63.7, 78.1
Shares needles	121	26.2	21.2, 32.3
Has sex with PWID	38	12.2	7.5, 17.5
HIV testing behaviours prior to survey			
Knows where to go for a confidential HIV test	363	85.8	81.0, 90.3
Ever tested for HIV	293	68.3	61.3, 74.3
Never tested for HIV	115	31.7	25.8, 38.7
Tested for HIV and received results in the past year	149	38.0	31.2, 45.2
STI symptoms (genital or anal sores/ulcers) in the past 6 months			
Yes	64	16.8	12.5, 21.8
No	344	83.2	78.2, 87.5

≠ RDSAT Weighted Population Estimate

≠≠ RDSAT Weighted Population Estimate 95% Confidence Interval

HIV prevalence among PWID was 11.3%; prevalence of HBV was 5.9%; HCV was 25.4% and syphilis was 0.8% (Figure 17, Table 8).

HIV, HBV, HCV, and syphilis prevalence and risk factors

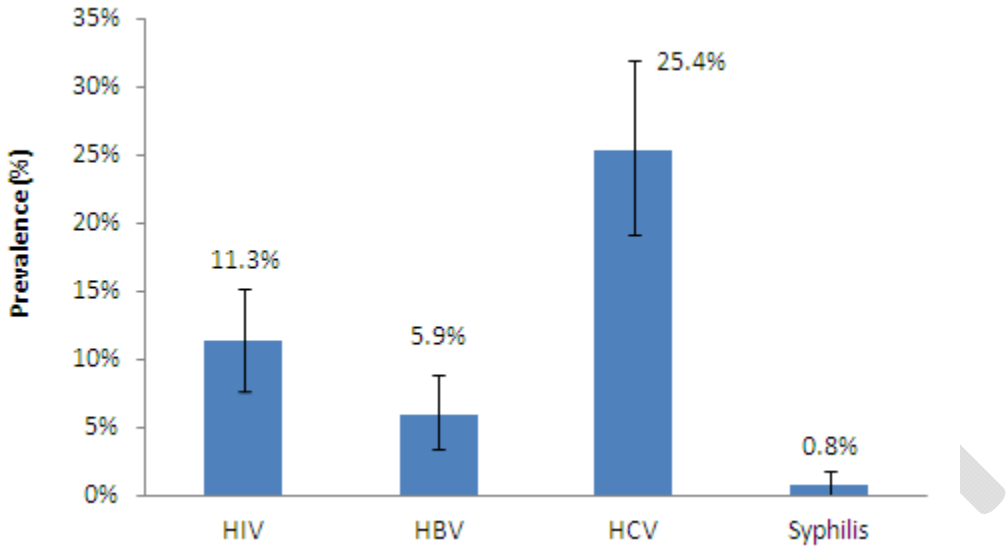


Figure 17. Prevalence of HIV, HBV, HCV, and syphilis among PWID in Unguja, 2011/2012

Table 8. Prevalence of HIV, HBV, HCV, and syphilis among PWID in Unguja, 2011/2012

Disease prevalence	Crude N	Percent≠	95% CI≠≠
HIV			
Positive	67	11.3	7.7, 15.2
Negative	341	88.7	84.8, 92.3
HBV			
Positive	25	5.9	3.5, 8.8
Negative	383	94.1	91.2, 96.5
HCV			
Positive	128	25.4	19.1, 32.0
Negative	280	74.6	68.0, 80.9
HIV/HCV co-infection			
Infected with HIV and HCV	47	6.9	4.0, 10.3
Syphilis			
Positive	3	0.8	0.0, 1.8
Negative	405	99.2	98.2, 100.0

≠ RDSAT Weighted Population Estimate

≠≠ RDSAT Weighted Population Estimate 95% Confidence Interval

HIV prevalence was higher among older PWID, with 16.1% of those 35 years or older being infected with HIV, followed by 10.5% of those 30-34 years. The prevalence among 25-29 year olds and 20-24 year olds was lower (6.7% and 6.2%, respectively). None of the PWID between the ages of 15 and 19 were infected (Figure 18).

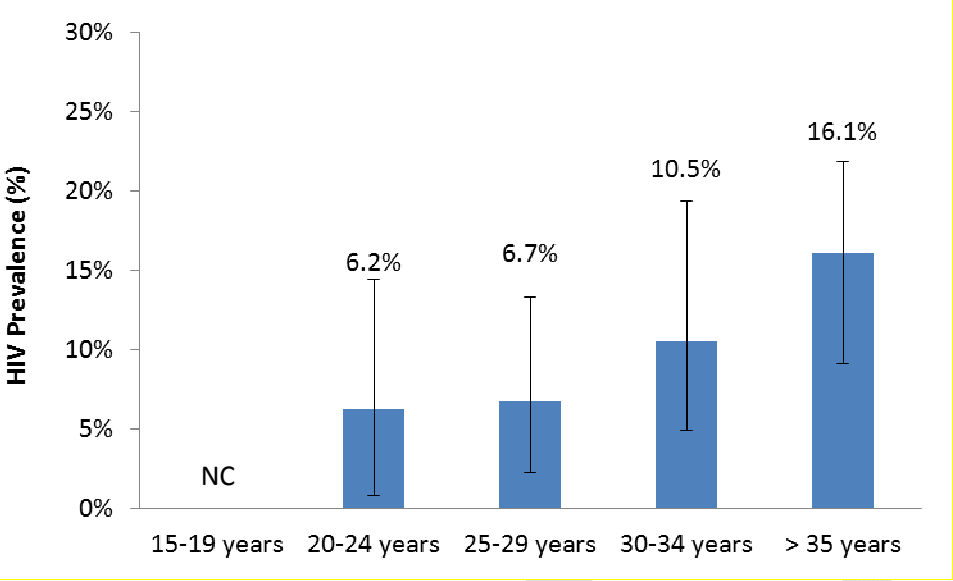


Figure 18. HIV prevalence by age group among PWID, Unguja, 2011/2012

HIV prevalence was highest among PWID who reported no education (21.2%) and decreased with increasing education level, though this trend was not significant. PWID who had at least some primary education had a prevalence of 11.5%, while PWID who had at least some secondary education had a prevalence of 10.0%. None of the PWID with more than a secondary school education were HIV-infected (Figure 19).

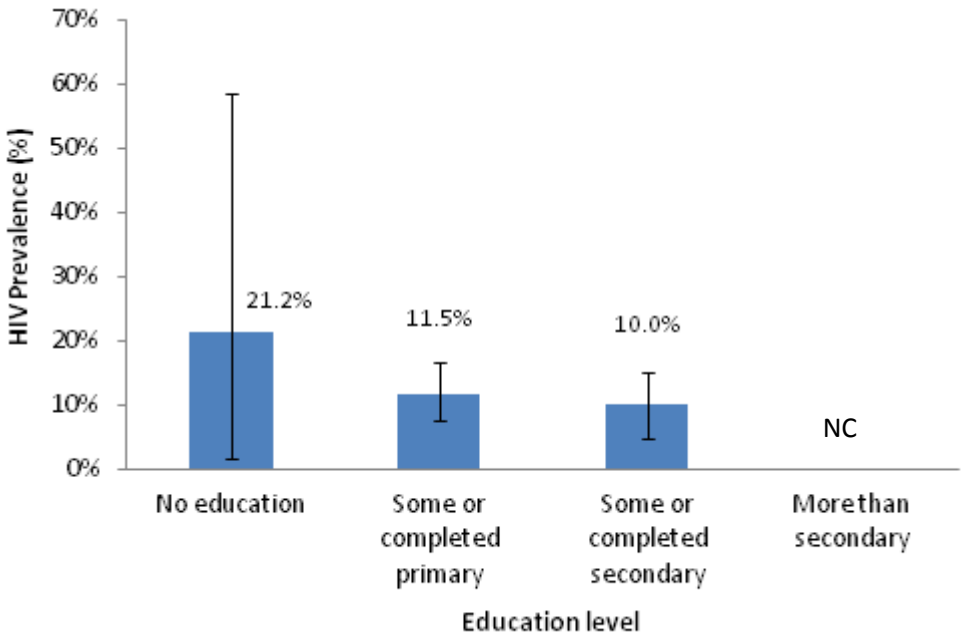


Figure 19. HIV prevalence by education level among PWID, Unguja, 2011/2012

Among those who reported earning money through illegal activities, HIV prevalence was 15.7%. HIV prevalence was slightly lower among those formally employed (12.2%) and self-employed (10.4%, Table 9).

Table 9. Socio-demographic characteristics by HIV prevalence among PWID, Unguja, 2011/2012

Socio-demographic characteristics	Crude HIV-positive (N)	HIV prevalence (%)¥	95% CI¥¥
Age groups			
15-19 years	0	NC (not calculable)	NC
20-24 years	4	6.2	0.8, 14.4
25-29 years	9	6.7	2.2, 13.3
30-34 years	19	10.5	4.9, 19.3
≥ 35 years	35	16.1	9.1, 21.8
Education			
No education	4	21.2	1.7, 58.5
Some or completed primary	38	11.5	7.6, 16.7
Some or completed secondary	25	10.0	4.8, 15.0
More than secondary	0	NC	NC
Ways of earning money			
Formally employed	4	12.2	0.0, 32.8
Self-employed	59	10.4	7.3, 14.7
Studying or currently not working	1	NC	NC
Engaged in illegal activities, including selling sex	10	15.7	5.4, 30.7

¥ RDSAT Weighted HIV Population Estimate

¥¥ RDSAT Weighted HIV Population Estimate 95% Confidence Interval

No significant difference was found in HIV prevalence between those who reported injecting brown heroin (11.3%) and those who reported injecting white heroin (12.5%). HIV prevalence among PWID who had used other drugs that they did not inject, excluding alcohol, in the three months prior to the survey was 10.8% (Table 10).

By age of drug injection initiation, the highest prevalence of HIV was found among those who started injecting between the ages of 25 and 29 years (13.4%), and the lowest prevalence was among those who first injected at 30 years or older (6.7%, Table 10).

Only 6.3% of PWID who reported injecting drugs for 3 years or less were HIV-infected compared to 15.6% of those who had been injecting drugs for 4-6 years and 15.9% of those who reported injecting drugs for 7 years or more (Figure 20).

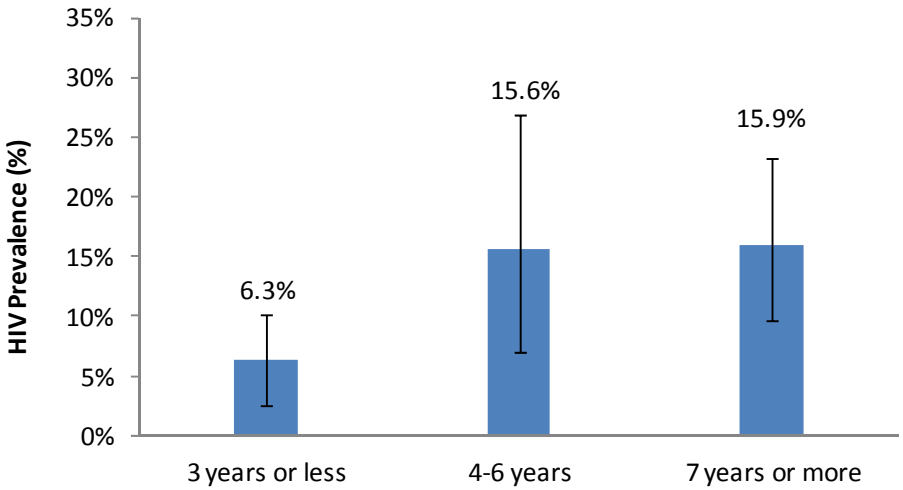


Figure 20. HIV prevalence by duration of drug use among PWID, Unguja, 2011/2012

PWID who had reported ever sharing a needle with someone else had a higher HIV prevalence (15.6%) than those who had never shared a needle (4.7%, Figure 21). Recent needle- sharing behaviours showed a different pattern: 18.3% of those who had not injected in the past month with a needle previously used by someone else were HIV-infected, compared to a prevalence of 14.4% among those who had injected with a used needle (Figure 21). HIV prevalence was 16.9% among PWID who reported that they did not use a new needle at last injection, compared to 9.2% among those who had (Table 10).

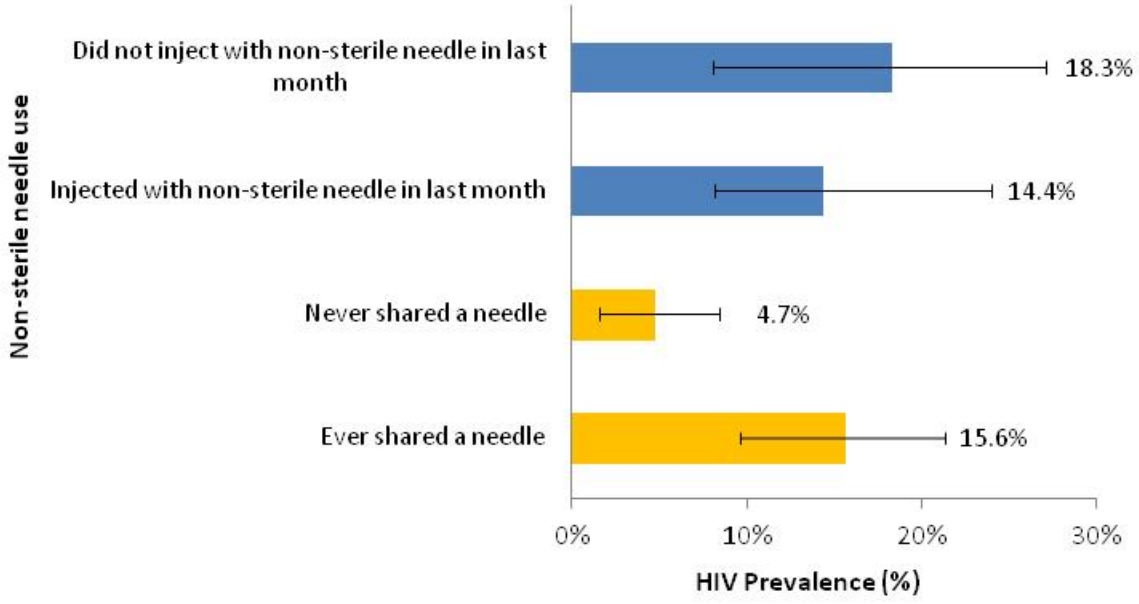


Figure 21. HIV prevalence and use of non-sterile needles among PWID, Unguja, 2011/2012

As sexual and injection-related risk behaviours overlap considerably, it is difficult to assess their respective roles in HIV transmission among PWID. There was little difference in the HIV prevalence between PWID who reported non-paid sex in the past one month with a man or a woman (12.3%) and those who did not (10.9%). Those with one partner had a higher HIV prevalence (12.7%) than those who reported two or more non-paid sex partners (10.2%, Table 10).

A larger percentage of PWID who reported 'always' using a condom with non-paid partners in the past month were HIV-infected (20.6%) compared to those who reported 'never' using a condom with this partner type (13.4%, Table 10). There was little difference in the HIV prevalence between PWID who reported paying a man or a woman to have sex with them in the past month (11.5%) compared to those who had not paid for sex in the past month (11.1%, Table 10). However, PWID who reported using condoms 'inconsistently' or 'never' had a higher HIV prevalence (18.3% and 18.8%, respectively) than those who reported 'always' using a condom with paid partners (Figure 22).

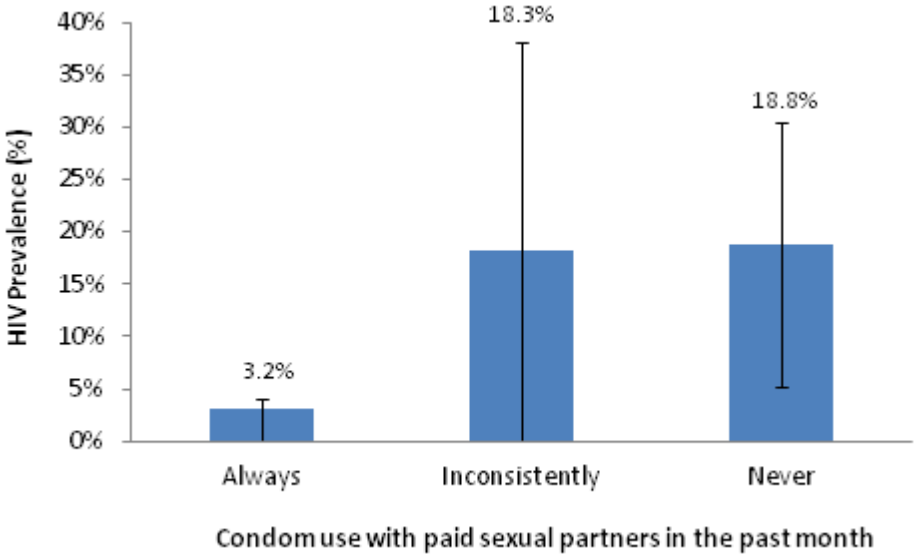


Figure 22. HIV prevalence and condom use with paid sexual partners among PWID, Unguja, 2011/2012

HIV prevalence was higher among PWID who had not been paid for sex in the past month (11.7%) compared to those who had been paid (6.7%, Table 10).

No association was found between HIV prevalence and the number of reported sexual partners in the past month among PWID. Those with two or more partners in the past month had an HIV prevalence of 13.1%, whereas HIV prevalence was 8.7% and 12.0% among PWID who had only one partner or no sexual partners in the past month, respectively (Table 10).

Very little difference was seen in HIV prevalence between PWID who reported ever having had an HIV test (11.2%) and those who had never had one (11.7%) before participating in this survey. HIV prevalence increased with perception of HIV risk behaviours (Table 10). A total of 15.1% of those who considered themselves to be at

'high risk' for HIV infection were found to be infected, followed by 12.3% of those who considered themselves to be at 'medium risk', 5.1% of those who thought they were 'low risk' and 3.4% of those who felt they were not at risk for HIV infection (Figure 23).

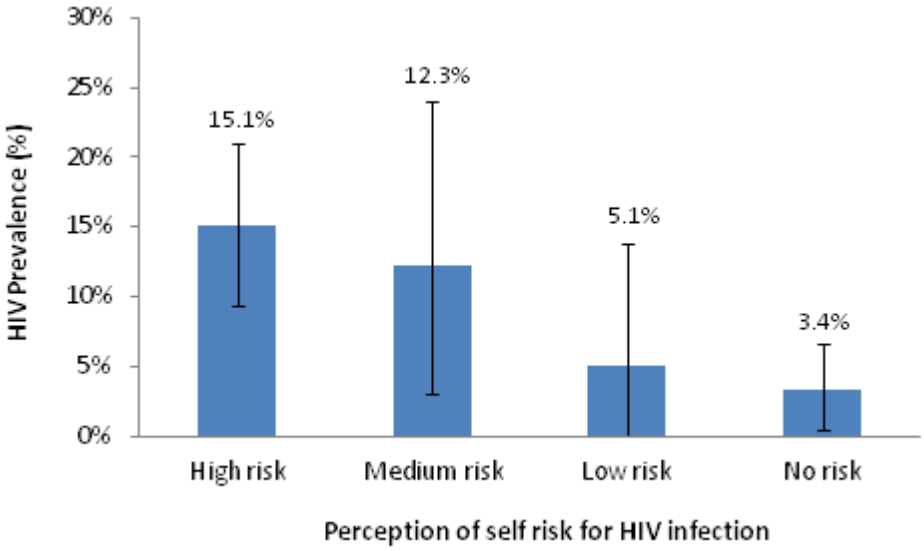


Figure 23. HIV prevalence and perception of risk for HIV infection among PWID, Unguja, 2011/2012

HIV prevalence was higher among PWID who reported being physically beaten in the past 12 months (12.2%) compared to those who had not been beaten in the past 12 months (9.9%, Table 10).

Table 10. HIV prevalence by risk behaviours among PWID, Unguja, 2011/2012

Risk factors	Crude HIV-positive (N)	HIV prevalence (%)[¥]	95% CI[¥¥]
Used any non-injection drug other than alcohol in the past 3 months			
Used non-injection drugs	47	10.8	6.6, 14.7
Types of drugs injected in the past 3 months			
Brown heroin	7	12.5	3.7, 27.1
White heroin	65	11.3	7.6, 15.1
Age at first injection			
≤ 19 years	9	12.1	3.5, 21.5
20-24 years	18	10.6	4.8, 19.2
25-29 years	27	13.4	7.8, 20.2
≥ 30 years	10	6.7	2.4, 11.5
Duration of injection drug use			
3 years or less	14	6.3	2.5, 10.1
4-6 years	15	15.6	7.0, 26.9
7 years or more	38	15.9	9.7, 23.2
Needle-sharing			
Ever shared a needle with someone else	48	15.6	9.7, 21.3
Never shared a needle with someone else	17	4.7	1.6, 8.3
Injected in the past month with a needle previously used by someone else			
Yes	27	14.4	8.2, 24.0
No	22	18.3	8.1, 27.1
Used an unused (new) needle at last injection			
Yes	39	9.2	6.0, 13.5
No	28	16.9	8.8, 24.5
Non-paid sex in past month with man or a woman			
Yes	21	12.3	6.3, 17.6
No	46	10.9	7.2, 15.9
Number of non-paying sex partners in past month			
0 partners	46	10.2	6.9, 15.3
1 partner	18	12.7	6.0, 17.8
2 or more partners	3	10.2	0.0, 32.1
Frequency of condom use with non-paid partners among those who had a non-paid partner in past month			
Always	6	20.6	2.5, 33.1
Inconsistently	1	NC	NC
Never	14	13.4	6.9, 20.8
Paid a man or woman to have sex in the past month			
Paid for sex	12	11.5	5.0,20.2
Did not pay for sex	55	11.1	7.0,15.3

Frequency of condom use with a paid partner among those who had a paid partner in past month			
Always	1	3.2	0.0, 4.0
Inconsistently	4	18.3	0.0, 38.1
Never	7	18.8	5.2, 30.4
Sold sex in past month			
Yes	4	6.7	0.0, 16.9
No	63	11.7	8.0, 15.8
Frequency of condom use with last paying sex partner among those who sold sex			
Always	3	13.1	0.0, 31.0
Inconsistently	1	NC	NC
Never	0	NC	NC
Ever had an HIV test			
Yes	47	11.2	6.9, 15.5
No	20	11.7	6.2, 19.3
Risk perception based on current behaviour			
High risk	49	15.1	9.4, 21.0
Medium risk	8	12.3	3.0, 24.0
Low risk	3	5.1	0.0, 13.8
No risk	6	3.4	0.5, 6.7
Physically beaten in past 12 months			
Yes	41	12.2	7.5, 18.0
No	26	9.9	5.3, 14.8

¥ RDSAT Weighted HIV Population Estimate

¥¥ RDSAT Weighted HIV Population Estimate 95% Confidence Interval

8. Comparison of 2007 and 2011 key findings

The proportion of PWID who reported using a new, unused needle at last injection was high at 71.4% in 2012. Nonetheless, nearly one-third (29.1%) had used a needle previously used by someone else at some point in the past month. Overall, the indicators of injection risk are somewhat improved over levels measured in 2007 when 62.9% (p=0.040) used a clean needle at last injection and 53.8% (p<0.001) had used a previously used needle in the past month. Among PWID who used a needle that had already been used by someone else in the past month, the proportion who reported always cleaning the needle was 52.2% in 2012 compared to 30.0% in 2007, p<0.001 .

Almost half of PWID (48.0%) reported injecting for 3 years or less in 2012, while 36.9% had been injecting for 7 years or more. This is significantly different from the 2007 PWID survey, in which nearly three-quarters (73.2%, p<0.001) had been injecting for 7 years or more and only 7.2% (p<0.001) had been injecting for 3 years or less. The median age at first injection was 26 years in 2012 compared to 20 years in 2007.

The vast majority of PWID in 2012 (85.8%) knew where to go for a confidential HIV test; 68.3% had ever tested for HIV; and over one-third 38.0% had tested for HIV and received their results in the past year. This is significantly different from the 2007 sample when less than half (43.6%) knew where they could get tested (p<0.001) and only 22.0% had ever tested (p<0.001).

HIV prevalence among PWID in 2012 was 11.3%, a figure that is several-fold higher than the general population prevalence of 1%. The figure is not significantly different from the 16.0% prevalence found in the 2007 survey (p=0.14, Table 11).

Table 11. Key findings among PWID. Unguja, Zanzibar. 2007, 2011/2012.

	2007	2011	p-value
Risk behaviours			
Used a clean needle at last injection	62.9%	71.4%	0.040
Used a needle that had previously been used by someone else in the past month	53.8%	29.1%	<0.001
Always cleaned the needle among those who had used a non-sterile needle in the past month	30.0%	52.2%	<0.001
Median age at first injection	20 years	26 years	
Been injecting for 3 years or less	7.2%	48.0%	<0.001
Been injecting for 7 years or less	73.2%	36.9%	<0.001
Access to and uptake of services			
Knows where to get tested for HIV	43.6%	85.8%	<0.001
Ever tested for HIV	22.0%	68.3%	<0.001
Disease prevalence			
HIV prevalence	16.0%	11.3%	0.14

9. Discussion and Recommendations: Persons Who Inject Drugs

Socio-demographic characteristics

Almost half of PWID were "new" injectors

The duration of injection drug use decreased from 2007 to 2011 whereas, the median age at first injection increased. There are several possible explanations for the decrease in duration of injection drug use among PWID. First, there may be an increase in the number of Zanzibaris injecting drugs. Related to this, if the quality of the drug supply has decreased, drug users who previously did not inject may have started injecting in order to achieve the same high. The finding may also reflect a relative decrease in the presence of long-term injectors on the island. For example, increased police activity or sweeps may be more likely to identify and incarcerate the longer-term PWID since they may be more visible. Alternatively, Zanzibar has started treatment programs for PWID, including sober houses which offer 12-step programs to help PWID stop using drugs. Such programs may have more draw for or may be more able to reach longer-term users. Nonetheless, this apparent increase in relatively new injectors merits vigilant attention as it may be a signal of increasing numbers of new PWID and future prevention and care needs for this population. Lastly, it is possible that the two RDS survey rounds recruited somewhat different social networks, as discussed in the overall conclusions below.

Risk behaviours among PWID

High risk injection drug use practices:

Promising is the proportion of PWID who reported using a new, unused needle at last injection was significantly higher in 2011 compared to 2007 and the proportion who used a needle that had been previously used by someone else was significantly lower. Among this group, a significantly larger proportion reported always cleaning the needle before use. Still, more than half of PWID still reported ever having using a contaminated needle and being able to obtain a clean needle whenever they need one. Also, the most commonly reported cleaning agent used to clean needles in between injectors in 2011 was cold water, which does not inactivate HIV, HBV and HCV, and only a very small proportion used bleach to clean their needle after last non-sterile use. These factors still leave a potential risk for using non-sterile needles among some PWID.

- Programs aimed at reducing the use of non-sterile needles and promoting effective needle-cleaning need to continue to be strengthened.

High risk sexual behaviours:

Even though the proportions of PWID engaging in unpaid and paid sex appear to be low, condom use among sexually active PWID is low, providing opportunities for HIV transmission. Also, the increase in HIV prevalence with increased condom usage is alarmingly but unclear. This survey did not include self-reported HIV status, therefore, it is unknown whether HIV status influenced the decision to use condoms and in turn influenced this association.

- Interventions promoting condom use among PWID need to be strengthened and condoms should continue to be distributed by peer educators.
- Brief prevention messages that reinforce the adoption of safe sexual and injection behaviours, including the importance of partner reduction, should be delivered by trained health care providers providing services to PWID.
- Future surveys should include a question on self-reported HIV status so the direction of this association between condom use and HIV prevalence can be more accurately analysed.

Access to and uptake of HIV prevention and other HIV-related services among PWID

HIV testing programs appear to be reaching many PWID:

The vast majority of PWID in 2012 knew where to go for a confidential HIV test and had ever tested for HIV which was significantly higher than the 2007 sample. These encouraging findings may be attributable in part to the increase in facility-based and outreach services targeting PWID throughout Unguja.

- Services targeting PWID should continue to be strengthened and expanded to build upon this success.

PWID report accessing or being reached by PWID-targeted services:

Zanzibar's MOH through ZACP, in collaboration with development partners and local agencies, has effectively rolled out prevention services targeting the PWID population since the 2007 survey was conducted. This is demonstrated in the fact that a third of respondents reported visiting a clinic or drop-in centre that provides PWID services for HIV testing, STI/HIV transmission and prevention information, counselling, or picking up condoms and/or bleach kits in the past 12 months.

Many PWID also reported having had contact with a health peer educator in the past 12 months. PWID reported receiving information on STI or HIV transmission or prevention and condoms. Peer educators also provided HIV tests, bleach kits, and referrals for VCT, and other services.

These findings suggest that PWID are accessing services that are being provided to them – particularly from peer educators. In addition, although it was not a part of this survey, a number of sober houses have opened in Unguja since 2007 that are accessible to PWID. Sober houses provide their clients with a place to live and use 12-step programs to help discontinue drug use. These services, combined with the PWID-targeted, facility-based and peer educator services, may have contributed to the rehabilitation of longer-term injectors an apparent increase in PWID who have been injecting for less than three years.

- Prevention and treatment services targeting PWID should build on past successes and continue to be scaled up and strengthened taking into account the results of the population size estimate.
- Peer educators should also build on past efforts shown to be successful in reaching a large proportion of PWID and further strengthen the provision of important services and health education messages.

- Existing peer educator programs can be used to link PWID to facility-based services.

Prevalence of HIV, HBV, HCV, and Syphilis among PWID

HIV prevalence remains very high among PWID in Unguja. This prevalence is several-fold higher than the general population prevalence but not statistically significantly different from the 2007 population prevalence. HBV and HCV remain substantial syphilis prevalence is low; all are similar to estimates from 2007.

- These figures should be interpreted in the context of net changes in new HIV infections versus AIDS deaths, in and out migration of PWID, initiating and stopping injection of drugs, and potential differences in the samples between the two RDS survey rounds.

Men who have Sex with Men (MSM)

From October to December 2011, 344 MSM were enrolled into the RDS survey.

1. Population size estimate

Table 12 below describes the different methods used to estimate the size of the MSM population in Unguja. The panel of experts presented with all of the results adopted the service multiplier calculation of 2,157 as the most plausible estimate. This estimate represents 0.9% of the male population over the age of 15 years.

Table 12. Population size estimates of MSM living in Unguja, Zanzibar by estimation method

	Estimate	Notes
Unique object multiplier	3,811	• 95% CI 2,659 – 5,319 • 484 blue bags distributed • 12.7% (RDSAT-adjusted) reported receiving a bag during the 2011/2012 survey
Services multiplier	2,157	• 95% CI 1,528 – 2,785 • 645 MSM tested for HIV through the outreach program • 29.9% (RDSAT-adjusted) reported receiving this service in the 2011/2012 survey
Recapture of 2007 RDS survey participants	6,160	• 95% CI 5,268 – 7,052 • 8.1% (RDSAT-adjusted) reported during the 2011/2012 survey that they had participated in the 2007 survey
Wisdom of the crowds	1,200	• Min 10 • Max 70,000
Literature review	-	• Not available
Modified Delphi	850	• Min 370 • Max 6,000

2. Socio-demographic characteristics

The median age of respondents was 23 years, with a minimum of 15 and a maximum age of 62 years. Nearly two-thirds of MSM (61.5%) were younger than 25 years (Figure 23).

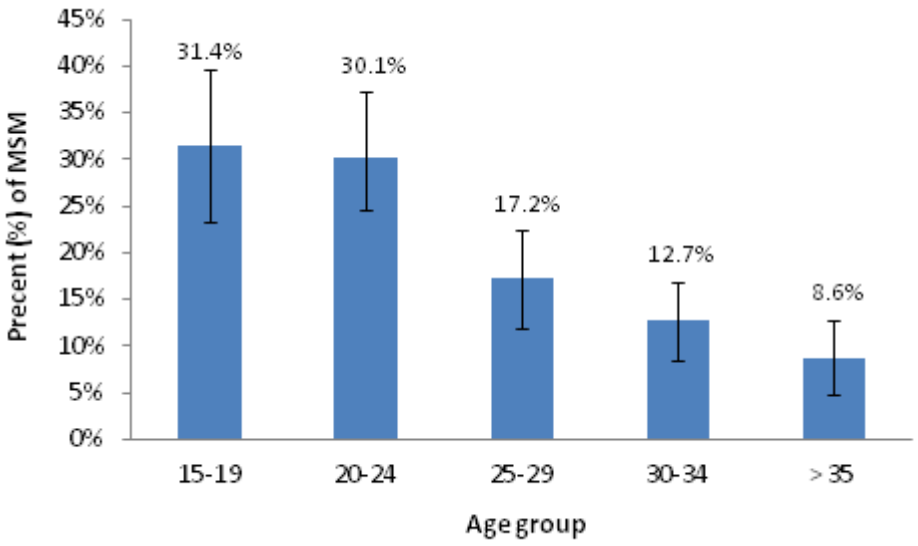


Figure 23. Age breakdown among MSM, Unguja, 2011//2012

The majority (81.6%, Table 13) of MSM had at least some or had completed secondary education, 4.2% had higher than secondary education, and only 0.6% reported having no education (Figure 24).

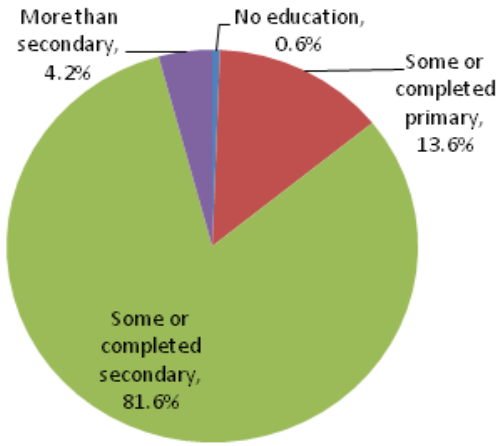


Figure 24. Education levels among MSM, Unguja, 2011/2012

The majority (83.3%) of MSM reported never having been married, whereas 10.9% and 5.8% reported being formerly married (separated, divorced, or widowed) or living with a partner, respectively (Figure 25).

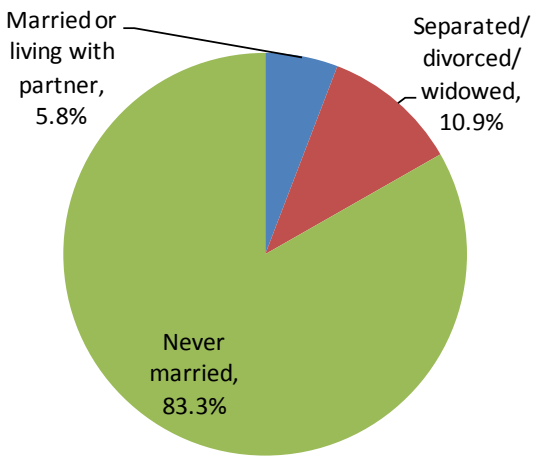


Figure 25.Marital status of MSM, Unguja, 2011/2012

Nearly two-thirds (62.3%) of MSM were living with relatives or family and 21.4% were living alone. A total of 59.3% of MSM reported that they did not have a live-in partner, while 33.5% reported living with a male partner and 7.2% reported living with a female partner (Table 13).

Almost half (44.9%) of MSM reported earning money through informal employment (e.g. musician, self-employed, petty trading) and a slightly smaller percentage (40.6%) reported earning income through formal employment (e.g. private business, government sector, service or tourism, driving, teaching). Approximately one-fourth (26.0%) of MSM were currently studying or unemployed, 7.9% reported earning money through illegal activities such as selling sex or drugs, and 4.6% reported receiving money from family (Table 13).

Slightly more than half (52.6%) of MSM reported earning more than 200,000 TZS per month, followed by 26.8% who earned 120,001 – 200,000 TZS per month, 17.9% who earned 50,001 – 120,000 TZS per month, and only 2.6% who earned 50,000 TZS per month or less (Figure 26).

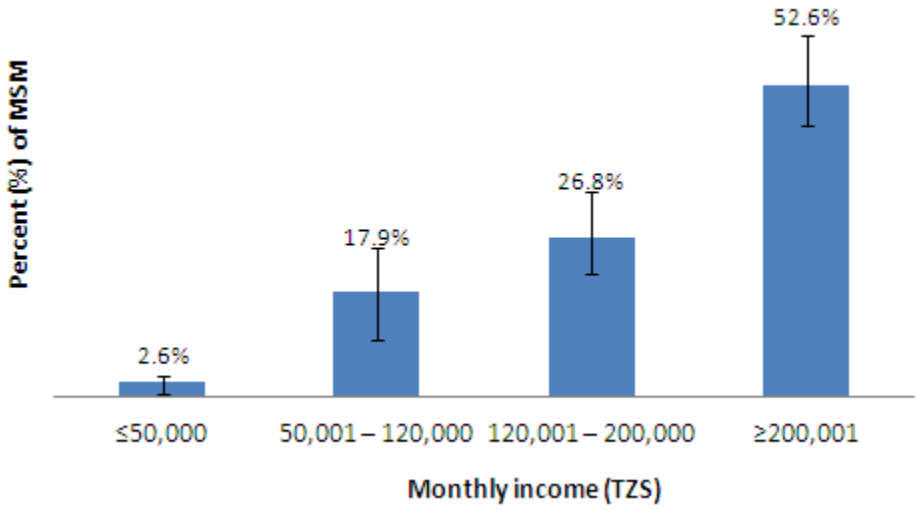


Figure 26. Reported monthly income (in TZS) among MSM, Unguja, 2011/2012

Table 13. Socio-demographic characteristics of MSM, Unguja, 2011/2012

Socio-demographic characteristics	Crude N	Percent[≠]	95% CI[≠≠]
Age (years)			
15-19	87	31.4	23.3, 39.6
20-24	106	30.1	24.6, 37.2
25-29	60	17.2	12.0, 22.4
30-34	46	12.7	8.4, 16.9
≥ 35	45	8.6	4.9, 12.8
Median age in years (IQR)		23 years (IQR: 19-30) Min. 15 – Max. 62 years	
Education			
No education	2	0.6	0.3, 1.3
Some or completed primary	47	13.6	10.0, 17.8
Some or completed secondary	279	81.6	77.0, 85.2
More than secondary	15	4.2	2.4, 6.8
Marital status			
Married or living with partner	24	5.8	3.2, 8.9
Separated/divorced/widowed	41	10.9	7.1, 15.7
Never married	279	83.3	77.6, 87.8
Current living arrangement			
Alone	79	21.4	17.2, 26.2
Wife/girlfriend	20	5.3	3.0, 7.7
Boyfriend	36	8.1	5.6, 11.2
With relatives/family	200	62.3	56.3, 67.7
With friends	9	3.0	1.4, 4.6
Gender of live-in partner			
No live-in partner	189	59.3	52.4, 65.0

Male	126	33.5	28.1, 40.3
Female	29	7.2	4.3, 10.3
Ways of earning money			
Informal (musician, self-employed, petty trading)	148	44.9	34.6, 48.0
Formal (private business, government, employed in private business, service/tourism, driving, teaching)	157	40.6	34.3, 47.6
Unemployed (Student, Currently unemployed)	76	26.0	19.1, 32.4
Illegal activities (Illegal activities, Selling sex, Selling drugs)	33	7.9	5.2, 11.2
Receives money from family	14	4.6	2.1, 7.3
Income (TZS)			
≤50,000	9	2.6	0.6, 3.8
50,001 – 120,000	37	17.9	9.7, 25.1
120,001 – 200,000	65	26.8	20.8, 34.7
≥ 200,001	163	52.6	45.8, 61.0

≠ RDSAT Weighted Population Estimate
≠≠ RDSAT Weighted Population Estimate 95% Confidence Interval

3. Sexual partnerships and risk behaviours

The median age of sexual debut among MSM was 16 years and more than half of MSM (58.8%) reported their first sexual partner to be a man (Figure 27).

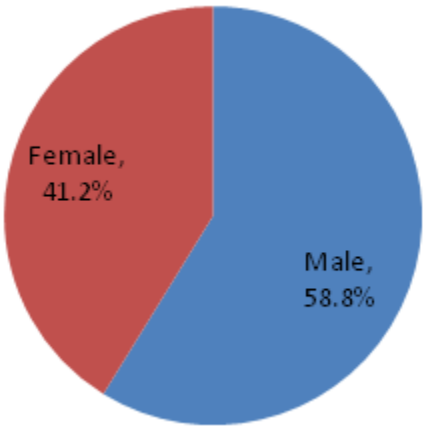


Figure 27. Gender of first sexual partner among MSM, Unguja, 2011/2012

More than half of MSM (59.0%) reported both male and female sexual partners in the past one year, while 41.0% reported exclusively having male partners (Table 14).

Sex in exchange for money was very commonly reported. Among MSM who reported ever paying another man for oral or anal sex (36.4%), 78.7% had paid a man for sex in the past one month. Similarly, among MSM who reported ever selling sex to another

man (86.3%), 92.1% had sold sex to a man in the month prior to the survey. In total, 86.1% of MSM had either paid or sold sex to a man in the past month (Table 14).

Fewer MSM reported exchanging money for sex with female partners. Only 12.2% of MSM reported ever selling sex to a woman. Among those who had ever paid a woman for sex (28.7%), more than half (57.0%) had done so in the past month (Table 14).

Among MSM who reported non-paying male sex partners in the past month, many reported having multiple partners. Almost forty percent of MSM (39.5%) reported having two or more non-paying male insertive sex partners in the past month, compared to 16.4% who reported only one. Nearly half of MSM (47.1%) reported two or more non-paying male receptive sex partners in the past month, while only 10.8% reported a single partner of this type. The median number of male partners in the past month was five (Table 14).

Only 4.5% of MSM had a condom with them at the time of the interview, and condom use at last sex varied by partner type (Table 14). Just over half of MSM (51.5%) used a condom the last time they paid a man for sex, and 48.3% used a condom the last time they paid a woman for sex. Almost half of MSM reported using a condom the last time they were paid by a man for sex and at last receptive anal sex with a non-paying male partner (47.4% and 47.1%, respectively). Condom use was lowest at last insertive sex with non-paying male partners (36.6%, Figure 28). Nearly forty percent (38.9%) of MSM said that they do not use condoms (Table 14).

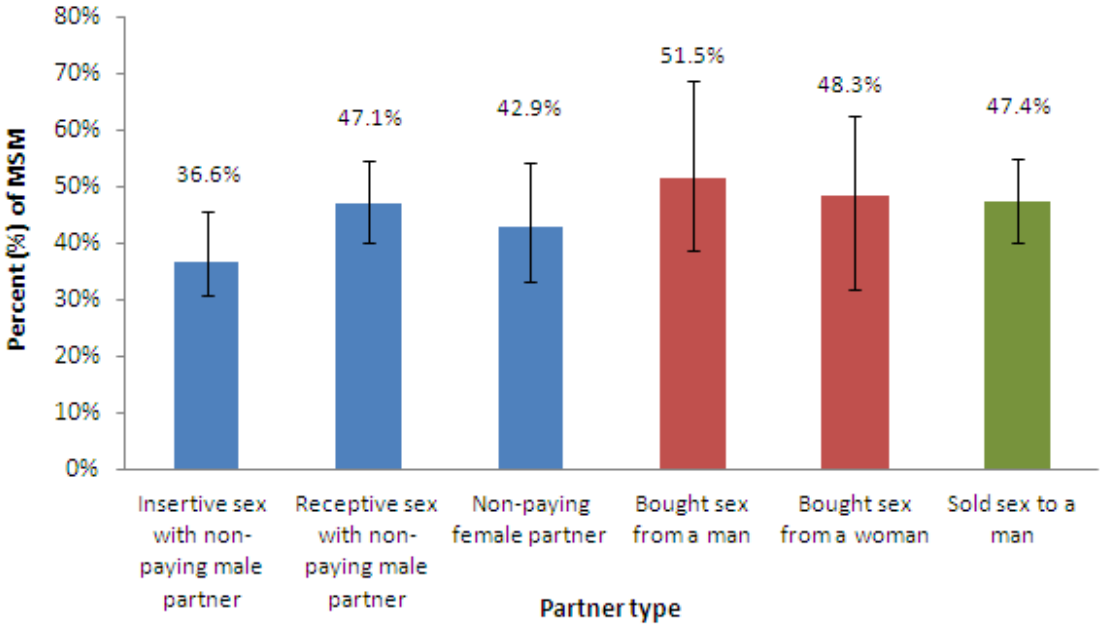


Figure 28. Condom use by type of sexual encounter among MSM, Unguja, 2011/2012

Approximately one-third of MSM (36.2%) reported having ever had sex in a group. Among these, 61.2% reported having group sex in the past one month (Table 14).

The majority of MSM (85.9%) reported ever using lubricant during sex, with more than a third of these (36.5%) reporting using a condom in addition to lubricant the last time they used lubricant during anal sex (Table 14).

Table 14. Sexual behaviours among MSM, Unguja, 2011/2012

Sexual Behaviours	Crude N	Percent[≠]	95% CI[≠≠]
Median age of sexual debut in years (IQR)	16 years (IQR: 14-18) Min. 6 – Max. 28		
Gender of first sexual partner			
Male	225	58.8	52.0, 66.3
Female	118	41.2	33.7, 48.0
Ever paid another man or been paid by another man for sex			
Ever bought sex from another man	131	36.4	30.5, 42.7
Ever been paid by another man for sex	300	86.3	81.4, 90.9
Bought sex in the past one month			
From a man (among those who ever paid a man for sex)	109	78.7	72.1, 93.0
From a woman (among those who ever paid a woman for sex)	96	28.6	22.2, 35.9
Sold sex to a man in the past one month among those who ever sold sex			
Yes	277	92.1	85.7, 95.9
Bought sex or sold sex to a man in the past month			
Yes	301	86.1	80.5, 91.0
Ever paid a woman or been paid by a woman for sex			
Ever bought sex from a woman	96	28.7	22.2, 35.9
Ever been paid by a woman for sex	43	12.2	8.2, 16.7
Number of non-paying male insertive sex partners in past month			
None	137	44.2	35.9, 50.5
1	49	16.4	11.2, 22.3
2 or more	114	39.5	32.7, 48.0
Median number of non-paying male insertive sex partners in past month (IQR)	1 partner (IQR: 0-2) Min. 0 – Max. 20 partners		
Number of non-paying male receptive sex partners in past month			
None	106	42.1	34.6, 49.1
1	45	10.8	6.1, 15.0
2 or more	148	47.1	41.3, 54.9
Median number of non-paying male receptive sex partners in past month (IQR)	1 partner (IQR: 0-3) Min. 0 – Max. 30 partners		
Gender of sex partners in the past year			
Males and females	182	59.0	53.5, 64.2
Exclusively males	158	41.0	35.8, 46.5
Number of non-paid female sex partners in the past month			
None	93	38.0	30.3, 49.4
1	63	34.0	23.5, 40.0
2 or more	47	28.0	19.9, 37.4
Median number of non-paid female sex partners in the past month (IQR)	1 partner (IQR: 0-1) Min. 0 – Max. 30 partners		
Had a condom during interview			
Yes	22	4.5	2.5, 7.0
Condom use at last insertive sex with non-paying male partner			
Yes	105	36.6	30.9, 45.7
No	186	63.4	54.3, 69.1
Condom use at last receptive sex with non-paying male partner			
Yes	132	47.1	40.0, 54.6

No	161	52.9	45.4, 60.0
Condom use at last sex with non-paying female partner			
Yes	75	42.9	33.2, 54.4
No	125	57.1	45.7, 66.8
Condom use at last time paid woman for sex			
Yes	39	48.3	31.9, 62.5
No	51	51.7	37.6, 68.1
Condom use at last time paid man for sex			
Yes	64	51.5	38.8, 68.7
No	64	48.5	31.3, 61.2
Condom use at last time paid by a man for sex			
Yes	145	47.4	40.1, 54.8
No	151	52.6	45.2, 59.9
Condom use at last time paid by a woman for sex			
Yes	25	NC	NC
No	17	NC	NC
Reported not using condoms			
Yes	129	38.9	32.4, 44.7
Total partners in the past month			
Median number of female partners (among those who ever had a female partner)	1 partner (IQR: 0-2) Min. 0 – Max. 39 partners		
Median male partners	5 partners (IQR: 3-8) Min. 0 – Max. 45 partners		
Median total partners	6 partners (IQR: 3.5-9) Min. 0 – Max. 81 partners		
Group sex			
Ever had sex in a group	129	36.2	30.1, 42.3
Had sex in a group in past month (among those who ever had sex in a group)	70	61.2	44.2, 71.8
Use of lubricant			
Ever used lubricant during sex	309	85.9	80.7, 91.0
Used a condom with lubricant (among those who used lubricant during sex)	120	36.5	30.5, 43.0

≠ RDSAT Weighted Population Estimate
≠≠ RDSAT Weighted Population Estimate 95% Confidence Interval

4. Drug use behaviour

Just under forty percent of MSM (39.8%) reported using any drugs other than alcohol in the past three months, and only 1.0% reported injecting drugs in the past three months (Table 15).

Table 15. Drug use behaviours among MSM, Unguja, 2011/2012

Drug use behaviour	Crude N	Percent≠	95% CI≠≠
Drug use other than alcohol in the past 3 months			
Drug use	135	39.8	32.7, 46.2
No drug use *(including those who had never done drugs)*	209	60.2	53.8, 67.3
Injection drug use in the past 3 months			
Yes	4	1.0	0.2, 2.1
No	340	99.0	97.9, 99.8
Used a needle or syringe after someone else used it at last injection			
Yes	2	NC	NC
No	2	NC	NC
Passed needle or syringe to someone else after using it at last injection			
Yes	2	NC	NC
No	2	NC	NC

≠ RDSAT Weighted Population Estimate
≠≠ RDSAT Weighted Population Estimate 95% Confidence Interval

5. Physical abuse, incarceration and stigma

Fewer than half of MSM (41.6%) reported being beaten in the past 12 months, among whom 16.0% were beaten by a family member and 4.4% were beaten by the police (Table 16).

Fewer than fifteen percent of MSM (13.9%, Table 16) had been arrested in the past 12 months. Among these, the most commonly reported reason for arrest was drug use (42.6%), followed by loitering (15.3%), aggravated assault (11.7%), and stealing (8.0%, Figure 29).

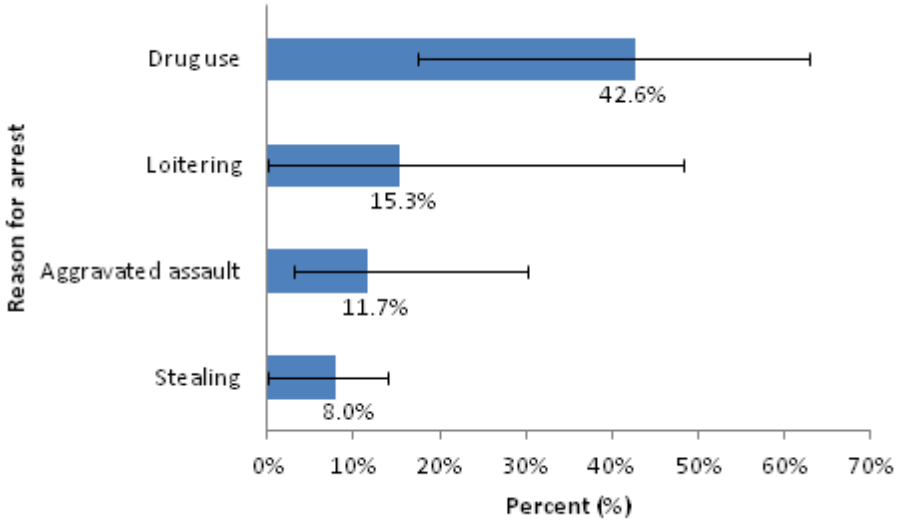


Figure 29. Main reasons for arrest in past 12 months among MSM who were arrested, Unguja, 2011/2012

Table 16. Violence and incarceration among MSM, Unguja, 2011/2012

Violence/incarceration	Crude N	Percent≠	95% CI≠≠
Physical violence in the past 12 months			
Has been beaten in past 12 months	142	41.6	34.6, 49.1
Was beaten by a family member	20	16.0	4.3, 33.8
Was beaten by police	4	4.4	0.0, 13.3
Incarceration in the past 12 months			
Has been arrested in past 12 months	47	13.9	9.2, 18.8
Arrested for stealing	9	8.0	0.0, 14.0
Arrested for drug use	12	42.6	17.4, 62.8
Arrested for aggravated assault	8	11.7	3.1, 30.2
Arrested for loitering	6	15.3	0, 48.3

≠ RDSAT Weighted Population Estimate
≠≠ RDSAT Weighted Population Estimate 95% Confidence Interval

6. Access to services among MSM

Just over ten percent of MSM (13.3%) accessed services through a clinic or drop-in centre targeted for the MSM population, and more than half of MSM (53.6%) were visited by a peer educator in the 12 months prior to the survey (Figure 30).

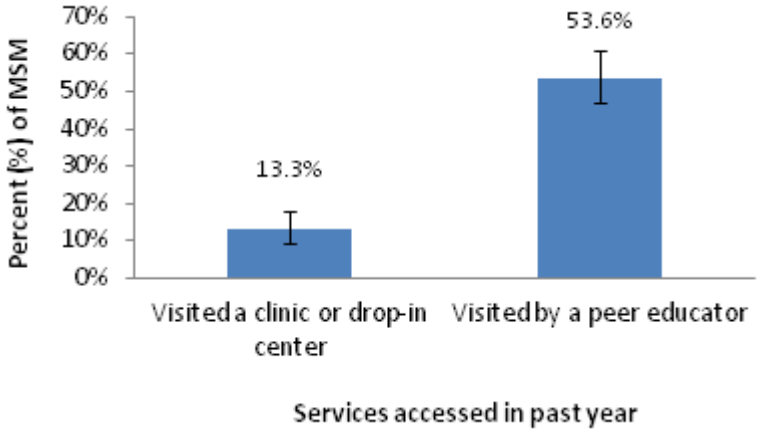


Figure 30. Services accessed by MSM over the past 12 months, Unguja, 2011/2012

The services most commonly received at clinics or drop-in centres were information on STI or HIV transmission or prevention (9.4%), condoms (6.9%) and HIV tests (5.6%). Fewer MSM reported receiving lubricant (2.6%), counselling from a peer counsellor (2.1%), or counselling from a professional or VCT counsellor (1.7%, Figure 31). All of the MSM who reported visiting a drop-in centre or clinic said that the staff were friendly and non-judgmental (Table 17.

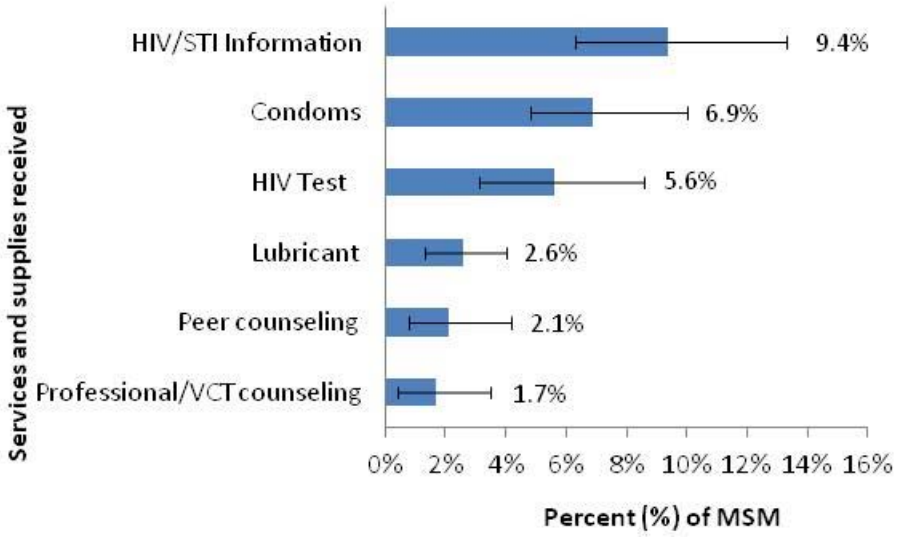


Figure 31. Services and supplies received by MSM at drop-in centres or MSM-friendly clinics over the past 12 months, Unguja, 2011/2012

The service most commonly received from peer educators was general STI or HIV transmission or prevention information, received by just under half of MSM (49.0%). Other services and supplies that MSM received from peer educators included condoms (28.6%) and home HIV tests (14.5%) and, to a lesser extent, lubricants (4.1%), referrals for VCT (3.7%), referrals for TB screening (1.4%) and referrals for STI treatment (0.8%). Nearly all MSM (97.1%) who were visited by a peer educator reported that they were friendly and non-judgmental (Figure 32).

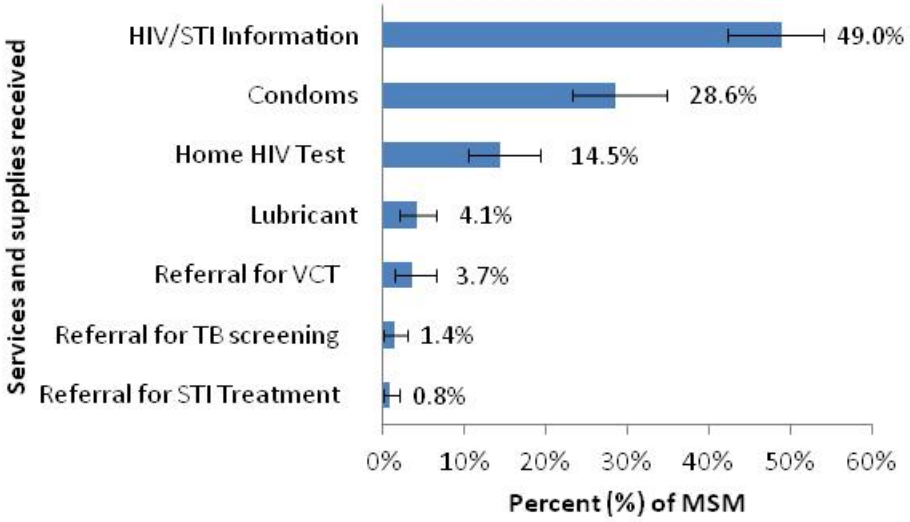


Figure 32. Services and supplies received from peer educators in past 12 months among MSM, Unguja, 2011/2012

Table 17. Access to services among MSM, Unguja, 2011/2012

Access to Services	Crude N	Percent≠	95% CI##
Visited a clinic or drop-in centre in the past 12 months			
Yes	62	13.3	9.4, 18.1
No	282	86.7	81.9, 90.6
Services and supplies received at clinic or drop-in centre among all respondents			
Information on STI or HIV transmission or prevention	44	9.4	6.3, 13.3
Condoms	40	6.9	4.8, 10.0
Lubricant	17	2.6	1.3, 4.0
General counselling from a peer counsellor	14	2.1	0.8, 4.2
Counselling from a professional/VCT counsellor	6	1.7	0.4, 3.5
HIV Testing	21	5.6	3.1, 8.6
Staff were friendly and non-judgmental among those who visited a clinic or drop-in centre			
Yes	62	100	NC
No	0	0.0	NC
In contact with a peer educator in the past 12 months			
Yes	189	53.6	47.0, 60.8
No	154	45.3	38.4, 52.4
Services and supplies received from the peer educator among all respondents			
General STI or HIV transmission or prevention information	169	49.0	42.2, 54.0
Condoms	118	28.6	23.2, 34.9
HIV test in your home	61	14.5	10.4, 19.4
Lubricant	25	4.1	2.0, 6.6
Referral for STI Treatment	2	0.8	0.0, 2.1
Referral for VCT	11	3.7	1.4, 6.5
Referral for TB screening	3	1.4	0.0, 3.0
Bleach Kit	0	NC	NC
Peer educators were friendly and non-judgmental among those who were in contact with a peer educator in the past 12 months			
Yes	188	97.1	95.4, 100
No	1	3.0	0.0, 4.7

≠ RDSAT Weighted Population Estimate

≠≠ RDSAT Weighted Population Estimate 95% Confidence Interval

7. HIV and STIs

STI History

Nearly a quarter of MSM (23.1%) reported having any symptoms of STI (unusual genital discharge or genital ulcers) in the past six months (Table 18).

HIV risk perception and testing

The majority of MSM (65.0%) believed they were at high risk of HIV infection based on their current behaviours (Figure 33). Among MSM who reported feeling any level of risk for HIV infection, the most common reasons were multiple sex partners (70.4%) and inconsistent condom use (67.4%, Table 18).

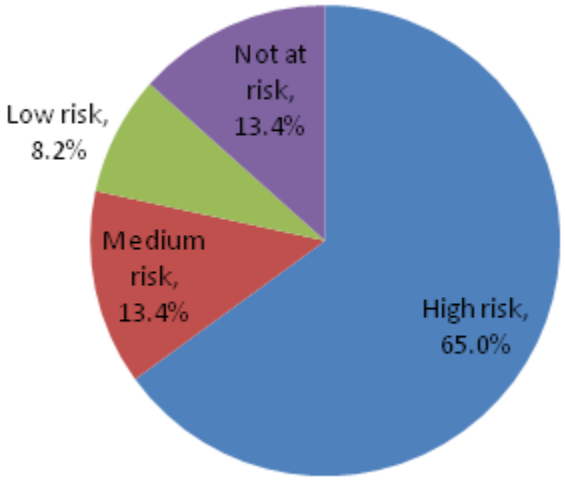


Figure 33. HIV risk perception among MSM based on current behaviours, Unguja, 2011/2012

Over two-thirds of MSM (68.2%) reported ever having an HIV test prior to the survey, and 53.7% of MSM had been tested in the past one year (Table 18).

Table 18. STIs, HIV testing and risk perception among MSM, Unguja, 2011/2012

STIs, HIV testing and risk perception	Crude N	Percent[≠]	95% CI[≠≠]
Risk perception based on current behaviours			
High risk	214	65.0	59.3, 70.8
Medium risk	44	13.4	8.8, 17.7
Low risk	34	8.2	5.0, 11.7
Not at risk	46	13.4	9.3, 18.2
Reasons for feeling at risk			
Multiple sex partners	212	70.4	63.3, 77.1
Inconsistent condom use	191	67.4	59.6, 72.6
Drug use	35	10.7	6.1, 14.4
Sex with sex workers	22	10.4	4.6, 16.5
Sells sex	10	2.4	1.0, 3.9
HIV testing prior to survey			
Ever tested	240	68.2	61.7, 74.8

Never tested	100	31.8	25.2, 38.3
Tested in last year	189	53.7	47.5, 60.2
STI symptoms in the past 6 months			
Yes	78	23.1	17.6, 28.0
No	266	76.9	72.0, 82.5

≠ RDSAT Weighted Population Estimate
≠≠ RDSAT Weighted Population Estimate 95% Confidence Interval

HIV and STI prevalence and risk factors

The prevalence of HIV infection among MSM in Unguja was 2.6%. The prevalence of HBV was 2.7% and the prevalence of HCV was 1.3%. No cases of syphilis were found.

Table 19. Disease prevalence among MSM, Unguja, 2011/2012

Disease prevalence	Crude N	Percent≠	95% CI≠≠
HIV			
Positive	12	2.6	1.0, 4.7
Negative	327	97.4	95.3, 99.0
HBV			
Positive	10	2.7	1.1, 4.7
Negative	329	97.3	95.3, 98.9
HCV			
Positive	5	1.3	0.2, 2.7
Negative	334	98.7	97.3, 99.8
Syphilis			
Positive	0	NC	NC
Negative	339	NC	NC

≠ RDSAT Weighted Population Estimate
≠≠ RDSAT Weighted Population Estimate 95% Confidence Interval

HIV prevalence was highest among MSM aged 35 years or older (6.5%) though this was not significantly different from HIV prevalence among other age groups (Figure 34).

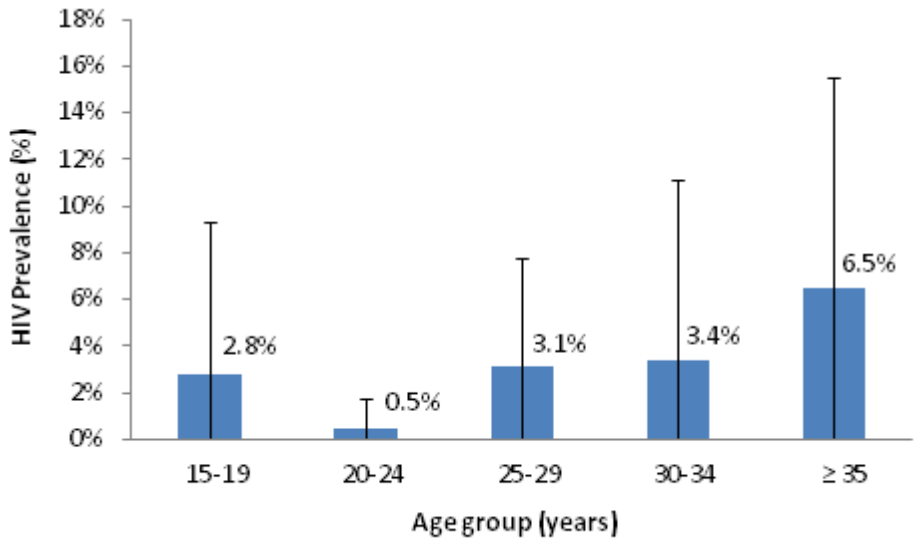


Figure 34. HIV prevalence by age group among MSM, Unguja, 2011/2012

HIV prevalence was highest among married MSM (4.7%), followed by MSM who had formerly been married (3.6%). Those who had never been married had the lowest HIV prevalence at 2.3% (Figure 35).

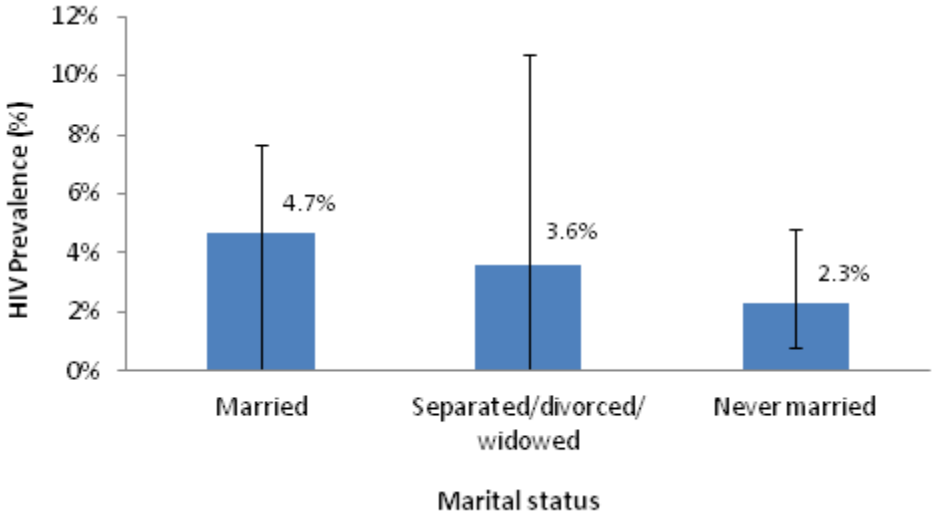


Figure 35. HIV prevalence by marital status among MSM, Unguja, 2011/2012

HIV prevalence was 8.1% among MSM who had attended at least some or who had completed primary education and was 1.8% among those who had some or had completed secondary education (Table 20).

MSM who reported having no live-in partner had an HIV prevalence of 3.2%, while those who had a male live-in partner had a prevalence rate of 1.7%. MSM who reported their first sexual partner to be male had an HIV prevalence of 3.5%, while those whose first sexual partner was female had an HIV prevalence of 1.6% (Table 20).

MSM who initiated sex at 15 years old or younger had a higher HIV prevalence estimate (6.0%) than those who initiated sex between 16 and 24 years of age (2.0%, Table 20).

Table 20. HIV prevalence by socio-demographic characteristics among MSM, Unguja, 2011

Socio-demographic characteristics	Crude HIV-positive (N)	HIV prevalence (%)¥	95% CI¥¥
Age			
15-19	2	2.8	0.0, 9.3
20-24	2	0.5	0.0, 1.8
25-29	3	3.1	0.0, 7.8
30-34	1	3.4	0.0, 11.1
≥ 35	4	6.5	0.0, 15.5
Marital status			
Married	2	4.7	0.0, 7.7
Separated/divorced/widowed	1	3.6	0.0, 10.7
Never married	9	2.3	0.8, 4.8
Education			
No education	0	NC	NC

Some or completed primary	5	8.1	1.1, 17.8
Some or completed secondary	7	1.8	0.3, 4.1
More than secondary	0	NC	NC
Gender of live in partner			
No live in partner	7	3.2	0.8, 6.2
Male	4	1.7	0.0, 5.2
Female	1	NC	NC
Source of Income			
Formal	7	2.8	0.4, 6.3
Informal	6	4.4	0.9, 8.7
Illegal activities	0	NC	NC
Unemployed or student	0	NC	NC
Receives money from family	0	NC	NC
Gender of first sexual partner			
Male	9	3.5	1.1, 7.0
Female	3	1.6	0.0, 3.5
Age at first sex			
15 years and younger	4	6.0	0.0, 13.9
16 to 24 years	1	2.0	0.0, 7.3
25 year or older	0	NC	NC

¥ RDSAT Weighted HIV Population Estimate

¥¥ RDSAT Weighted HIV Population Estimate 95% Confidence Interval

Higher HIV prevalence was found among MSM who reported having no non-paying male insertive partners in the month prior to the survey (3.8%) compared to those with 3 or more partners (1.7%). There was slight difference in HIV prevalence among respondents with 0 (2.1%), 1-2 (2.6%) or 3 or more (2.4%) non-paying male receptive partners in the past month (Table 21).

HIV prevalence differed only slightly between those who reported being paid or paying for sex in the past month (2.7%) and those who did not (2.4%) and between those who reported engaging in group sex in the past month (2.5%) and those who did not (2.5%). HIV prevalence was higher among those who reported exclusive sex with males in the past year (4.7%) compared to those who had sex with males and females in the past year (1.1%, Table 21).

HIV prevalence was highest among those reporting 11 or more partners (6.6%), followed by those reporting 3-5 partners (3.3%), 1-2 partners (3.0%) and, 6-10 partners (0.4%). No HIV cases were found among those who reported no sex partners in the past month (Table 21).

HIV prevalence was higher among MSM who had ever had an HIV test (3.0%) compared to those who had not (1.7%). Conversely, HIV prevalence was 5.5% among MSM who did not report an HIV test in the past one year compared to 3.9% among MSM who did have an HIV test in the past one year (Table 21).

MSM with no STI symptoms in the past six months had a higher HIV prevalence compared to MSM who reported symptoms (9.8% and 0.9%, respectively, Table 21).

HIV prevalence did not differ between respondents who had used drugs other than alcohol in the past three months (2.8%) and those who had not (2.7%, Table 21).

MSM who perceived themselves to be at medium or high risk for HIV infection had a higher HIV prevalence (3.3%) than those who believed themselves to be at low or no risk for infection (1.1%, Table 21).

Table 21. HIV prevalence by risk behaviours among MSM, Unguja, 2011

Risk factors	Crude HIV-positive (N)	HIV prevalence (%)¥	95% CI¥¥
Number of non-paying male insertive sex partners in past month			
None	4	3.8	0.3, 8.6
1-2	1	NC	NC
3 or more	4	1.7	0.0, 5.3
Number of non-paying male receptive sex partners in past month			
None	3	2.1	0.0, 4.9
1-2	1	2.6	0.0, 10.5
3 or more	5	2.4	0.0, 6.9
Paid a woman for sex in the past month *among those who ever paid a woman for sex*			
Yes	2	7.8	NC
No	4	9.6	NC
Paid another male for sex in the past month			
Yes	6	1.7	0.0, 3.3
No	1	NC	NC
Sold sex to a man in the past month			
Yes	7	1.9	1.2, 4.1
No	0	NC	NC
Paid or sold sex to a man in the past month *(among those who ever had transactional sex with a male partner)*			
Yes	11	2.7	0.9, 4.9
No	1	2.4	0.0, 8.5
Group sex in past month			
Yes	3	2.5	0.0, 6.4
No	9	2.5	0.7, 5.2
Exclusive sex with males in the past year			
Males and females	4	1.1	0, 3.7
Exclusively males	8	4.7	1.4, 8.5
Number of sex partners in past month			
0 partners	0	NC	NC
1-2 partners	3	3.0	0.0, 8.2
3-5 partners	4	3.3	0.0, 6.9
6 -10 partners	2	0.4	0.0, 1.7
11 or more partners	3	6.6	0.0, 15.7
Number of male sex partners in past month			
0 partners	0	NC	NC
1-2 partners	4	2.5	0.0, 6.2
3-5 partners	4	2.4	0.0, 5.3
6-10 partners	3	2.0	0.0, 6.8
11 or more partners	1	4.1	0.0, 14.0
Number of female sex partners in past month			
0 partners	9	3.2	1.0, 6.1
1-2 partners	1	NC	NC
3-5 partners	0	NC	NC

6-10 partners	2	14.4	0.0, 38.7
11 or more partners	0	NC	NC
Ever had an HIV test			
Yes	11	3.0	1.0, 5.3
No	1	1.7	0.0, 5.7
Had an HIV test in the past year *(all respondents)*			
Yes	10	3.9	1.0, 6.8
No	1	5.5	0.0, 16.1
STI symptoms in the past 6 months			
Yes	1	0.9	0.0, 2.5
No	11	9.8	3.9, 18.7
Drug use other than alcohol in the past 3 months *(all respondents)*			
Yes	4	2.8	0.4, 6.2
No *(including those who have never done drugs)*	8	2.7	0.7, 5.7
Injection drug use in the past 3 months *(all respondents)*			
Yes	0	NC	NC
No *(including those who have never done drugs)*	12	2.9	1.3, 5.6
HIV risk perception			
Med or high risk	10	3.3	1.0, 5.7
No or low risk	2	1.1	0.0, 5.2

¥ RDSAT Weighted HIV Population Estimate

¥¥ RDSAT Weighted HIV Population Estimate 95% Confidence Interval

8. Comparison of 2007 and 2011 findings among MSM

In the 2012 survey, adolescents aged 15-19 had notably higher inclusion (31.4%) compared to the 2007 figure of 9.9% (p<0.001).

In 2011, only 1.0% of MSM compared to 13.9% in 2007 reported using injection drugs in the past three months (p<0.001).

We observed that more than two-thirds of MSM in 2011 had ever tested which differed greatly from the 2007 survey when 18.8% (p<0.001) of MSM had ever tested for HIV.

HIV prevalence among MSM in the 2011 RDS survey (2.6%) was significantly lower than the prevalence measured in the 2007 RDS round (12.3%) (p<0.001). HCV prevalence was also significantly lower among MSM sampled in 2011 compared to 2007 (1.3% vs. 14.7%, p<0.001, Table 22).

Table 22. Key findings among MSM. Unguja, Zanzibar. 2007, 2011/2012.

	2007	2011	p-value
Socio-demographic characteristics			
15-19 years old	9.9%	31.4%	<0.001
Risk behaviours			
Used injection drugs in the past 3 months	13.9%	1.0%	<0.001
Access to and uptake of services			
Ever tested for HIV	18.8%	68.2%	<0.001
Disease prevalence			
HCV	14.7%	1.3%	<0.001
HIV	12.3%	2.6%	<0.001

9. Discussion and Recommendations: MSM

Socio-demographic characteristic of MSM

MSM are young, educated and not married:

The 2011 sample was significantly younger than the 2007 sample and the vast majority of 2011 participants have never been married. The latter finding may in part reflect the young age of participants.

Risk behaviours of MSM

High rates of risky sexual behaviours:

MSM reported multiple high risk sexual practices including sex in exchange for money, high numbers of sexual partners and low condom use. Sex in exchange for money was commonly reported among MSM; the large majority had bought or sold sex to a man in the month prior to the survey. Transactional sex was also reported between MSM and female partners, although to a lesser extent. Also, MSM had a median of 6 total partners in the month prior to the survey, including both male and female partners, with a range from zero to a maximum of 81 partners. Lastly, reported condom use among MSM was low in 2011. Condom use at last sex increased significantly among all partner types, including: non-paying insertive and receptive male partners, non-paying female partners, and both male and female partners who paid or were paid for sex. In spite of these improvements, more than one-third of MSM in 2011 reported that they do not use condoms generally.

The co-existence of multiple high-risk sexual behaviours among MSM is cause for concern for the potential HIV transmission between MSM and potential transmission to other key populations and women. For instance, the majority of MSM reported having sex with men and women, and nearly one-third of MSM who bought sex in the past one month did so from a woman. Although more work needs to be done, the potential increase in condom use over a few years ago is encouraging. This improvement may be a result of peer outreach and other interventions targeting MSM that were established following the first IBBS in 2007.

- Behaviour change interventions and prevention messages targeting MSM are needed to strengthen this population's understanding of the risks associated with having multiple partners, transactional sex, and inconsistent condom use. Continued efforts to promote correct and consistent condom use with all partner types are needed, and efforts should be made to ensure wide availability and accessibility of condoms for MSM.

Majority of MSM perceive themselves to be at risk of HIV infection:

Based on their current behaviours, the majority of MSM in 2011 believed themselves to be at risk of HIV. The most common reasons given for feeling at risk were as a result of having multiple sex partners and inconsistent condom use. Despite understanding the

risk factors for HIV transmission and perception of high risk, MSM continue to engage in risky sexual behaviours.

- Behaviour change interventions are needed to help MSM translate knowledge of HIV prevention into their behaviours.

Access to and uptake of HIV prevention and other HIV-related services

High proportion of MSM ever tested for HIV:

We observed that the vast majority of MSM in 2011 knew where to get a confidential HIV test, more than two-thirds had ever tested, and more than one-third had tested and received their result in the past year. The proportion of MSM who had ever tested for HIV was significantly higher in 2011 compared to 2007. This increase in testing could be attributed to the services implemented following the 2007 IBBS.

Reach and access to HIV services:

Following the 2007 IBBS, targeted services were established both in clinics or drop-in centres and through outreach services that were spearheaded by MSM peer educators. Just over half of MSM reported being in contact with a peer educator in the past 12 months, of whom the majority received information and received condoms. Fewer MSM reported visiting a drop-in centre. Among MSM who either visited a drop-in centre or were reached through peer educators, nearly all reported receiving friendly and non-judgmental services. Services targeting MSM have experienced success thus far, with peer educators having a wider reach than facilities.

- Strategies should be developed to encourage MSM to access the services being provided through MSM-friendly clinics/drop-in centres, and peer outreach services should continue to be strengthened.
- Because peer educators seem to have easier access to the MSM population, they could be used to link MSM to facility-based services.
- As MSM-specific services continue to scale up, government and non-governmental service providers focusing on MSM should consider their targets, coverage, and service delivery strategies in light of this population size estimate.

Prevalence of HIV, HBV, HCV, and syphilis

Apparent decline in HIV and HCV prevalence:

Both HIV and HCV prevalence were significantly lower among MSM sampled in 2011 compared to 2007. The lower HCV prevalence may be attributable to the fact that HCV transmission is highly correlated to unsafe injection drug practices and there was a significant decrease in the percentage of MSM who reported injection drug use in 2011 compared to 2007.

These apparent decreases in HIV and HCV prevalence may be partially explained by the differences in the demographic and behavioural characteristics of the two survey populations (e.g., younger and fewer injectors) and/or by the samples recruiting from very different social networks. The latter possibility is discussed further in the overall

conclusions below. The demographic and risk differences in the two samples should be considered when interpreting comparisons between the present survey and that of 2007.

- Additional rounds of surveillance activities need to be implemented in order to determine more accurately the levels and trends in HIV and related risk behaviours among MSM.

Sex Workers (SWs)

A total of 316 SWs residing in Unguja enrolled in the survey. Although both male and female SWs were eligible to enrol in the study, the majority of respondents (97.4%) were female. Unless otherwise stated, results presented in this section combine responses from both male and female participants.

1. Population size estimates

The table below describes the different methods used to estimate the size of the SW population in Unguja. The panel of experts decided that the average of the three multiplier method results, 3,958, would be adopted as the plausible estimate of SWs in Unguja Island. The estimate translates to 1.6% of the female population 15 years and older.

Table 23. Population size estimates of SWs living in Unguja, Zanzibar by estimation method.

	Estimate	Notes
Unique object multiplier	2,252	• 95% CI 1,462 – 3,030 • 475 yellow bags distributed • 21.1% (RDSAT-adjusted) reported receiving a bag during the 2011/2012 survey
Services multiplier	5,000	• 95% CI 3,924 – 6,076 • 335 SWs tested for HIV through the outreach program • 6.7% (RDSAT-adjusted) reported receiving this service in the 2011/2012 survey
Recapture of 2007 RDS survey participants	4,622	• 95% CI 3,625 – 5,608 • 8.2% (RDSAT-adjusted) reported during the 2011/2012 survey that they had participated in the 2007 survey
Wisdom of the crowds	200	• Min 5 • Max 500,000
Literature review	-	• Not available
Modified Delphi	900	• Min 200 • Max 4,000

2. Socio-demographic Characteristics

Approximately half of SWs were below 30 years of age (51.8%). SW participants ranged in age from 17 to 52 years and the median age was 30.5 years (Figure 36). Just over half (54.2%) of SWs reported they had lived in Unguja all their lives, while 45.8% immigrated (Table 24).

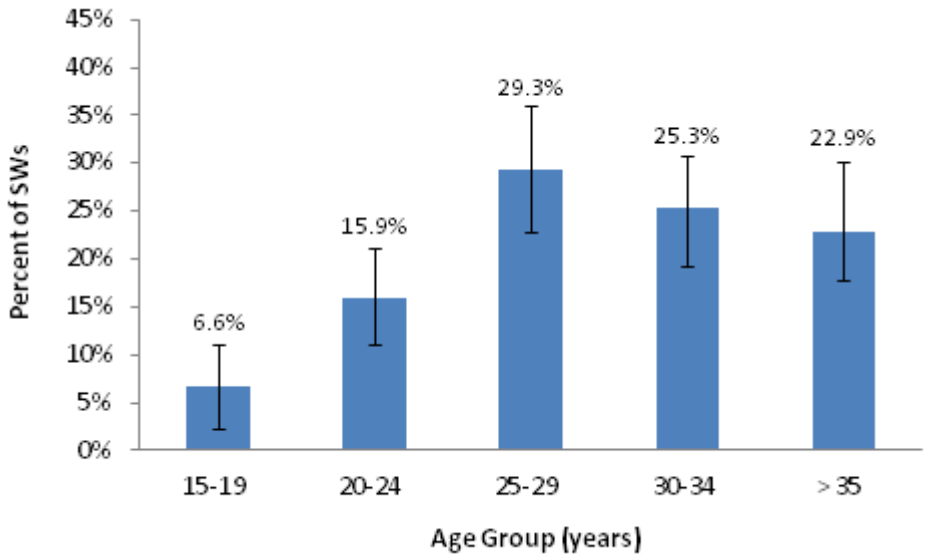


Figure 36. Age of SWs, Unguja, 2011/2012

Almost half (47.3%) of SWs had completed some or all secondary education. A small proportion (5.9%) reported having received no education at all (Figure 37).

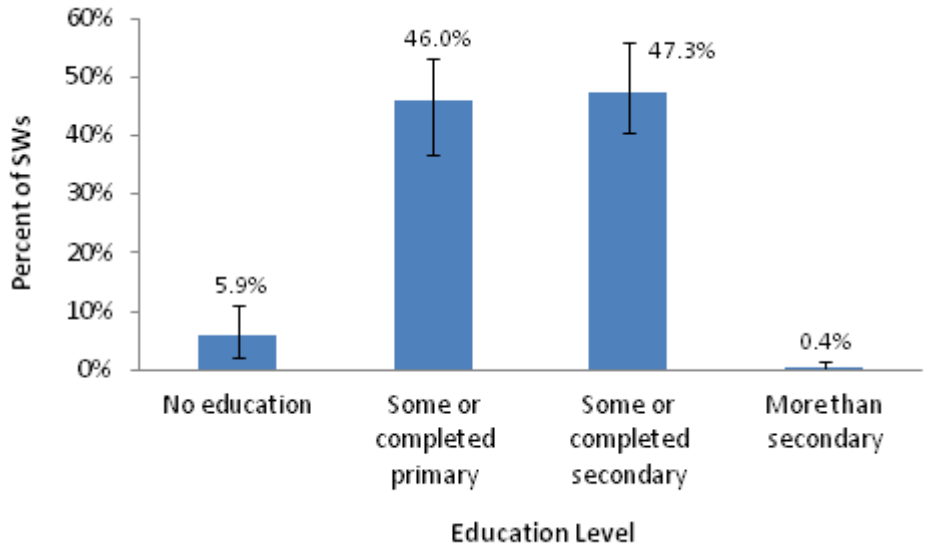


Figure 37. Years of education completed among SWs, Unguja, 2011/2012

The majority of SWs (63.3%) were formally married (separated, divorced or widowed), and 27.0% had never been married. More than a third reported living alone or with family (39.1% and 37.6%, respectively) and 14.5% lived with a spouse or partner. A smaller proportion was living with friends or other SWs (8.8%) and no SWs reported not having a fixed address (Table 24).

Approximately half of SWs (50.9%) reported having no other source of income besides sex work. About one-third (31.5%) had “other” sources of income, and 17.6% were receiving additional income through private business (Table 24).

The median monthly income among SWs was 150,000 TZS and ranged from 15,000 to 6,000,000 TZS (Table 24). More than half (52.1%) earned 120,000 TZS per month or less, with the majority of these earning between 50,000-120,000 TZS per month. Slightly more than one-fourth (27.2%) earned more than 200,000 TZS (Figure 28).

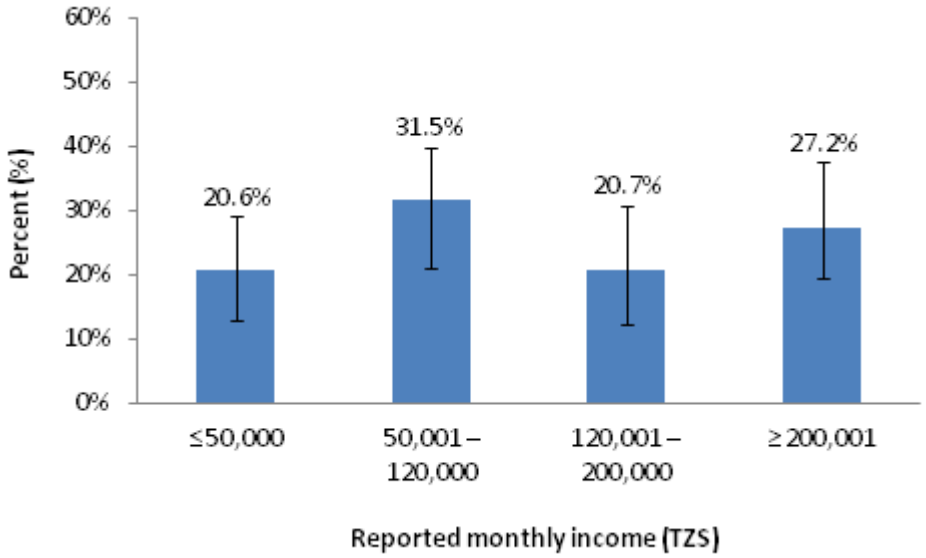


Figure 38. Reported monthly income of SWs in TZS, Unguja, 2011/2012

Table 24.Socio-demographic characteristics of SWs, Unguja, 2011/2012

Socio-demographic characteristics	Crude N	Percent[≠]	95% CI[≠≠]
Age			
15-19 years	14	6.6	2.3, 11.0
20-24 years	49	15.9	11.0, 21.2
25-29 years	82	29.3	22.8, 36.0
30-34 years	87	25.3	19.3, 30.8
≥ 35 years	84	22.9	17.7, 30.1
Median age in years (IQR)		30.5 years (IQR: 25 – 35 years) Min. 17 – Max. 52 years	
Sex			
Male	10	2.6	0.9, 4.8
Female	306	97.4	95.2, 99.1
Education			
No education	15	5.9	2.0, 10.9
Some or completed primary	143	46.0	36.8, 53.2
Some or completed secondary	154	47.3	40.4, 55.9
More than secondary	2	0.4	0.1, 1.6
Marital status			
Currently married/living with partner	31	9.6	5.4, 14.8
Separated, divorced or widow	193	63.3	55.2, 70.6
Never married	91	27.0	20.6, 34.0
Current living situation			

Alone	136	39.1	31.7, 46.6
Husband/boyfriend/wife/girlfriend	50	14.5	9.7, 20.3
Family	104	37.6	30.8, 45.1
Friends/other FSWs	25	8.8	4.4, 13.5
No fixed address	0	NC	NC
Migration			
Immigrated to Unguja	151	45.8	36.7, 55.3
Lived whole life in Unguja	165	54.2	44.7, 63.3
Alternative sources of income			
No other income	158	50.9	43.0, 58.6
Private business	63	17.6	12.1, 23.4
Other	94	31.5	24.7, 39.3
Personal income (TZS)			
≤ 50,000	44	20.6	13.0, 29.2
50,001 – 120,000	57	31.5	20.9, 39.9
120,001 – 200,000	43	20.7	12.3, 30.7
≥ 200,001	74	27.2	19.4, 37.6
Median income in TZS	150,000 TZS (IQR: 60,000 – 300,000 TZS) Min. 15,000 – Max. 6,000,000 TZS		

≠ RDSAT Weighted Population Estimate
≠≠ RDSAT Weighted Population Estimate 95% Confidence Interval

3. Sexual history and profile of sex work

The majority of SWs (88.7%, Figure 39) initiated sex before 20 years of age, with 29.3% initiating sex at 15 years or younger (Table 25). The median age of sexual debut was 18 years and ranged from 7 to 35 years (Table 25).

More than half of SWs (59.1%) began selling sex before reaching 25 years of age (Figure 39). The median age at which SWs first sold sex was 23 years and ranged from 11 to 45 years (Table 25).

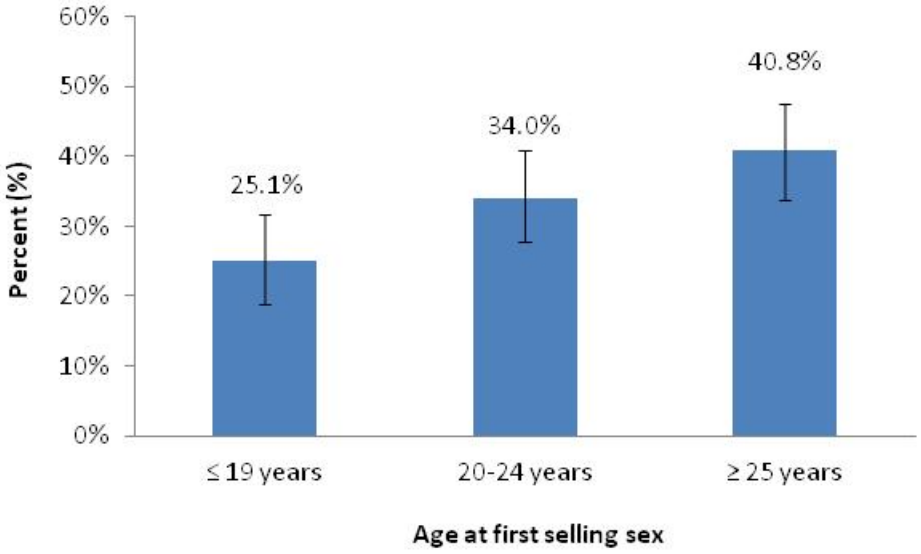


Figure 39. Age first sold sex among SWs, Unguja, 2011/2012

At the time of the survey, 39.4% of SWs had been engaged in sex work for 3 years or less while 26.7% reported selling sex for 10 years or more. The median duration of selling sex was 5 years (Table 25).

The majority of respondents (67.4%) reported that they entered sex work because they needed money to support their family or pay a debt. Another 14.1% of SWs started selling sex after being abandoned by their families and/or husbands, while 10.5% reported entering sex work because they liked the work or have a friend or family member engaged in sex work. Only 1.1% reported entering sex work because of substance dependency and 1.0% said they were “forced” into sex work (Table 25).

SWs most commonly reported their primary place for meeting clients to be in pubs or bars (43.3%). For others, the main places to meet clients were guesthouses or private rooms (17.8%), hotels (15.8%) and discos or full moon parties (15.4%). Almost half of SWs (46.6%) had an “agent” or pimp to help manage clients (Table 25).

Similar proportions of SWs reported having one, two, three or four or more clients on their last day of sex work (29.3%, 23.9%, 24.6% and 22.2%, respectively, Figure 40). The median number of clients served on the last day of sex work was two (Table 25).

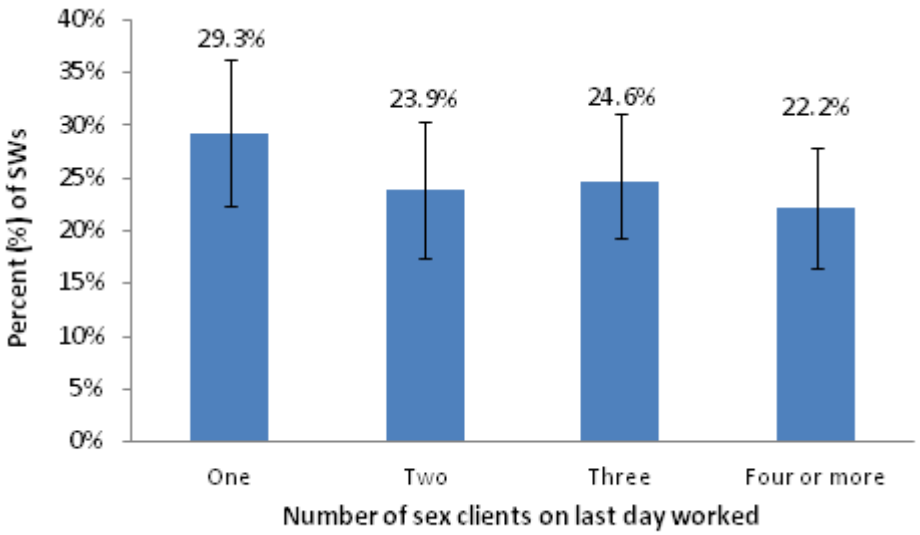


Figure 40. Number of clients on last day of work among SWs, Unguja, 2011/2012

SWs reported earning a median of 20,000 TZS (~$13 USD) for their last sex act with a client, ranging from a low of 0 to a high of 390,000 TZS. Among SWs, the median minimum payment for sex was 5,000 TZS and the median maximum payment for sex was 50,000 TZS (Table 25). The majority of sex workers were paid between 10,000 and 19,999 TZS at last sex (Figure 41).

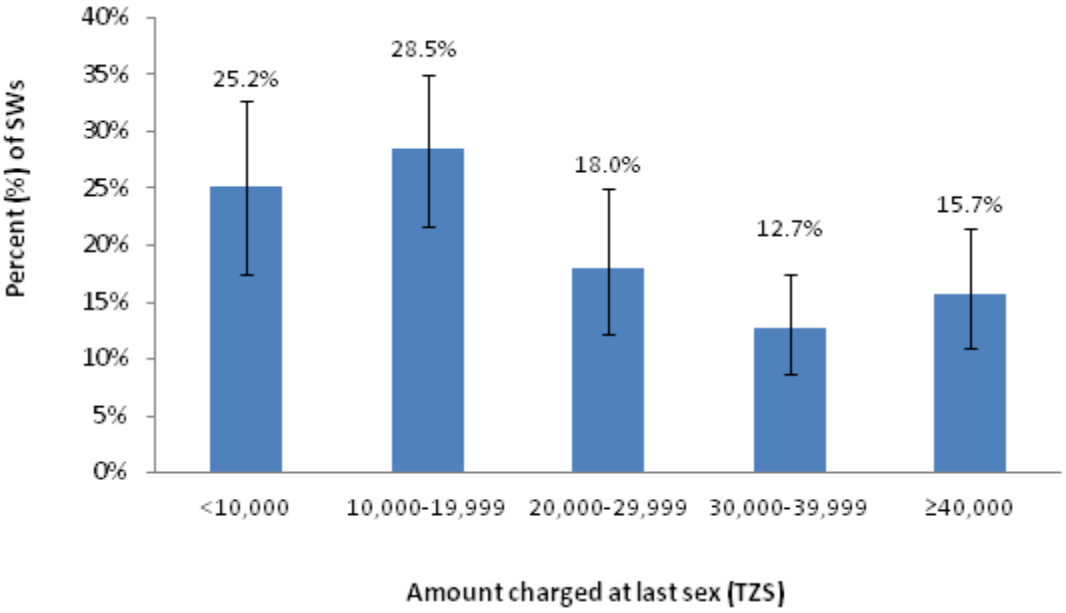


Figure 41. Amount charged at last sex in TZS by SWs, Unguja, 2011/2012

Table 25. Sexual history and sex work among SWs, Unguja, 2011/2012

Sexual history and sex work	Crude N	Percent≠	95% CI≠≠
Age at sexual debut			
≤ 15 years	89	29.3	22.2, 35.7
16-20 years	189	59.4	52.8, 66.6
≥ 21 years	35	11.3	7.2, 16.2
Median age at sexual debut (years)		18 years (IQR:15 – 20 years) Min. 7 – Max. 35 years	
Age at first selling sex			
≤ 19 years	72	25.1	18.9, 31.6
20-24 years	106	34.0	27.8, 40.9
≥ 25 years	137	40.8	33.7, 47.6
Median age when first sold sex		23 years (IQR: 20 – 27 years) Min. 11 – Max. 45 years	
Duration of selling sex			
≤ 3 years	111	39.4	31.2, 46.1
4-6 years	70	22.7	17.6, 30.5
7-9 years	39	11.2	7.3, 15.1
≥ 10 years	95	26.7	20.5, 33.0
Median duration of selling sex (years)		5 years (IQR: 3 – 10 years) Min. 0 – Max. 32 years	
Reasons for entering sex work			
Need money to support family/pay debt	199	67.4	60.2, 74.6
Abandoned by family/husband	51	14.1	9.9, 18.5
Like to do/friend or family doing it	33	10.5	5.7, 16.2
Good income	17	3.6	1.6, 6.0
Hardship	7	2.3	0.6, 4.3
Substance dependency	3	1.1	0.0, 3.1
Forced	3	1.0	0.0, 2.4
Primary meeting place for clients			
Pub/bar	145	43.3	35.4, 50.2
Disco/Full moon party	51	15.4	11.3, 19.3
Guesthouse/Private rooms	53	17.8	13.2, 24.4
Hotel	46	15.8	11.2, 19.7
On the streets	12	4.7	2.3, 7.5
By telephone	4	0.9	0.3, 1.7
Gravesites/burials	4	2.0	0.3, 5.4
Number of clients on last day of sex work			
1	91	29.3	22.4, 36.2
2	68	23.9	17.5, 30.3
3	82	24.6	19.3, 31.2
≥ 4	74	22.2	16.4, 27.8
Median number of clients on last day of work		2 clients (IQR: 1 – 3 clients) Min. 1 – Max. 20 clients	

Has an "agent" or pimp			
Yes	143	46.6	38.8, 53.8
No	167	53.4	46.2, 61.2
Payment for sex work (in TZS)			
Median payment for last sex act	20,000 TZS (Min. 0 – Max. 390,000 TZS)		
Median minimum payment for sex	5,000 TZS (Min. 50 – Max. 100,000 TZS)		
Median maximum payment for sex	50,000 TZS (Min. 45 – Max. 1,800,000 TZS)		
Amount charged at last sex (in TZS)			
< 10,000 TZS	67	25.2	17.5, 32.7
10,000 – 19,999 TZS	86	28.5	21.6, 34.9
20,000 – 29,999 TZS	52	18.0	12.2, 25.0
30,000 – 39,999 TZS	51	12.7	8.7, 17.5
≥ 40,000 TZS	59	15.7	10.9, 21.5

≠ RDSAT Weighted Population Estimate
≠≠ RDSAT Weighted Population Estimate 95% Confidence Interval

4. Sexual risk behaviours

Sex workers were asked about their different partner types and the sexual risk behaviours and practices with each type. Sexual partners were classified as 'steady non-paying' (spouse or boy/girlfriend), 'casual non-paying', one-time client, regular client, or tourist/foreigner client.

In the past month, virtually all SWs reported having sex with regular and one-time clients (95.5% and 94.2%, respectively), and 70.1% reported having sex with a steady, non-paying partner. Less than half of SWs reported having sex with a casual, non-paying partner (47.7%) or tourist/foreigner clients (44.6%, Figure 42).

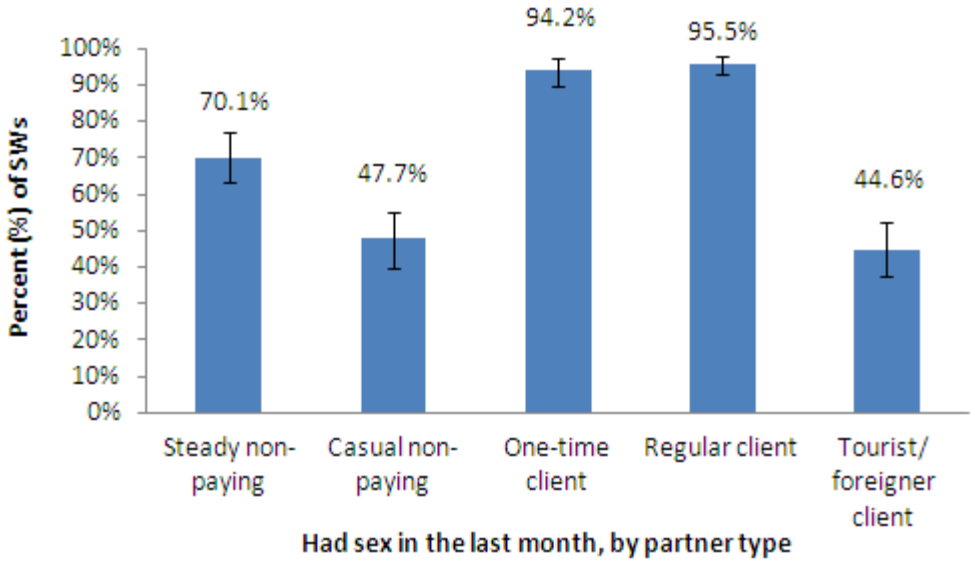


Figure 42. Sexual partners in the past month, by partner type among SWs, Unguja, 2011/2012

Nearly two-thirds of SWs (63.7%) reported having more than 10 sexual partners in the past month, with 21.3% reporting 31 or more (Table 26).

Four out of five SWs (78.9%) reported using a condom the last time they had sex. The most commonly cited reason for not using a condom at last sex was partner objection (39.3%), followed by trusting the partner (15.4%), and not having any condoms (9.3%, Table 26).

Condom use varied slightly by type of sexual partner, although overall reported condom use was high. Less than a quarter (24.0%) of SWs reported 'always' using a condom with their steady partner, while 86.0% reported 'always' using a condom with tourists/foreigners. The majority of SWs also reported 'always' using condoms with one-time clients (79.0%), regular clients (71.8%) and casual, non-paying clients (68.2%, Figure 43).

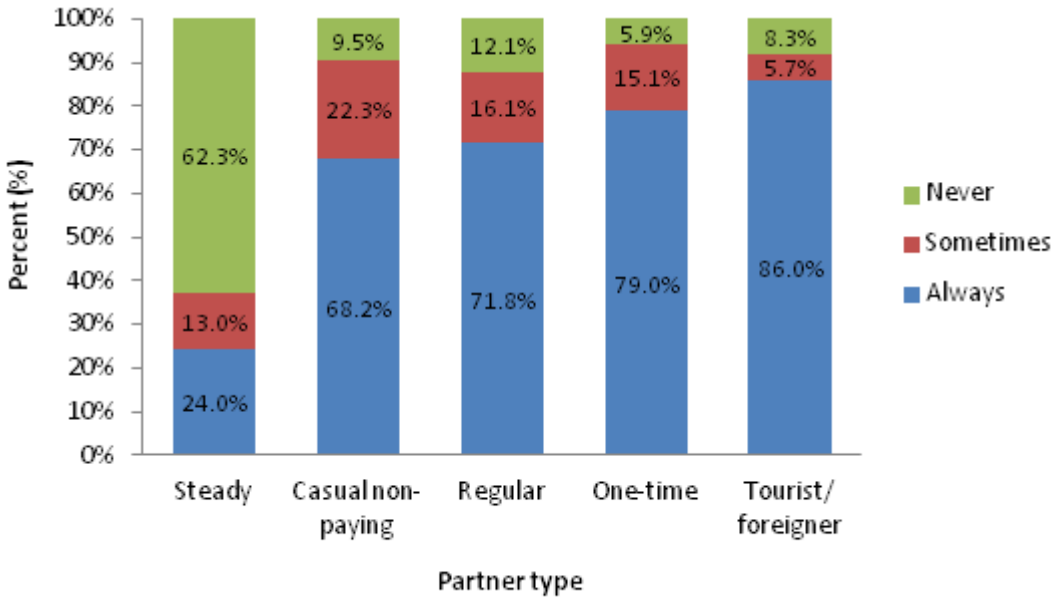


Figure 43. Frequency of condom use by partner type among SWs, Unguja, 2011/2012

Almost all (94.7%) SWs said they were able to obtain a male condom when needed, while only 16.2% reported ever having used a female condom (Table 26).

Table 26. Sexual risk behaviours among SWs, Unguja, 2011/2012

Sexual risk behaviours	Crude N	Percent[≠]	95% CI[≠≠]
Had sex in the past month with:			
Steady non-paying partner	223	70.1	63.4, 76.8
Casual non-paying partner	143	47.7	39.9, 55.0
One-time client	301	94.2	89.7, 97.5
Regular client	297	95.5	92.8, 97.9
Tourist/foreigner client	170	44.6	37.4,52.3
Number of sex partners in past month			

1-5	31	12.9	7.4, 17.6
6-10	53	23.5	17.5, 31.9
11-20	85	27.1	20.7, 33.6
21-30	56	15.3	10.2, 20.5
≥31	88	21.3	15.7, 27.3
Condom use at last sex			
Yes	263	78.9	71.5, 86.1
No	53	21.1	13.9, 28.5
Main reasons for not using a condom at last sex			
Partner objected	23	39.3	25.3, 65.0
Trust my partner	6	15.4	2.7, 19.8
Didn't have any condoms	7	9.3	3.2, 17.7
Frequency of condom use			
Frequency of condom use with steady partner among those who had a steady partner in the past month			
Always	61	24.0	15.7, 32.6
Sometimes	19	13.0	6.5, 18.2
Never	142	62.3	54.0, 72.0
Frequency of condom use with casual non-paying partner among those who had a casual non-paying partner in the past month			
Always	124	68.2	57.0, 79.3
Sometimes	19	22.3	12.6, 33.1
Never	14	9.5	3.8, 15.9
Frequency of condom use with regular client among those who had a regular client in the past month			
Always	236	71.8	63.7, 79.5
Sometimes	41	16.1	10.4, 22.7
Never	26	12.1	7.0, 17.4
Frequency of condom use with one-time client among those who had a one-time client in the past month			
Always	246	79.0	70.6, 86.1
Sometimes	45	15.1	9.8, 21.7
Never	12	5.9	2.1, 10.4
Frequency of condom use with tourist/foreigner client among those who had a tourist/foreigner client in the past month			
Always	155	86.0	79.0, 91.9
Sometimes	9	5.7	1.8, 10.7
Never	12	8.3	3.5, 14.3
Can obtain a male condom when needed			
Yes	297	94.7	89.3, 99.0
No	9	5.3	1.0, 10.7
Ever used a female condom			
Yes	60	16.2	11.0, 21.5
No	256	83.8	78.5, 89.0

≠ RDSAT Weighted Population Estimate
≠≠ RDSAT Weighted Population Estimate 95% Confidence Interval

5. Drug use

A total of 19.8% of SWs reported using any drugs other than alcohol in the past three months. Only 1.5% reported injecting drugs in the three months prior to the survey, although 4.1% had ever injected drugs (Table 27).

Suspicion of drug use and injection drug use by partners differed by partner type, although fewer than 30% of SWs suspected any partner type of using drugs. This proportion was lowest for steady partners (17.9%) and highest for one-time clients (26.4%, Table 27).

About one-tenth of SWs (9.8%) suspected injection drug use of their casual, non-paying clients, followed by one-time clients, tourist/foreigners and regular clients (8.5%, 8.4% and 8.3%, respectively). Only 2.8% of SWs suspected their steady partners of injection drug use (Figure 44).

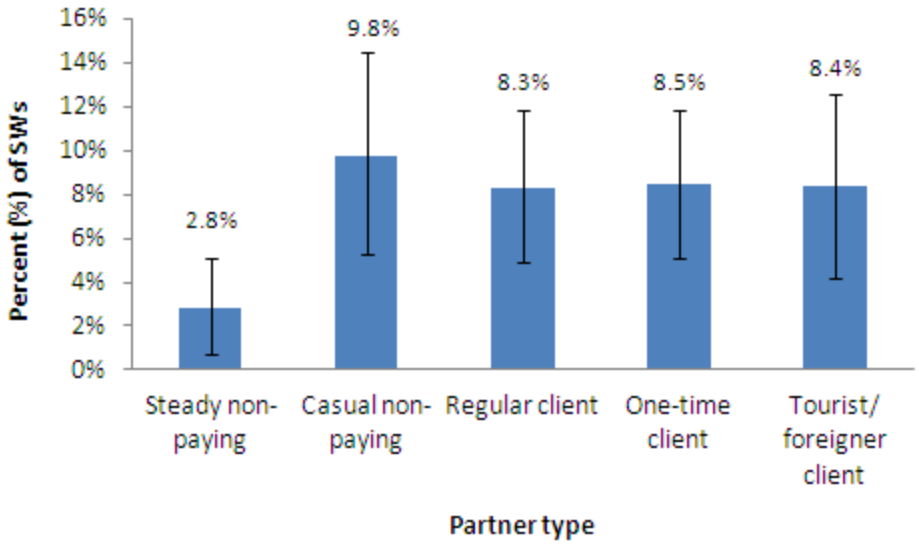


Figure 44. Suspicion of injection drug use by partner type among SWs, Unguja, 2011/2012

Table 27. Drug use among SWs and suspected drug use of their partners, Unguja, 2011/2012

Drug use	Crude N	Percent[≠]	95% CI[≠≠]
Used any drugs in past 3 months			
Yes	64	19.8	14.0, 26.6
No	252	80.2	73.3, 86.0
Ever injected drugs			
Yes	20	4.1	2.0, 6.6
No	296	95.9	93.4, 98.0
Used injection drugs in past 3 months			
Yes	9	1.5	0.5, 2.9
No	307	98.5	97.1, 99.5
Suspects sex partner uses drugs by partner type			
Suspects steady partner uses drugs among those who had a steady partner			
Yes	55	17.9	11.3, 24.7

No	217	80.5	73.9, 87.1
Don't know	6	1.6	0.3, 3.2
Suspects injection drug use	9	2.8	0.7, 5.1
Suspects casual, non-paying partner uses drugs among those who had a casual, non-paying partner			
Yes	60	25.4	18.1, 33.2
No	102	52.0	43.2, 61.1
Don't know	42	22.7	14.3, 31.8
Suspects injection drug use	24	9.8	5.3, 14.5
Suspects regular client uses drugs among those who had a regular client			
Yes	82	23.5	17.2, 29.2
No	190	65.5	58.8, 72.5
Don't know	35	11.0	6.8, 16.1
Suspects injection drug use	35	8.3	4.9, 11.9
Suspects one-time client uses drugs among those who had a one-time client			
Yes	100	26.4	20.1, 33.3
No	146	53.0	45.5, 59.9
Don't know	64	20.6	14.9, 27.5
Suspects injection drug use	34	8.5	5.1, 11.9
Suspects tourist/foreigner client uses drugs among those who had a tourist/foreigner client			
Yes	51	20.1	14.4, 26.1
No	116	54.6	45.7, 62.9
Don't know	51	25.3	17.8, 34.1
Suspects injection drug use	22	8.4	4.2, 12.6

≠ RDSAT Weighted Population Estimate
≠≠ RDSAT Weighted Population Estimate 95% Confidence Interval

6. Stigma, physical abuse and incarceration

Almost two-thirds of SWs (63.4%) felt that people with HIV/AIDS should be ashamed of themselves and the same proportion reported that they would feel ashamed if they were infected with HIV. About half (50.2%) of SWs said they would feel ashamed if someone in their family had HIV or AIDS. When asked about stigma commonly associated with HIV, 64.4% of SWs thought that people with HIV/AIDS were promiscuous, 64.6% believed that HIV/AIDS was punishment for bad behaviour, and 47.7% agreed that SWs were responsible for spreading HIV in the community (Table 28).

Almost half of SWs (43.7%, Table 28) reported experiencing physical violence in the past year. Nearly one in five (18.5%) reported being beaten by a one-time sex partner, a similar percentage (17.2%) were beaten by their steady partner, and 9.4% were beaten by a regular client (Figure 45).

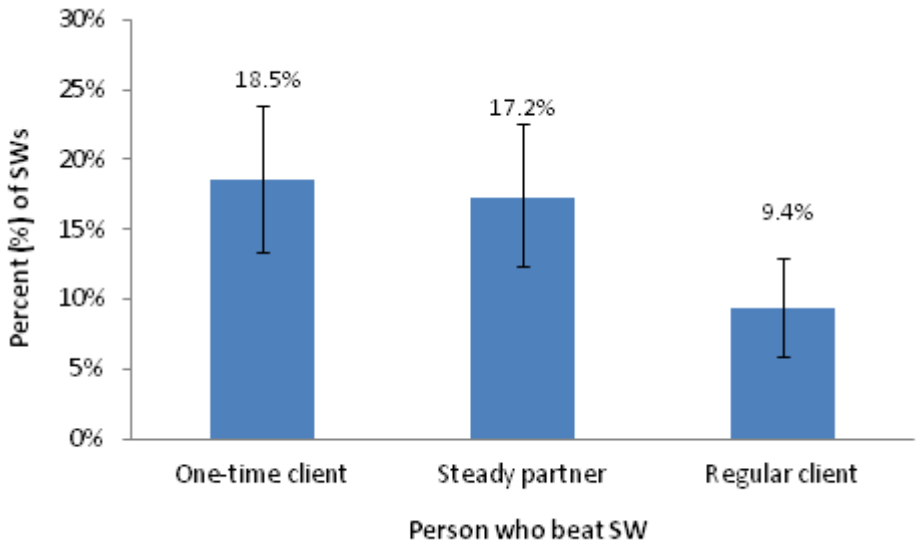


Figure 45. Perpetrator of physical violence among those who were beaten in the past year, Unguja, 2011/2012

More than a quarter (27.3%) of SWs were arrested in the past year. Among these, the primary reasons for being arrested were for selling sex (12.6%) and for loitering (7.5%, Table 28).

Table 28. Stigma, violence and incarceration among SWs, Unguja, 2011/2012

Violence/incarceration/stigma	Crude N	Percent≠	95% CI≠≠
HIV Stigma			
People with HIV/AIDS should be ashamed of themselves	197	63.4	56.6, 70.4
I would feel ashamed if someone in my family had HIV/AIDS	169	50.2	42.8, 57.5
I would feel ashamed if I were infected with HIV/AIDS	192	63.4	55.9, 69.6
People with HIV/AIDS are promiscuous	205	64.4	56.0, 71.0
It is SWs who spread HIV in the community	130	47.7	40.0, 54.1
HIV/AIDS is punishment for bad behaviour	191	64.6	58.7, 71.3
Physical violence in past 12 months			
Beaten in past 12 months	152	43.7	36.6, 51.3
Beaten by one-time sex partner	65	18.5	13.4, 23.8
Beaten by steady partner	59	17.2	12.4, 22.6
Beaten by regular client	32	9.4	5.9, 13.0
Arrests in past 12 months			
Arrested in past 12 months	94	27.3	20.0, 33.9
Arrested for selling sex	56	12.6	8.1, 16.7
Arrested for loitering	21	7.5	3.8, 11.8

≠ RDSAT Weighted Population Estimate

≠≠ RDSAT Weighted Population Estimate 95% Confidence Interval

7. Access to services among SWs

Only 13.8% of SWs reported having visited a clinic or drop-in centre with SW-focused services in the past 12 months. Among all respondents, the most commonly received services were condoms (10.2%) and information on STI or HIV transmission or prevention (10.1%), followed by an HIV test (7.9%). Fewer SWs reported having received counselling from either a professional/VCT counsellor or a peer counsellor (5.8% and 5.4%, respectively, Figure 46). Nearly all (98.1%) SWs who visited a clinic or drop-in centre reported the staff to be friendly and non-judgmental (Table 29).

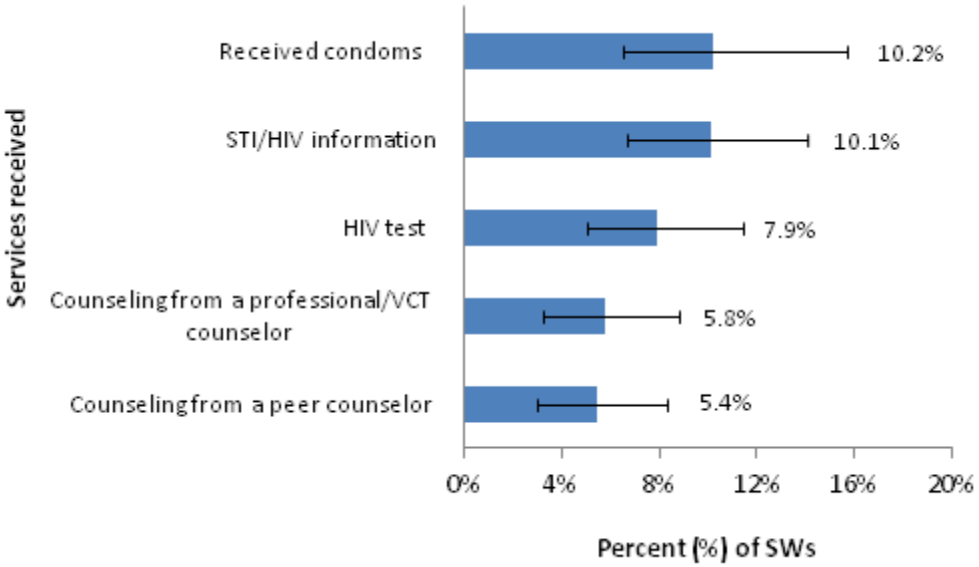


Figure 46. Services received by SWs at clinics or drop-in centres, Unguja, 2011/2012

More than a quarter of SWs (27.6%) had been visited by a peer educator in the past 12 months (Table 29). Among all respondents, the most frequently reported services and supplies received from peer educators were general STI/HIV transmission or prevention information (23.6%), condoms (19.8%) and a home HIV test (6.7%, Figure 47). Of those who had been visited by a peer educator, nearly all (95.4%) SWs reported that the peer educators were friendly and non-judgmental (Table 29).

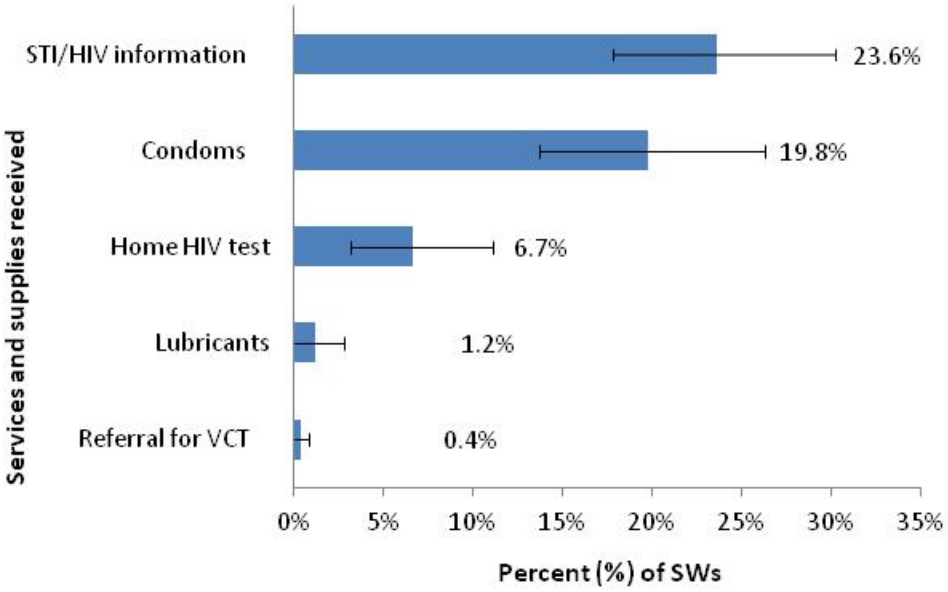


Figure 47. Services and supplies received by SWs from peer educators, Unguja, 2011/2012

Table 29. Access to services among SWs, Unguja, 2011/2012

Access to Services	Crude N	Percent≠	95% CI##
Visited a clinic or drop-in centre in the past 12 months			
Yes	58	13.8	9.6, 19.0
No	258	86.2	81.0, 90.4
Services and supplies received at clinic or drop-in centre among all respondents			
Condoms	47	10.2	6.5, 15.7
Lubricant	4	0.5	0.1, 1.1
Information on STI or HIV transmission or prevention	47	10.1	6.7, 14.1
General counselling from a peer counsellor	23	5.4	3.0, 8.3
Counselling from a professional/VCT counsellor	25	5.8	3.2, 8.8
HIV Test	31	7.9	5.0, 11.4
Staff were friendly and non-judgmental among those who had visited a clinic or drop in centre			
Yes	57	98.1	96.0, 100
No	1	1.9	0.0, 4.0
Visited by a peer educator in the past 12 months			
Yes	108	27.6	21.4, 35.1
No	208	72.4	64.9, 78.6
Services and supplies received from the peer educators among all respondents			
General STI or HIV transmission or prevention information	98	23.6	17.8, 30.2
Condoms	77	19.8	13.7, 26.3
HIV test in your home	24	6.7	3.2, 11.1
Lubricant	4	1.2	
Referral for STI Treatment	0	NC	NC
Referral for VCT	1	0.4	
Referral for PMTCT or Family Planning	0	NC	NC
Referral for TB screening	0	NC	NC
Bleach Kit	0	NC	NC
Peer educators were friendly and non-judgmental among those who had contact with a peer educator			
Yes	101	95.4	89.4, 100
No	1	4.6	0.0, 10.6

≠ RDSAT Weighted Population Estimate
RDSAT Weighted Population Estimate 95% Confidence Interval

8. HIV and STIs

STI History

Almost a quarter of SWs (24.8%) reported that they had experienced symptoms of an STI (unusual genital discharge or genital ulcers) in the past six months, and 18.2% reported that they had ever had an STI diagnosed by a physician or nurse (Table 30).

HIV knowledge

Nearly all SWs had ever heard of HIV/AIDS (98.7%), and few (10.3%) believed that one could identify an HIV-infected person just by looking at him or her. SWs were asked a series of questions about protective behaviours for HIV infection and the level of knowledge varied greatly. More than three-quarters (76.5%) of SWs agreed that having one faithful, uninfected partner reduces HIV risk and 79.9% agreed that using a condom during vaginal sex prevents HIV, although only 62.5% agreed that condom use during anal sex also prevents HIV. Nearly all SWs (94.7%) agreed that sharing needles to inject drugs increases HIV risk; however, only 38.6% agreed that cleaning needles reduces risk (Table 30).

Risk perception and testing

Just over half of SWs (56.5%) considered themselves to be at high risk for HIV infection based on their current behaviours and almost one-third (27.1%) believed themselves to have no risk of infection (Figure 48). Among those who felt any level of HIV risk, 61.8% felt that having multiple partners put them at risk, and 56.3% reported that using condoms inconsistently or malfunctioning condoms put them at risk. Very few SWs (2.3%) attributed their risk to personal or partner substance use (Table 30).

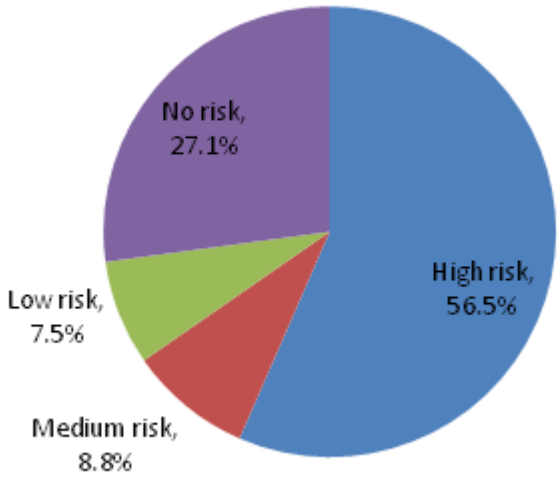


Figure 48. Perception of personal risk for HIV infection among SWs, Unguja, 2011/2012

Nearly all SWs (84.3%) knew where to get a confidential HIV test. More than three-quarters (77.2%) reported ever having an HIV test, and 50.8% reported having been tested in the past 12 months (Table 30).

Table 30. STIs, HIV knowledge, testing and risk perception among SWs, Unguja, 2011/2012

STIs, HIV knowledge, testing and risk perception	Crude N	Percent≠	95% CI≠≠
HIV knowledge			
Ever heard of HIV	313	98.7	97.1, 99.8
Agrees having one faithful uninfected partner reduces HIV risk	239	76.5	71.4, 83.5
Agrees that using a condom during vaginal sex prevents HIV	252	79.9	74.6, 85.2
Agrees that using condoms during anal sex prevents HIV	199	62.5	54.3, 69.2
Agrees that sharing needles increases HIV risk	304	94.7	91.7, 98.1
Agrees that cleaning needles reduces risk	124	38.6	31.9, 46.5
Disagrees one knows an HIV-infected person by looking	288	89.7	83.7, 94.7
Disagrees that one can get HIV from public toilets	281	87.8	82.8, 92.6
Risk perception based on current behaviour			
High risk	167	56.5	51.0, 65.7
Medium risk	36	8.8	5.4, 12.3
Low risk	21	7.5	3.4, 11.7
No risk	81	27.1	19.6, 32.5
Reasons for feeling at risk for HIV infection among those who felt at risk			
Frequently change partners	129	61.8	55.2, 71.4
Inconsistent use or malfunction of condoms	124	56.3	46.2, 64.7
Personal or partner substance use (injection and non-injection)	10	2.3	0.6, 4.4
HIV testing behaviour prior to the survey among all respondents			
Knows where to obtain an HIV test	268	84.3	79.7, 88.8
Ever had an HIV test	260	77.2	68.9, 83.8
Tested in the past 12 months	185	50.8	42.0, 58.5
STI symptoms in the past 6 months (genital/anal sores and/or discharge)			
Yes	82	24.8	18.8, 31.3
No	234	75.2	68.8, 81.2
Ever diagnosed with an STI by a nurse/physician			
Yes	68	18.2	13.7, 24.4

≠ RDSAT Weighted Population Estimate

≠≠ RDSAT Weighted Population Estimate 95% Confidence Interval

HIV and STI infection and associated risk factors

The prevalence of HIV among SWs was 19.3%. HBV prevalence was 2.2%, HCV prevalence was 1.6%, and syphilis prevalence was 3.1% (Figure 49, Table 31).

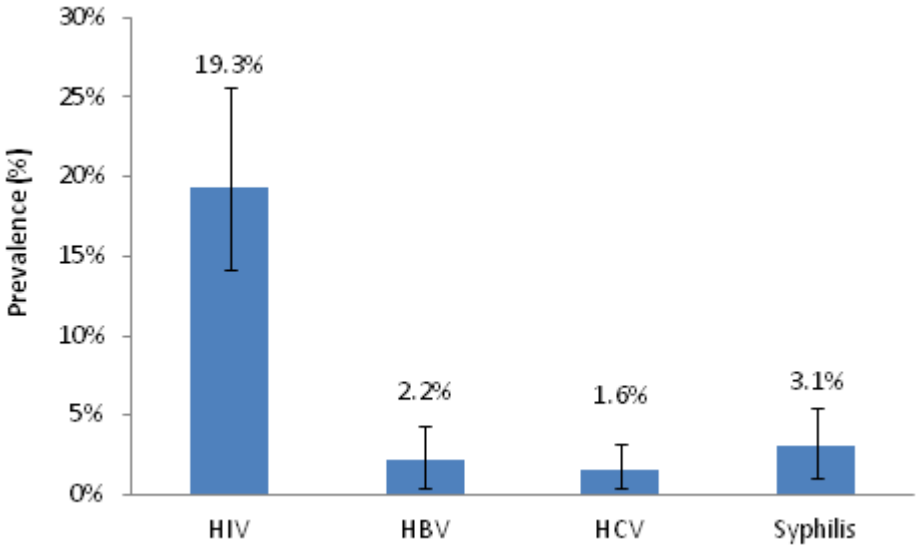


Figure 49. HIV, HBV, HCV, and syphilis prevalence among SWs, Unguja, 2011/2012

Table 31. HIV, HBV, HCV, and syphilis prevalence among SWs, Unguja, 2011/2012

Disease prevalence	Crude N	Percent≠	95% CI##
HIV			
Positive	72	19.3	14.2, 25.6
Negative	244	80.7	74.4, 85.8
HBV			
Positive	7	2.2	0.4, 4.4
Negative	309	97.8	95.6, 99.6
HCV			
Positive	9	1.6	0.4, 3.2
Negative	307	98.4	96.8, 99.6
Syphilis			
Positive	11	3.1	1.1, 5.5
Negative	305	96.9	94.5, 98.9

≠ RDSAT Weighted Population Estimate

RDSAT Weighted Population Estimate 95% Confidence Interval

The highest HIV prevalence was among 20-24 year olds (25.7%), followed by 30-34 year olds (23.9%) and those 35 years and older (19.2%). The lowest HIV prevalence was among the youngest age group, 15-19 years (3.9%, Table 32).

Among those with at least some education, HIV prevalence ranged from 19.9% among those with some or complete primary education to 16.6% among those with some or complete secondary education. There was no significant difference between the HIV prevalence of SWs who had immigrated to Unguja (18.3%) compared to those who had lived their entire lives in Unguja (20.4%).

HIV prevalence was higher among SWs who reported earning ≥ 200,001 TZS per month (39.3%) and those who reported earning ≤ 50,000 TZS per month (33.8%, Figure 50).

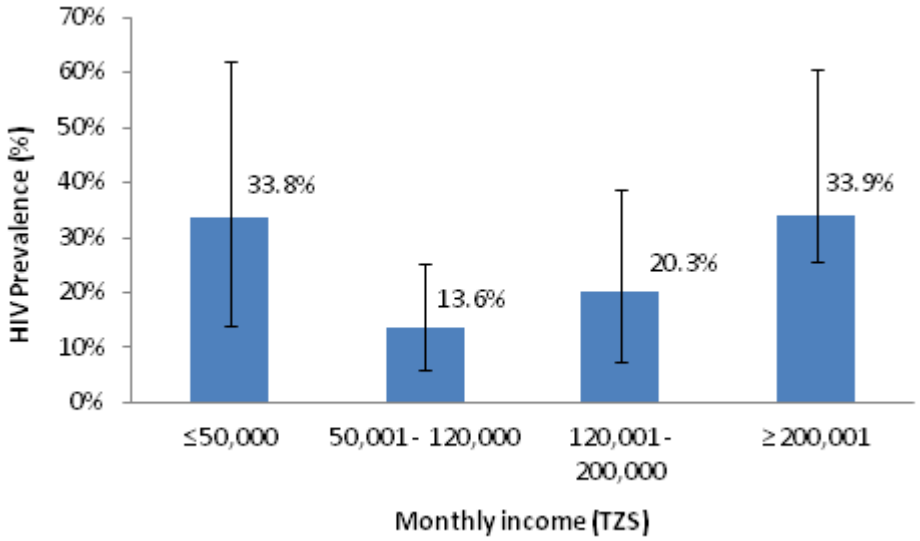


Figure 50. HIV prevalence by monthly income (TZS) among SWs, Unguja, 2011/2012

HIV prevalence was higher among SWs who started selling sex at older ages. Among SWs who started selling sex between the ages of 20 and 24 year and 25 years or older, HIV prevalence was 23.9% and 23.2%, respectively, whereas HIV prevalence was only 9.0% among SWs who first sold sex before the age of 20 (Figure 51).

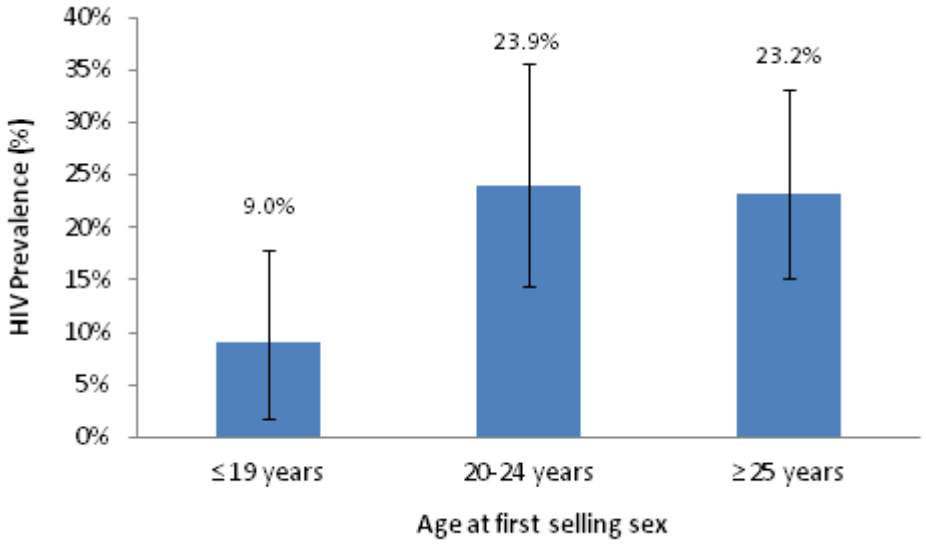


Figure 51. HIV prevalence by age at first selling sex among SWs, Unguja, 2011/2012

Table 32. HIV prevalence by socio-demographic characteristics among SWs, Unguja, 2011/2012

Socio-demographic characteristics	Crude HIV-positive (N)	HIV prevalence (%)¥	95% CI¥¥
Age group			
15-19 years	1	3.9	0.0, 15.6
20-24 years	13	25.7	11.0, 43.3
25-29 years	16	16.1	7.9, 27.4
30-34 years	22	23.9	13.9, 34.8
≥ 35 years	20	19.2	9.8, 31.7
Sex			
Male	0	NC	NC
Female	72	19.8	14.6, 26.1
Education			
No education	4	18.2	0.0, 50.4
Some or completed primary	34	19.9	12.6, 29.9
Some or completed secondary	31	16.6	10.8, 24.9
More than secondary	2	100	50.0, 100
Personal income (TZS)			
≤ 50,000	12	33.8	13.8, 62
50,001 - 120,000	10	13.6	5.9, 25.1
120,001 - 200,000	10	20.3	7.3, 38.8
≥ 200,001	21	39.3	25.8, 60.7
Migration			
Migrated to Unguja	33	18.3	10.5, 27.6
Lived whole life in Unguja	39	20.4	13.4, 28.5
Age at first selling sex			
≤ 19 years	9	9.0	1.8, 17.8
20-24 years	29	23.9	14.4, 35.6
≥ 25 years	34	23.2	15.2, 33.2

¥ RDSAT Weighted HIV Population Estimate

¥¥ RDSAT Weighted HIV Population Estimate 95% Confidence Interval

HIV prevalence did not vary significantly based on the duration of sex work. Those who had been selling sex for three years or less had a similar prevalence (18.5%) to those who had been selling sex for 4-6 years (21.8%), 7-9 years (21.4%) and 25 years or more (17.0%, Table 33).

HIV prevalence was similar by type of sexual partner in the past month. HIV prevalence was higher among SWs who reported using a condom with their most recent client (20.5%), compared to those who did not (14.6%, Table 33).

The relationship between HIV prevalence and frequency of condom use varied by partner type but in general, HIV prevalence increased with increased condom use (Table 33).

There was little difference in HIV prevalence between those SWs who reported using drugs that weren't injected, excluding alcohol, in the past three months (23.9%) and those who did not (17.9%, Table 33). HIV prevalence was higher among SWs who had ever injected drugs compared to those who had not (30.1% versus 18.5%). The same trend was seen among SWs who reported injecting drugs in the past three months: HIV prevalence was 36.8% among those who had injected and 19.0% among those who had not (Figure 53).

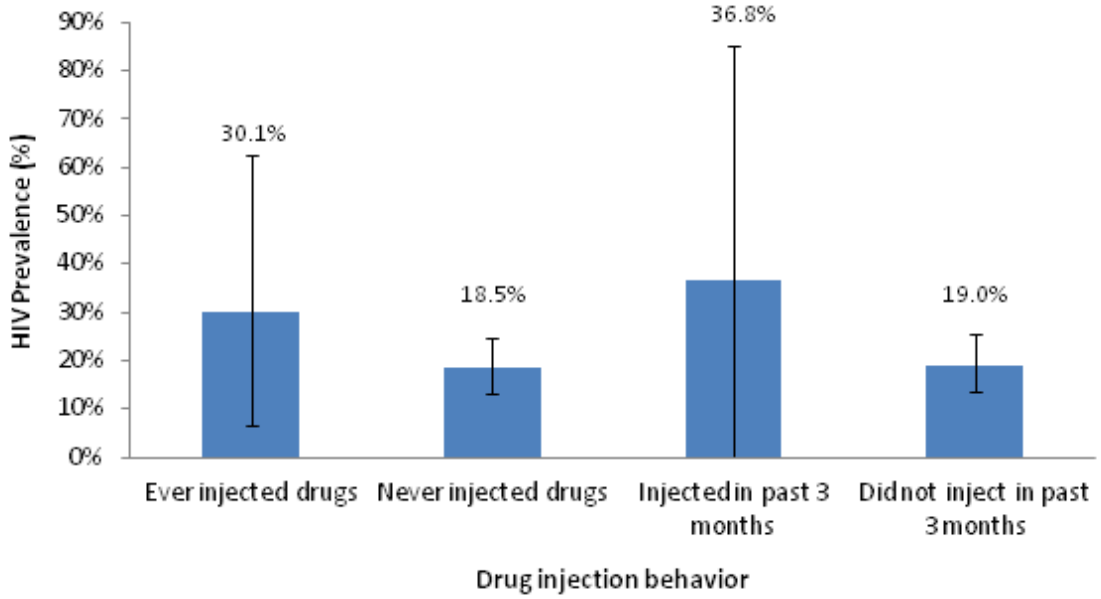


Figure 523. HIV prevalence and injection drug use among SWs, Unguja, 2011/2012

HIV prevalence was higher among SWs who reported having an HIV test prior to the survey (20.7%) compared to those who had not (11.9%, Table 33).

There was no significant difference in HIV prevalence between SWs who had been physically beaten in the past month and those who had not (21.5% versus 17.8%, Table 33).

Table 33. HIV prevalence by risk behaviours among SWs, Unguja, 2011/2012

Risk factors	Crude HIV-positive (N)	HIV prevalence (%)¥	95% CI¥¥
Duration of selling sex			
3 years or less	24	18.5	10.3, 28.7
4-6 years	19	21.8	12.2, 37.2
7-9 years	10	21.4	9.4, 40.0
25 years or more	19	17.0	7.7, 25.5
Number of clients on last day worked			
One	18	17.0	8.2, 28.1
Two	15	16.0	7.9, 28.3
Three	24	27.9	15.3, 40.6
Four or more	15	16.5	9.3, 26.5
Amount charged at last sex (TZS)			
< 10,000 TZS	16	17.0	8.6, 32.2
10,000 – 19,999 TZS	19	19.9	9.0, 30.7
20,000 – 29,999 TZS	12	22.0	8.6, 34.1
30,000 – 39,999 TZS	11	17.6	7.3, 31.1
≥ 40,000 TZS	14	19.9	7.9, 33.8
Had sex in the past month with:			
Steady non-paying partner	51	17.8	12.2, 24.7
Casual non-paying partner	31	17.1	10.6, 25.1
One-time client	69	19.0	13.5, 25.7
Regular client	66	17.9	13.1, 24.2
Tourist/foreigner	39	19.7	13.0, 28.8
Condom use with last client on last day worked			
Yes	64	20.5	14.6, 27.8
No	8	14.6	5.2, 27.1
Frequency of condom use with steady partner among those who had a steady partner in the past month			
Always	19	29.0	16.0, 44.4
Inconsistently	3	10.8	0.0, 26.9
Never	29	14.1	8.6, 21.5
Frequency of condom use with casual non-paying partners among those who had a casual, non-paying partner in the past month			
Always	29	21.3	12.9, 30.2
Inconsistently	1	5.1	0.0, 16.5
Never	2	14.8	0.0, 40.8
Frequency of condom use with one-time clients among those who had a one-time client in the past month			
Always	59	19.4	13.6, 26.9
Inconsistently	7	9.9	3.1, 18.0
Never	3	27.4	0.0, 63.1
Frequency of condom use with a regular client among those who had a regular client in the past month			

Always	56	19.3	13.7, 26.5
Inconsistently	5	7.7	1.6, 15.7
Never	6	23.5	6.2, 45.8
Frequency of condom use with tourist/foreigner clients among those who had tourist/foreigner clients in the past month			
Always	37	21.1	14.3, 32.0
Inconsistently	1	19.5	0.0, 51.8
Never	1	8.0	0.0, 23.2
Use of non-injection drugs other than alcohol in the past 3 months			
Used non-injection drugs	18	23.9	12.6, 41.0
No drug use	54	17.9	12.4, 24.4
Ever injected drugs			
Yes	6	30.1	6.7, 62.6
No	66	18.5	13.2, 24.9
Injection drug use in the past 3 months			
Used injection drugs	4	36.8	0.0, 85.1
Did not use injection drugs	68	19.0	13.8, 25.4
Ever had an HIV test prior to survey			
Yes	60	20.7	14.9, 28.7
No	11	11.9	4.8, 21.8
Was physically beaten in the past 12 months			
Yes	34	21.5	14.1, 30.3
No	38	17.8	11.8, 25.8

¥ RDSAT Weighted HIV Population Estimate

¥¥ RDSAT Weighted HIV Population Estimate 95% Confidence Interval

9. Comparison of 2007 and 2011 findings

The median age of SWs was 30.5 years in 2012 compared to 26 years in the 2007 survey. About one-quarter of SWs had been selling sex for 10 years or more in 2012 which is significantly higher than what was found in the 2007 survey (16.9%, p=0.02).

The majority of SWs reported always using condoms in the past month, was moderately high among SWs in 2012, with 86.0% reporting consistent condom use with tourist/foreign clients, 79.0% with one-time clients, 71.8% with regular clients, and 68.2% with casual non-paying partners. The estimates were significantly lower in the 2007 survey: 46.9%, 47.1%, 44.1%, and 28.1%, respectively (all p-values <0.001). In addition, condom use at last sex increased significantly from 55.7% in 2007 to 78.9% in 2012 (p<0.001).

Over half (56.5%) of SWs in 2012 believed themselves to be at high risk of acquiring HIV based on their current behaviours, which is significantly lower than in the 2007 survey (83.8%, p<0.001).

SWs were asked a series of questions related to HIV and stigma, and most (63.4%) agreed that 'People with HIV/AIDS should be ashamed of themselves' or that 'I would feel ashamed if I were infected with HIV/AIDS' (also 63.4%). This is significantly (p<0.001) higher than the results of the 2007 survey, when only 36.5% and 35.0%, respectively, agreed with those same statements.

In 2012, a large majority of SWs had ever tested for HIV (77.2%), higher than in the 2007 survey (32.9%, p<0.001).

HIV prevalence among SWs was 19.3%, much higher than the prevalence in the general population of women in Zanzibar. HIV prevalence in the current survey is significantly higher than that of the 2007 survey (10.8%, p=0.02). Most notable was the higher prevalence among the 20-24 year age group, which was 4.0% in 2007 and 25.7% in 2012 (Table 34).

Table 34. Key findings among SWs. Unguja, Zanzibar. 2007, 2011/2012.

	2007	2012	P-Value
Socio-demographic characteristics			
Median age of sample	26 years	30.5 years	
Sold sex for 10 years or more	16.9%	26.7	0.02
Risk behaviours			
Always used condom in the past month with:			
tourist/foreign clients	46.9%	86.0%	<0.001
one-time clients	47.1%	79.0%	<0.001
regular clients	44.1%	71.8%	<0.001
casual non-paying partners	28.1%	68.2%	<0.001
Condom use at last sex	55.7%	78.9%	<0.001
Believe self to be at high risk of acquiring HIV based on current behaviours	83.8%	56.5%	<0.001
Believe people with HIV/AIDS should be ashamed of themselves'	36.5%	63.4%	<0.001
Would feel ashamed if infected with HIV/AIDS	35.0%	63.4%	<0.001
Access to and uptake of services			

Ever tested for HIV	32.9%	77.2%	<0.001
Disease prevalence			
HIV prevalence	10.8%	19.3%	0.02
HIV prevalence among 20-24 year olds	4.0%	25.7%	0.02

10. Discussion and Recommendations: SWs

Socio-demographic characteristics of SW

The majority of SWs were 25 years or older:

The majority of the SW population captured by the 2012 survey was 25 years or older and the median age was older in 2011 compared to 2007. The duration of selling sex was significantly longer in 2011 compared to 2007.

Most SWs were widowed, divorced or separated:

The majority of SWs in 2012 were separated, divorced or widowed, and the most common for entering sex work was to support their family or pay off debt.

- Interventions such as income-generating activities for widowed, divorced or separated women should be established to avoid the necessity of selling sex for survival.

Risk behaviours of SWs

Consistent condom use among SWs:

In 2012, the proportion of SWs who reported always using condoms in the past month with clients and casual, non-paying partners was moderately high in 2012 which was significantly higher than the proportion in 2007. In addition, condom use at last sex also increased significantly and nearly all SWs reported that they were able to obtain male condoms when needed.

These increases in condom use may be a result of the initiation of prevention interventions targeting SWs through outreach peer education sessions that include condom distribution.

In spite of these improvements in condom use, only one quarter of SWs had always used a condom with their steady partner in the past month and SWs continue to report that they choose to not use condoms because their partners object or because they trust their partners. In addition, HIV prevalence was high among those reporting consistent condom use. This may be due to social desirability bias, or it is possible that HIV-infected SWs use condoms to prevent further transmission.

- Targeted interventions should be established with clients of SWs, providing education around HIV transmission and promoting condom use.
- SWs should be supported to build negotiation skills and capacity on conceptualization of risk behaviours so that they can protect themselves with all partner types.
- HIV prevention counselling and other prevention interventions should be designed to raise awareness among SWs, particularly the young, about the risks of unsafe sexual relations with all partner types.

Low levels of risk perception despite high HIV knowledge:

Over half of SWs in 2012 believed themselves to be at high risk of acquiring HIV based on their current behaviours, which is significantly lower than in the 2007 survey. The level of HIV knowledge among SWs has not changed significantly since 2007 and is therefore unlikely to be the reason for the change in risk perception. This change could be related to the apparent increase in condom use among SWs, but it could also translate to new infections if SWs do not see the importance of prevention.

- Prevention messages targeting SWs should clearly address risk factors contributing to HIV transmission among this population as well as preventive measures.
- HIV prevention counselling and interventions should be designed to raise awareness among SWs about the risks of unsafe sexual relations with all partner types, including non-paying partners, with whom condom use is most inconsistent.

High levels of stigma around HIV:

SWs were asked a series of questions related to HIV and stigma and significantly more agreed that 'People with HIV/AIDS should be ashamed of themselves' or that 'I would feel ashamed if I were infected with HIV/AIDS' in 2011 than in 2007. This increasing instance of stigma around HIV among SWs could have implications for SWs' willingness to access health services.

- HIV prevention counselling and interventions need to address issues of stigma and the impact that stigma has on the HIV epidemic.

Potential bridging between SWs and the general population:

Unprotected sex is a potential route of HIV transmission to the general population. SWs have a significantly higher HIV prevalence than the general population in Zanzibar, and are known to have steady as well as other paying and non-paying partners who might provide a bridge for HIV transmission. Although condom use seems to have increased, reported levels are still not 100% and vary with partner type.

- Prevention programs should take into account the important role that clients and other partners of SWs can play in the spread or prevention of HIV transmission, distinguishing between different partner types in prevention messages. In addition, interventions targeting these populations should be developed.

Access to and uptake of HIV prevention and other HIV-related services among SW

High rates of HIV testing among SWs:

In 2012, a large majority of SWs had ever tested for HIV which was significantly higher than in the 2007 survey. In addition and half of SWs in 2012 had tested in the 12 months prior to the survey. This increase may be due to interventions that were initiated after the 2007 RDS study targeting KPAR, including training of HCW on a comprehensive counselling approach for KPAR, peer educator outreach services, and distribution of behavioural chance communication materials with prevention messages targeting SWs.

- The above interventions should be strengthened to enable regular testing of SWs.
- All SWs found to be HIV-infected should be referred to a care and treatment clinics to enrol in care and treatment services to both maintain their own health and to lower their risk of infecting others.

Services targeting SWs are reaching limited numbers:

The MOH in Zanzibar in collaboration with health and development partners began implementing HIV and health-related programs targeting SWs after the 2007 survey. Despite these efforts, SWs have been a difficult population to reach with services. In the past year a little more than one-tenth of SWs had visited a clinic or drop-in centre that catered to the SW population, and only one-third had been visited by a peer educator. The most common services received through both approaches were HIV or STI information and condoms.

- HIV and health-related interventions targeting the SW population should be expanded, using new and innovative approaches to reach this population with services and other programs.
- Government and non-governmental service providers focusing on SWs should consider their targets, coverage, and service delivery strategies in light of this population size estimate.

Prevalence of HIV, HBV, HCV, and syphilis

High HIV prevalence:

HIV prevalence among SWs was much higher than the prevalence in the general population of women in Zanzibar and significantly higher than that of the 2007 survey. Most notable was the more than six-fold increase in HIV prevalence from 2007 to 2011 among the 20-24 year age group. While some of the apparent increase in HIV may be partially explained by the differences in age between the two survey populations, the very high prevalence among the young cohort of SWs in 2012 speaks strongly to new infections and high incidence continuing to occur.

- Further rounds of IBBS should be done in order to confirm the increase in HIV prevalence noted in this study.
- HIV prevention interventions should continue to be improved and strengthened. Care and treatment should also be made available to SWs.

Highest HIV prevalence among highest earning SWs:

HIV prevalence among SWs in 2012 was highest among the highest earning category – those earning more than 200,000 TZS per month. In Pemba, SWs were being paid more to have sex without using a condom. It is possible that the same is happening in Unguja, contributing to higher prevalence rates among higher paid SWs.

- Further investigation should be conducted to better understand what factors are placing higher paid SWs at risk for HIV infection. Study findings should be used to develop prevention messages.

CONCLUSIONS AND RECOMMENDATIONS

PEMBA

The rapid assessment conducted in Pemba confirms the presence of PWID, MSM and FSW. Results from those sampled for all three of these KPAR show that they are engaging in behaviours that put them at increased risk for HIV infection, including risky drug injection practices, multiple sexual partners, and low levels of condom use. HIV prevalence among study participants for all three populations was greater than that of the general population of Pemba.

High levels of stigma and potential criminalization make these three groups difficult to reach, and make them less likely to use health related services, particularly those linked to HIV and STIs behaviour. While services targeting PWID were available and were being accessed by some members of that population, study findings show that many FSW and MSM had yet to be reached by HIV/STI prevention and care programs addressing their needs.

The rapid assessment findings confirm the need for prevention efforts in Pemba to be expanded to include MSM and FSW, in addition to PWID. Prevention programs must be comprehensive, including activities focusing on harm reduction, condom promotion, sensitization of the authorities and of the community around the importance of reaching KPAR, peer education on HIV risk behaviours and HIV transmission prevention, HIV testing, and referral to HIV care and treatment services. This rapid assessment can serve as a foundation for program planning as well as future surveillance activities in Pemba. Surveillance activities among KPAR on Pemba should continue with a repeat rapid assessment combining qualitative and quantitative methods in three to five years. Such a repeat rapid assessment should focus on what factors have changed since the present study in terms of the direction of the epidemic, the reach of services, and sizes of the populations. The repeat rapid assessment may also serve as the first step for a larger quantitative survey closer in methods to those of the IBBS surveys done on Unguja. Based on the likely size of the KPAR, a full IBBS survey should be considered for FSW whose population size ranges from a few to several hundred on Pemba. For MSM and PWID whose population sizes range from a few score to a couple hundred, their numbers do not support a full IBBS survey. Instead, convenience samples in the 50 to 100 range may be more feasibility and may garner a large proportion of all identifiable MSM and PWID.

Efforts made by Zanzibar's MOH through ZACP and in collaboration with development partners, to reach KPAR with HIV prevention services should be commended. Study findings confirm that these hard to reach populations were, in fact, beginning to access services available to them, particularly those implemented through peer-led outreach programs. Improvements were seen in condom use among both MSM and SWs and rates of HIV testing have increased in all three populations since 2007.

However, considering that Zanzibar's HIV epidemic is known to be concentrated in KPAR and that all three populations continue to engage in high risk behaviours, it is critical that these efforts continue and that targeted interventions be strengthened and expanded to increase uptake and access. HIV prevention services must be comprehensive and tailored to meet the needs of each high risk population. Services should include: education on how to reduce sexual and drug use risk; promotion of skills and tools for safe injection; medication-assisted therapy for treatment among PWID; condom promotion and distribution; routine STI screening and treatment; and linkages to appropriate HIV care and treatment services for those found to be infected. Given the findings that stigma and discrimination continue to plague these populations, efforts must be made to ensure that services targeting KPAR, including care and treatment, are being provided in KPAR-friendly settings.

These repeated rounds of IBBS surveys are among the few to be documented in sub-Saharan Africa and in the world. Zanzibar is therefore among the few experiences that can speak to the ability of the RDS approach to consistently track indicators within KPAR over time. Several important considerations should be noted.

First, the dramatic decrease in HIV prevalence among MSM and the dramatic increase in HIV prevalence among SWs in Unguja compared to the results of the 2007 surveys call into question whether the repeated rounds sampled the same populations. Different sub-samples or different social networks may have been included in each round accounting for part or much of the apparent change in HIV prevalence. In addition to the very large changes in HIV prevalence in different directions, the demographic characteristics of the samples also differed. Similar results were noted for two rounds of RDS among PWID conducted in Seattle, USA [32]. Changes in indicators across the waves therefore should be interpreted cautiously.

Second, without a gold standard survey to compare to (i.e., a sample from a complete list of all persons who are KPAR is not attainable), there is uncertainty as to which of the rounds of RDS is closer to the true populations. The RDS survey data should therefore be interpreted in light of what other information, qualitative or quantitative, is known about the populations. The formative assessment is a vital component of the surveillance data in KPAR, guiding both the conduct and interpretation of the RDS survey data.

Third, to maintain RDS as a useful tool for surveillance, the need to adhere to the theory and practice of RDS as closely as possible should be emphasized. According to the theory of RDS, if the assumptions are fulfilled and both samples reach equilibrium, the studies should produce similar demographics. Some of the assumptions of RDS are impossible to test, such as that of the entire target population being networked.

Adherence to the protocols includes a thorough repeat formative, qualitative assessment phase with a focus on what may have changed in the KPAR since the previous rounds. A third round of RDS should be conducted on Unguja following the previous protocols as precisely as possible. A third round will help determine the trends in indicators over time and also help understand which RDS round, 2007 or 2011/12, comes closer to the truth.

Fourth, to address the possibility that different social networks were reached in the two RDS rounds, implementation techniques can be applied. Within the accepted theory and practice of RDS, techniques to help ensure achieving the most representative sample possible including seed selection (i.e., re-planting or further seed planting), steering (i.e., encouraging certain chains to grow faster), and pruning (i.e., slowing certain chains) are permitted. That is, under the theoretical assumptions that social networks are ultimately connected and sufficient data are gathered to adjust for patterns of inter- and intra-network connections, the speed at which equilibrium is reached can be adjusted through different methods.

Fifth, consideration for a different method to conduct IBBS in parallel to RDS should be considered, ideally at the same time as a third round of RDS. For example, if time-location sampling (TLS) were to be implemented for SWs alongside the RDS survey, discrepancies with the previous RDS rounds may also be resolved. The parallel exercise could also answer questions on which approach is logistically more feasible and further could be used as a “capture-recapture” method for population size estimation.

While these results may call into question the value of RDS as a surveillance tool, the above steps can be taken to ensure reproducible samples. The discrepant results should serve the scientific aim of strengthening methods, improving upon them, and considering alternative methods. These findings contribute to scientific knowledge of the limitations of RDS as it is currently being implemented in many parts of the world. Ultimately, public health decisions must be based on the best possible data available even as efforts to improve surveillance methods and data continue.

REFERENCES

1. Aceijas, C.S., Gerry V; Hickman, Matthew; Rhodes, Tim; on behalf of the United Nations Reference Group on HIV/AIDS Prevention and Care among IDU in Developing and Transitional Countries, *Global overview of injecting drug use and HIV infection among injecting drug users.* AIDS, 2004. **18**(17): p. 2295-2303.
2. Mathers, B.M., et al., *Global epidemiology of injecting drug use and HIV among people who inject drugs: a systematic review.* Lancet (London, England), 2008. **372**(9651): p. 1733-1745.
3. Abdool, R., F.T. Sulliman, and M.I. Dhannoo, *The injecting drug use and HIV/AIDS nexus in the Republic of Mauritius.* Afr J Drug Alcohol Stud, 2006. **5**(2): p. 107-116.
4. Deveau, C., B. Levine, and S. Beckerleg, *Heroin use in Kenya and findings from a community based outreach programme to reduce the spread of HIV/AIDS.* African Journal of Drug & Alcohol Studies, 2006. **5**(2): p. 95-107.
5. Dahoma, M.J.U., et al., *HIV and substance abuse: the dual epidemics challenging Zanzibar.* African Journal of Drug and Alcohol Studies, 2006. **5**(2): p. 129-38.
6. McCurdy, S.A., et al., *Flashblood: blood sharing among female injecting drug users in Tanzania.* Addiction, 2010. **105**(6): p. 1062-1070.
7. Zanzibar AIDS Control Program, *Integrated Behavioural and Biological Surveillance Survey among Most at Risk Populations in Zanzibar, 2007.* 2007.
8. Baral S, S.F., Cleghorn F, Beyrer C, *Elevated Risk for HIV Infection among Men Who Have Sex with Men in Low- and Middle-Income Countries 2000GÇô2006: A Systematic Review.* PLoS One, 2007. **4**: p. e339.
9. Baral S, T.G., Motimedi F, Umar E, Iipinge S, Dausab F, Beyrer C, *HIV Prevalence, Risks for HIV Infection, and Human Rights among Men Who Have Sex with Men (MSM) in Malawi, Namibia, and Botswana.* PLoS One, 2009. **4**: p. e4997.
10. Sanders EJ, G.S., Okuku HS, van der Elst EM, Muhaari A, Davies A, Peshu N, Price M, McClelland RS, Smith AD, *HIV-1 infection in high risk men who have sex with men in Mombasa, Kenya.* AIDS, 2007. **21**: p. 2513-20.
11. Sharma AS, B.E., Gorbach PM, Cohen CRM, Muga CB, Kwena ZM, Holmes KKM, *Sexual Identity and Risk of HIV/STI Among Men Who Have Sex With Men in Nairobi.* Sexually transmitted diseases, 2008. **35**: p. 352-54.
12. van Griensven F, S.E., *Understanding HIV Risks Among Men Who Have Sex With Men in Africa.* Sexually transmitted diseases, 2008. **35**: p. 355-56.
13. Wade AS, K.C., Diallo PAN, Diop AK, Gueye K, Mboup S, Ndoye I, Lagarde E, *HIV infection and sexually transmitted infections among men who have sex with men in Senegal.* AIDS, 2005. **19**: p. 2133-40.
14. Chen, L., et al., *Sexual risk factors for HIV infection in early and advanced HIV epidemics in sub-Saharan Africa: systematic overview of 68 epidemiological studies.* PLoS One, 2007. **2**(10): p. e1001.
15. Kriitmaa K, T.A., Osman M, Bozicevic I, Riedner G, Malungu J, et al., *HIV prevalence and characteristics of sex work among female sex workers in Hargeisa, Somaliland, Somalia.* AIDS, 2010. **24**(S61).

16. Ramjee, G. and E. Gouws, *Prevalence of HIV among truck drivers visiting sex workers in KwaZulu-Natal, South Africa.* Sexually transmitted diseases, 2002. **29**(1): p. 44-49.
17. Tanzania National AIDS Control Programme, *HIV Behavioral and Biological Surveillance Survey among Female Sex Workers in Dar es Salaam, 2010*, 2012.
18. Ghys PD, J.C., Pisani E, *HIV surveillance among female sex workers.* AIDS, 2001. **15**: p. S33-40.
19. Ao, T.T.H., et al., *Human immunodeficiency virus type 1 among bar and hotel workers in northern Tanzania: the role of alcohol, sexual behavior, and herpes simplex virus type 2.* Sexually transmitted diseases, 2006. **33**(3): p. 163-169.
20. Kapiga, S.H., et al., *HIV-1 epidemic among female bar and hotel workers in northern Tanzania: risk factors and opportunities for prevention.* Journal of acquired immune deficiency syndromes (1999), 2002. **29**(4): p. 409.
21. Riedner, G., et al., *Baseline survey of sexually transmitted infections in a cohort of female bar workers in Mbeya Region, Tanzania.* Sexually transmitted infections, 2003. **79**(5): p. 382-387.
22. McCurdy, S.A., et al., *HIV/AIDS and injection drug use in the neighborhoods of Dar es Salaam, Tanzania.* Drug and Alcohol Dependence, 2006. **82, Supplement 1**(0): p. S23-S27.
23. O'Connell, K., *International Rapid Assessment Response and Evaluation (I-RARE); Drug Use and Sexual HIV Risk Patterns Among Non-injecting and Injecting Drug Users in Phnom Penh and Poipet, Cambodia.* Phnom Penh, 2005.
24. Parry, C., et al., *Rapid assessment of drug use and sexual HIV risk patterns among vulnerable drugusing populations in Cape Town, Durban and Pretoria, South Africa.* SAHARA J (Journal of Social Aspects of HIV/AIDS Research Alliance), 2009. **5**(3): p. 113-119.
25. Patton, M.Q., *Qualitative research & evaluation methods* 2001: Sage Publications, Incorporated.
26. Paz-Bailey, G., et al., *How many men who have sex with men and female sex workers live in El Salvador? Using respondent-driven sampling and capture–recapture to estimate population sizes.* Sexually Transmitted Infections, 2011. **87**(4): p. 279-282.
27. National Bureau of Statistics, *Regional and district population projections*, 2006, Ministry of Planning, Economy and Empowerment: United Republic of Tanzania
28. Carty, L. and P. Nieburg, *HIV prevention among injection drug users in Tanzania and Kenya, New opportunities for progress*, 2011, Center for Strategic and International Studies Global Health Policy Center.
29. Cáceres, C.F., et al., *Epidemiology of male same-sex behaviour and associated sexual health indicators in low-and middle-income countries: 2003–2007 estimates.* Sexually Transmitted Infections, 2008. **84**(Suppl 1): p. i49-i56.
30. Vandepitte, J., et al., *Estimates of the number of female sex workers in different regions of the world.* Sexually Transmitted Infections, 2006. **82**(suppl 3): p. iii18-iii25.
31. Abramovitz, D., et al., *Using respondent-driven sampling in a hidden population at risk of HIV infection: who do HIV-positive recruiters recruit?* Sex Transm Dis, 2009. **36**(12): p. 750-6.
32. Burt, R.D., et al., *Evaluating respondent-driven sampling in a major metropolitan area: comparing injection drug users in the 2005 Seattle area national HIV behavioral surveillance system survey with participants in the RAVEN and Kiwi studies.* Annals of epidemiology, 2010. **20**(2): p. 159-167.