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Integrated Behavioral and Biological Surveillance Survey among Most at Risk Populations in Zanzibar, 2007

Injection Drug Users, Men who have Sex with Men, and Female Sex workers

Version 5. November 23, 2009

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Report on HIV/STI Biological and Behavioral Surveillance among Most at Risk Populations in Zanzibar, 2007

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ABBREVIATIONS/ACRONYMS

ANC	Antenatal clinic
ART	Antiretroviral therapy
CDC	Centers for Disease Control and Prevention
DEFF	Design effect
FSW	Female sex worker
HBV	Hepatitis B virus
HCV	Hepatitis C virus
HIV	Human immunodeficiency virus
IDU	Injection drug user
IGA	Income generating activities
IQR	Inter-quartile range
MARP	Most at risk population
MAT	Medication-assisted therapy
MSM	Men who have sex with men
NGO	Non-governmental organization
PEPFAR	President's Emergency Plan for AIDS Relief
PMTCT	Prevention of mother to child transmission
RDS	Respondent driven sampling
RDSAT	Respondent driven sampling analysis tool
STI	Sexually transmitted infection
TB	Tuberculosis
VCT	Voluntary counseling and testing
ZACP	Zanzibar AIDS Control Programme

INTRODUCTION

(letter from principal secretary or other politician)

EXECUTIVE SUMMARY

This report presents findings of the first round of behavioral and biological surveillance surveys conducted among most at risk populations (MARPs) in Zanzibar. The primary objective of these surveys is to provide information on the prevalence of HIV infection and associated risk factors among injection drug users (IDUs), men who have sex with men (MSM) and female sex workers (FSWs). This information should both inform programmatic and policy responses for these populations and provide a baseline from which to monitor epidemic trends. While the prevalence of HIV infection in Zanzibar remains less than 1% in the general population, routine surveillance among MARPs provides essential evidence for interventions to prevent more widespread transmission.

The 2007 MARPs HIV surveillance surveys were implemented by the Zanzibar AIDS Control Programme (ZACP), Ministry of Health and Social Welfare. Technical Assistance was provided by Tulane University through the University Technical Assistance Program (UTAP) and the US Centers for Disease Control (CDC) in Tanzania and Atlanta. Funding was provided by the US President's Emergency Plan for AIDS Relief (PEPFAR) through the CDC.

The 2007 MARPs surveillance surveys used respondent-driven sampling (RDS) to obtain samples of 499 IDUs, 509 MSM and 379 FSWs aged 15 years and older in Unguja island, Zanzibar, the main island in the Zanzibar archipelago. RDS is a chain-referral sampling method specifically designed to obtain probability-based samples of 'hidden' populations. After providing informed consent, respondents completed an interview, provided blood specimens to be tested for HIV, hepatitis B, hepatitis C and syphilis, and received a voucher to receive test results with post-test counseling at the interview site after two weeks. Proportion estimates adjusted for participants' probability of recruitment were calculated using RDS Analysis Tool (RDSAT) Version 5.6.

Key Findings

The prevalence of HIV infection was high among all three risk groups in comparison to the general population of Zanzibar. HIV prevalence was 16.0% among IDUs, 12.3% among MSM and 10.8% among FSWs. While MARPs are characterized by unique risk behaviors, these groups are not mutually exclusive and there is considerable overlap in transmission risks. Among MSM, 13.9% reported using injection drugs in the previous three months and 77.5% reported being paid for sex in the last year. Although only 2.8% of FSWs reported injection drug use, a larger proportion (10.9-17.6%) suspected their sex partners of using injection drugs.

Furthermore, reported risk behaviors in all three groups provide evidence for potential bridges for HIV transmission to the general population of Zanzibar; nearly three-quarters of MSM (71.2%) reported having female sex partners in the previous year; in addition having sex with to paying clients, half of FSWs (48.9%) reported having a steady non-paying partner; and more than half of IDUs (52.8%) reported being sexually active in the previous month. Among all these groups, multiple partnerships were commonly reported and consistent condom use was rare.

Despite having high levels of knowledge about HIV risks, few MARPs had previously accessed HIV testing services. IDUs, MSM, and FSWs all reported the primary reason for not accessing HIV testing was 'fear of knowing one's status.' This fear may be related to lack of awareness about available services for care and treatment or options for living with HIV. It may also be a consequence of stigma associated with one's HIV status. Respondents in all three groups reported experiencing stigma in addition to violence and legal persecution. These findings indicate a need for comprehensive healthcare services as well as sensitization of healthcare and law enforcement professionals to ensure respect for individual rights.

Given high infection levels, overlapping risk behaviors, and potential bridging with the general population, targeted HIV prevention, care and treatment services for MARPS groups should be a high priority. A minimum package of services should address multiple risks and build on existing peer education and outreach activities. Within a comprehensive HIV prevention and care strategy following a 'do no harm' approach, services should include risk reduction counseling, targeted condom and lubrication promotion and distribution, enhanced HIV counseling and testing, STI screening and treatment services, and linkages to other health services including family planning, reproductive and primary health care. In addition, interventions should involve education about safe injection practices, overdose and medication-assisted therapy (MAT) for IDUs and antiretroviral therapy (ART) for those found to be eligible. The feasibility of hepatitis screening, vaccination and/or treatment should also be explored. The design of programs and services for MARPs should seek to involve the target populations to the greatest extent possible in their design and implementation. Finally, community and health-facility based activities and services need to be complemented by structural interventions such as community mobilization and policy level initiatives, in particular those addressing stigma and discrimination of MARPs.

Injection drug users

Risk behaviors

- *High-risk injection drug use practices*: 98.4% of IDUs reported injecting several times a day and 53.8% reported injecting with a previously used needle in the past month.
- *High-risk sexual behaviors*: 52.8% of IDUs reported any sex in the past month. Among these, 63.0% reported having two or more partners in that period. Overall, 42.8% of IDUs reported sex with a non-paid partner, 20.7% reported paying a partner for sex, and 16.5% reported being paid for sex. By partner type, 66.7% to 73.4% reported "never" using condoms.
- *Longer duration of injection drug use associated with HIV infection*: The majority of IDUs (73.2%) reported using drugs for seven years or longer. HIV prevalence among IDUs who reported injecting drugs for three years or fewer was 5.5% compared with 16.7% among IDUs who injected drugs for seven years or more.

IDU Biological Results

- HIV prevalence was 16.0%.
- Syphilis prevalence was 0.3%
- HBV prevalence was 6.5%
- HCV prevalence was 26.9%.
- Among IDUs who tested positive for HIV, 45.1% also tested positive for HCV infection.

Violence and stigma

- *High prevalence of violence and arrests*: In the past 12 months, 57.1% of IDUs reported being physically abused and of these, nearly one-third reported being beaten by police (32.6%). Three-quarters of IDUs (73.9%) had been arrested in the past year.
- *Abandonment*: Almost two-thirds of IDUs (60.3%) reported they had been abandoned by their family or partner as a result of their drug abuse.

Service Utilization and Access

- *Low rates of HIV testing*: despite comprehensive knowledge and risk perception only 22.0% of IDUs had ever had an HIV test prior to the survey.

Transmission bridges

- *Potential for sexual transmission*: 52.8% of IDUs were sexually active in the past month and of these, only 18.2% reported always using condoms in the last month.

Men who have Sex with Men

Risk behaviors

- *High-risk sexual behaviors*:
  - Transactional sex: 82.7% reported being paid by a man to have anal or oral sex.
  - Multiple partners: MSM had a median of three male partners and one female partner in the past month.
  - Low rates of condom use: 63.3% to 77.2% of MSM reported never using a condom with different partner types.
- *High rates of drug use and injection drug use*: in the past 3 months, 60.3% of MSM reported drug use of any kind and 13.9% reported injection drug use.

MSM Biological Results

- HIV prevalence was 12.3%
- Syphilis prevalence was 0.2%.
- HBV prevalence was 4.6%
- HCV prevalence was 14.7%
- 43.0% of MSM infected with HIV also tested positive for HCV infection.

Violence

- *Prevalence of violence and arrests*: 35.2% of MSM reported being beaten in the past 12 months and 25.0% reported being arrested in the past 12 months.

Service Utilization and Access

- *Low rates HIV testing*: only 18.8% MSM had ever had an HIV test prior to the survey although 55.9% were aware of where to get a confidential HIV test.

Transmission bridges

- *Potential for sexual transmission*: 71.2% of MSM reported having sex with women in the last year.
- *Potential for injection drug use transmission*: 13.9% of MSM reported injection drug use in the past three months

Female Sex Workers

FSWs Biological Results

- HIV prevalence was 10.8%
- Syphilis prevalence was 1.3%
- Hepatitis B prevalence was 5.1%
- HCV prevalence was 1.9%

Risk behaviors

- *Rates of condom use were low to moderate and varied by partner type:* 55.7% of FSWs reported using condoms the last time they had sex. The most common reason reported by FSWs for not using a condom was partners' objection to using one (42.5%)
- *HIV prevalence higher among FSWs reporting less education and selling sex for a longer period:* 16.7% of FSWs who completed 1 to 7 years of school were HIV-infected compared with 3.1% of those who completed 8 to 10 years of school. HIV prevalence was highest among FSWs who reported selling sex for 10 years or more (28.6%), compared with that of FSWs who reported selling sex for three years or less (3.6%).

Violence and stigma

- *Physical abuse by male clients and other sex partners:* 37.2% of FSWs reported they were the victim of physical violence in the past 12 months. Among these, 39.4% reported being beaten by their steady partner and 28.5% reported being beaten by a one-time sex partner.

Service Utilization and Access

- *Low rates of HIV testing despite high perception of HIV risk:* Though the majority of FSWs perceived themselves at high risk of HIV infection (83.8%), only 32.9% of FSWs had ever had an HIV test.

Transmission bridges

- *FSWs have several different partner types:* half of FSWs report having a steady non-paying partner (48.9%) while 23.9% report having casual non-paying partners. FSWs had a median of 3 clients on their last day of work.
- *Drug use among FSWs was low however higher proportions suspected drug use among sexual partners:* less than 3% of FSWs (2.8%) reported using injection drugs; however, 10.9% - 17.6% of FSWs suspected their sexual partners of using injection drugs.

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 less than one percent. Antenatal clinic (ANC) surveillance in 2008 found that approximately 0.6% of pregnant women seen in ANC sites were HIV-positive. While HIV prevalence in the general population remains low, it is known that certain populations are at increased risk for HIV infection, including injection drug users (IDUs), men who have sex with men (MSM), and female sex workers (FSWs). To date, there has been very little information about infection rates among these groups, the factors that put them at risk, or the extent to which transmission routes bridge to the general population.

HIV prevention efforts in a concentrated HIV epidemic such as the epidemic in Zanzibar should focus on the groups most vulnerable to infection. The Government of Zanzibar recognizes the urgent need to address the prevention, care and treatment needs of most at risk populations (MARPs).

HIV Surveillance

The Zanzibar AIDS Control Programme (ZACP) of the Zanzibar Ministry of Health and Social Welfare coordinates all national HIV surveillance and program activities in Zanzibar. Historically, HIV surveillance data in Zanzibar have been obtained through two types of data sources: 1) Sero-surveys conducted annually in sentinel sites to monitor trends in HIV prevalence among ANC attendees, blood donors, and tuberculosis (TB) patients and 2) general population-based surveys with HIV testing. HIV data are also collected via passive surveillance activities conducted in programs offering HIV testing, such as HIV voluntary counselling and testing (VCT) services, and prevention of mother to child HIV transmission (PMTCT) programs.

Most at Risk Populations

IDUs

Sharing syringes and other injecting equipment is a well-known route for HIV transmission among IDUs. However, injection drug use has received little attention in sub-Saharan Africa. In recent years, documented increases in drug trafficking through Zanzibar have caused concern for associated increases in local drug use, in particular heroin.[1] A 2005 survey of substance users in Zanzibar found high prevalence of HIV infection among substance users (13.0%) and particularly among IDUs (26.2%) in comparison to the general population;[2] In addition to injection-related risk, IDUs may have increased risk of acquiring and transmitting HIV through high-risk sexual behaviors.[3-5] Studies in Mainland Tanzania showed that many female IDUs turned to commercial sex work in order to support their drug use habits.[4]

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.[6-11] 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.[7;11]

FSWs

In many countries around the world, sex workers and their clients are considered a core group contributing to the transmission of HIV, and sex workers often have a disproportionately high prevalence of HIV infection. By definition, sex workers 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. Several countries with low HIV prevalence have shown rapid increases in HIV infection among FSWs well before similar increases are seen in the general population.[12] In addition, studies among female bar workers in Mainland Tanzania – often informal sex workers – found HIV prevalence among these women ranged from 19% – 68%.[13-16]

RATIONALE AND OBJECTIVES

To date, HIV surveillance in Zanzibar has focused on the general population, and information to guide programmatic and policy decisions targeting most at risk populations (MARPS) was lacking. In 2007, the Government of Zanzibar conducted behavioral and biologic surveys among three known high risk groups: MSM, FSWs, and IDUs.

The objectives of biological and behavioral surveillance among MARPS were to:

I. Measure the prevalence of HIV, hepatitis B and C, and syphilis among IDUs, MSM, and FSWs in Zanzibar

II. Measure key HIV risk and preventive behaviors

III. Generate key data for advocacy, policy-making and program design

IV. Assess STI treatment seeking behaviors

METHODS

1. Respondent Driven Sampling (RDS)

This study 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 FSWs, IDUs, 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 with which to recruit peers into the study. Their peers who then enroll 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

According to HIV prevalence estimates for Unguja, the prevalence of HIV infection for MSM, FSW, and IDU was estimated at 30%, 20%, and 30%, respectively. Sample sizes

for various prevalence estimates (P) ranging from 10% to 40% with precision ranging from 2% to 20% are detailed below. Sample sizes were corrected for an expected design effect (DEFF) of 1.5.

MSM sample size
Assuming 30% HIV prevalence in the MSM population and expected precision of 5%, with a 95% confidence interval (CI) of 25% to 30% around the prevalence estimate, the estimated sample size was 490.

FSW sample size
Assuming 20% HIV prevalence in the FSW population and an expected precision of 5%, with a 95% CI of 15% to 25% around the prevalence estimate, the estimated sample size was 375.

IDU sample size
Assuming 30% HIV prevalence in the IDU population and expected precision of 5%, with a 95% CI of 25% to 30% around the prevalence estimate, the estimated sample size was 490.

3. Data collection

In Zanzibar, seeds were identified during formative focus group discussions 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 and provided informed consent for a face-to-face interview and blood draw for HIV, syphilis, hepatitis B virus (HBV) and hepatitis C virus (HCV) testing. Interviews used a face-to-face questionnaire tool, which were conducted in Kiswahili and took approximately 45 minutes to complete. The questionnaire collected data on socio-demographic characteristics, sexual and drug risk behaviors, STI and HIV knowledge, information on participants' social networks, as well as access and utilization of HIV-related services. Following the interview, each participant was provided three coupons with which to recruit eligible peers. All biological and behavioral data collection took place at ZACP offices in Stonetown, Zanzibar.

Participants received a primary compensation for completing the survey and, for MSM and IDUs, an additional secondary compensation for each recruit who was eligible and consented to participate in the survey (Table a). After specimen collection, participants received a voucher to return to the interview site after two weeks to receive their test results with post-test counseling. Those with positive test results for HIV, HBV, HCV, and/or syphilis infection were referred to the HIV/STI care and treatment center in Mmnazi Moja Hospital for further management. 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 a. RDS survey parameters by target population

	MSM	FSW	IDU
Dates of survey	April - June 2007	July – September 2007	August – September 2007
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 Zanzibar for the past three months d) able to adequately grant informed consent	a) exchanged sexual intercourse for money in the past month b) liberated minors, female, aged 15 or older c) lived in Zanzibar for the past three months d) able to adequately grant informed consent	a) injected illicit drugs in the past three months b) liberated minors, female or male, aged 15 or older c) lived in Zanzibar for the past three months d) able to adequately grant informed consent
Number of seeds	10 (1 with no recruits)	7 (1 with no recruits)	7 (1 with no recruits)
Final sample size[1]	509	379	499
Compensation	$3.20 US for completing the survey $1.60 US for each successful recruit	$6.40 US for completing the survey and giving biological sample No secondary incentive, but transport fee of $1.60 provided to FSWs who collected biological test results	$3.20 US for completing the survey $1.60 for each successful female recruit $0.80 for each successful male recruit
Number of coupons	3	3	3

4. Tools development and staff training

All study investigators were provided training on behavioural surveillance with a focus on RDS methodology from November 13-19, 2006. 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 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. In addition, using previously used survey tools from other countries

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

with concentrated HIV epidemics as a template, investigators developed and reviewed the informed consent for the study, created screening questions, and wrote the interview questions. After the workshop, these initial tools were refined and additional tools were created, including daily log forms, coupon tracking forms, and databases for behavioral data, non-response bias, and laboratory test results. A second training was conducted immediately prior to survey implementation in April 2007 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 behavioral 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 target population.

Commented [EK1]: Include tools as appendices?

5. Laboratory procedures

Venous blood was transferred daily to the main HIV referral laboratory in Unguja at Mmnazi Moja hospital and was tested for the following:

1) **HIV serostatus** assessed through HIV antibody testing using SD Bioline HIV-1/2 3.0 test (Standard Diagnostics, Kyonggi-do, South Korea). Reactive specimens were confirmed using Determine HIV1/2 test (Abbott Diagnostic Division, Hoofddorp, Netherlands) and discordant results were tested with Unigold (Trinity Biotech, Bray, Ireland). All three tests are assays for the detection of antibodies to HIV types 1 and 2.
2) 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.
3) 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.
4) **Syphilis infection** was tested with ACON Syphilis Ultra Rapid Test strip (ACON Laboratories, Inc., Hangzhou, China), a qualitative treponemal membrane strip-based immunoassay for the detection of *Treponema pallidum* antibodies (IgG and IgM) in whole blood, serum or plasma.

6. Data management and analysis

Data were entered into Microsoft Excel. Double entry procedures were performed at ZACP for data cleaning and quality control. Final datasets were converted to SPSS (version 15.0). Consistency checks and frequencies were performed to check validity and logic of all variables in the datasets. Final datasets were kept at ZACP and only authorized staff members were allowed access. Hard copies of completed questionnaires were stored at ZACP.

Data management and recoding were conducted in SPSS (version 15.0). Datasets were then converted to Microsoft Excel. Estimates and 95% confidence intervals (CI) were calculated using the RDS Analysis Tool 6.0 (RDSAT).

7. Ethical considerations

In order to minimize any social risks, consultations were held prior to the start of the survey with the local authorities including Zanzibar Regional Commissioners Office, police and county level government and community leaders, local Research Council, non-governmental organizations (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, the consent form was read to the survey participant by project staff. 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.

To minimize any discomfort due to the sensitive nature of the questions asked, the questionnaire was administered by same-sex study personnel in a private, confidential setting. Participants could refuse to answer any specific question and biologic testing. Also, study staff provided referrals to local services for care and treatment, as appropriate. 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 the result of being or not being part of the survey.

All study data including behavioral and laboratory information were kept in a confidential manner. The survey team did not record names or other personal identifiers on the survey questionnaires nor on any of the laboratory specimens and results. In this survey, coupon identification numbers were assigned to each of the participants and used to link questionnaire responses to behavioral 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 Zanzibar Health Research Task Force and was approved as non-engaged research by the Associate Director of Science at the National Center for HIV, Hepatitis, STD, and TB Prevention at CDC.

8. Limitations

This study was subject to several limitations. Because behavioral 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 behaviors; 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-enrollment 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 carefully adjusted to reach appropriate levels. In order to prevent double-enrollment and ensure all participants met eligibility criteria, recruits attending the study site were screened by three separate study staff.

Analysis of drug use behavior was limited only to more 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. Further, as analysis in RDSAT depends on the integrity of recruitment chains to determine and adjust estimates for probability of recruitment, missing values may distort adjusted proportion estimates. We have attempted to correct for this in the analysis by taking special care to include missing values in the denominator for prevalence estimates when appropriate.

RESULTS

This chapter presents biological and behavioral findings for IDUs, MSM and FSWs in separate sections. For each population, socio-demographic characteristics are described, followed by risk behaviors, experience of stigma and violence, prevalence of HIV, Hepatitis B and C, and syphilis, and basic analysis of risk factors associated with HIV infection. Each section concludes with a brief discussion of the findings and their programmatic and policy implications for HIV prevention and services among the population at risk. 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.

Injection Drug Users (IDUs)

From August to September 2007, 499 IDUs enrolled in the survey. Of these, only 16 (3.0%) were female. Unless otherwise stated, all results presented in this section combine responses from both male and female participants.

1. Socio-demographic characteristics

The median age of IDUs was 31 years. Just over one-third of IDUs (34.1%) completed some primary school education, while 38.2% completed 8-10 years of education and 26.6% received any secondary education.

Table 1. Socio-demographic characteristics of IDUs, Unguja, 2007

Socio-demographic characteristics	N	%	95% CI
Age			
15-19 years	5	0.7%	0.1, 1.5
20-24 years	62	14.3%	10.1, 18.3
25-29 years	130	28.6%	23.8, 34.1
30-34 years	126	24.0%	19.0, 29.1
≥ 35 years	176	32.4%	27.0, 38.0
Median age in years (IQR)		31 years (IQR: 27 – 37) Min. 15 – Max. 66	
Education			
No education	6	1.1%	0.1, 2.6
2-7 years	147	34.1%	28.3, 40.4
8-10 years	188	38.2%	32.2, 43.9
≥ 11 years	149	26.6%	21.5, 31.8
Median educational in years completed (IQR)		10 years (IQR: 7 – 11 years) Min. 0 – Max. 13 years	
Current living situation			
Alone	94	18.6%	14.5, 23.5
Wife/girlfriend	56	11.0%	7.4, 15.2
Husband/boyfriend	5	0.5%	0.0, 1.1
Family	316	64.2%	58.0, 70.1
Friends	13	4.1%	1.2, 7.4
No fixed address	14	1.6%	0.6, 3.0
Occupation			
Formal employment	73	13.2	9.9, 17.4
Non-formal employment	165	29.9	24.8, 34.6
Illegal activities	81	14.1	10.2, 18.1
Unemployed	63	15.4	11.1, 20.6
Other	116	27.4	22.1, 32.6
Income TZS			
< 50,000	68	22.4%	17.2, 28.9
50,000 – 120,000	170	47.4%	40.1, 54.2
120,001 – 200,000	103	21.9%	16.8, 26.9
≥ 200,001	44	8.3%	5.7, 11.6
Median income		100,000 TZS Min. 6,000 – Max. 600,000	

The majority of IDUs (64.2%) were currently living with their family. About one-fifth of IDUs (18.6%) reported living alone and others reported living with their spouse/partner or friends. Only a small proportion (1.6%) reported having no fixed address.

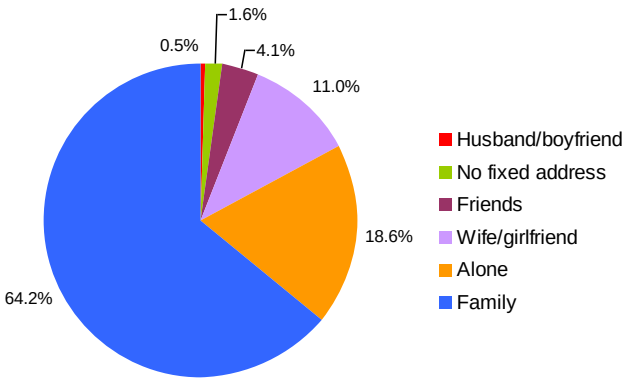

Figure 1. Living situation among IDUs, Unguja, 2007

IDUs reported earning an average of 126,590 TZS monthly, ranging from 6,000 TZS to 600,000 TZS. The median reported income was 100,000 TZS. A large proportion of IDUs (29.9%) earned income through non-formal employment which was loosely defined as 'petty trading'. Only 13.2% of IDUs reported having formal employment, 15.4% were currently unemployed and 14.1% reported earning income through "illegal activities".

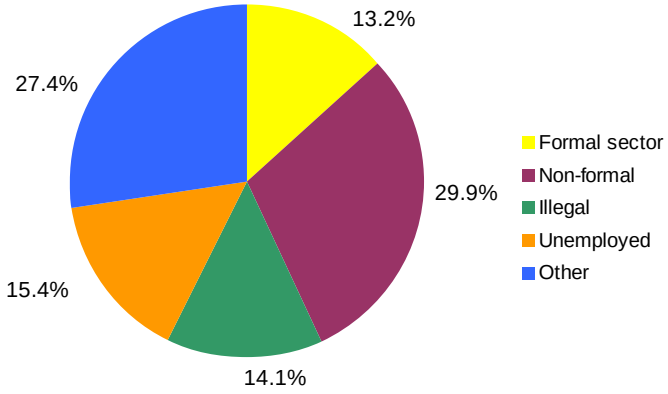

Figure 2. Employment among IDUs, Unguja, 2007

Virtually all male IDUs were circumcised (99.6%), consistent with religious customs on Unguja where the population is predominantly Muslim.

2. Drug use and injection practices

Initiation and duration of injection drug use

IDUs reported their age at first use of injectable drugs as young as 8 years and as old as 50 years. The median age of initiation of injection drug use was 20 years. The majority of IDUs reported being introduced to injectable drugs by a friend (56.0%) or another drug user (35.5%). At the time of the survey, IDUs had been injecting drugs for an average of 12 years. Nearly three-quarters of respondents (73.2%) had injected drugs for seven years or more.

Non-injection drug use

The majority of IDUs (79.5%) reported taking non-injectable drugs other than alcohol within the last three months. Among those who had taken non-injectable drugs in the past three months, the most commonly reported was smoking marijuana or hashish (84.4%), followed by inhaling cocaine (60.1%), taking painkillers or prescription drugs (54.6%), and smoking heroin (48.4%).

Table 2. Drug use and injection practices among IDUs, Unguja, 2007

Drug use and injection practices	N	%	95% CI
Non-injection drug use			
Used any non-injectable drugs other than alcohol in the past 3 months	385	79.5%	74.9, 83.8
Smoked marijuana/hashish	328	84.4%	79.3, 88.8
Inhaled cocaine[2]	212	60.1%	53.4, 65.7
Painkillers (prescription drugs)	187	54.6%	48.9, 60.6
Smoked heroin	135	48.4%	41.5, 54.5
Sniffed petrol or glue	105	33.8%	27.6, 40.1
Valium	41	12.5%	7.9, 16.8
Smoked crack cocaine	8	2.6%	0.7, 5.0
Duration of injection drug use			
3 years or less	31	7.2%	4.3, 10.2
4-6 years	85	19.6%	14.9, 24.0
7 years or more	381	73.2%	68.6, 78.5
Median age at first injection	20 years Min. 8 – Max. 50 years (IQR. 17-25)		
Types of drugs injected in the past 3 months			
White heroin	485	96.9%	94.2, 98.9
Brown heroin	14	2.3%	1.0, 4.3

[2] The study team reported that respondents were likely using the names for “cocaine” and “heroin” interchangeably. Cocaine is very difficult to get and very expensive; therefore, it is likely that most IDUs meant heroin when they referred to inhaling or smoking cocaine.

Injection drug use

In the last three months, the most commonly reported injectable drug used by IDUs was white heroin (96.9%). Additionally, 2.3% reported injecting brown heroin. The type of injectable drug used by IDUs is reflective of what is currently available in the local market. The average amount IDUs spent for their last injection (estimated per *kete*[3]) was 1000 TZS.

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Almost all IDUs (98.4%) reported injecting several times a day and very few (N=13) reported injecting less frequently. IDUs prepared and injected drugs alone or with other drug users. Sixteen percent (15.6%) of IDUs reported that they "always" prepared drugs with someone else while 37.6% reported that they never prepared drugs with another person.

The practice of "flashblood" or injecting the blood of another user who has drugs in their bloodstream was reported by 3.4% of IDUs.

Needle sharing and access to clean needles

Just over half of IDUs (53.8%) reported that in the past month they had used a needle that had been previously used by someone else. At last injection, 62.9% of IDUs reported that they used a new sterile needle.

Almost a third (30.0%) of IDUs reported that they "always" cleaned a needle that had been used by someone else before injecting drugs with it; however, use of any disinfecting agent was very rare. Of those who reported cleaning used needles in the past one month, virtually all IDUs (99.3%) reported using cold water and only 2.0% reported using alcohol.

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

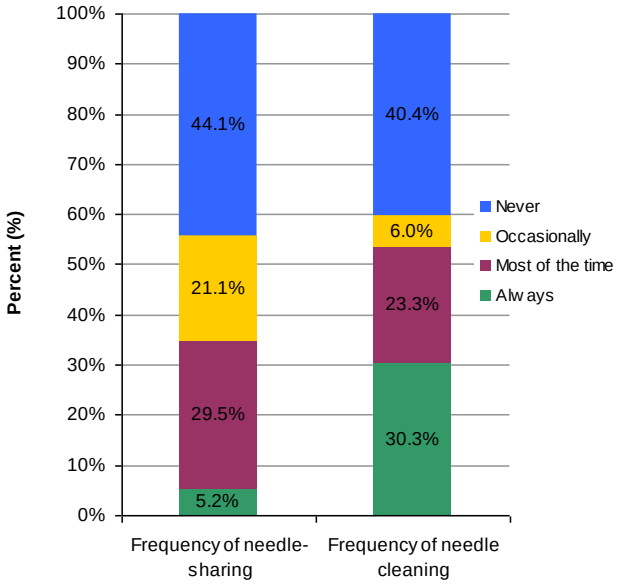

Figure 3. Needle sharing and needle cleaning among IDUs, Unguja, 2007

The most commonly reported reason that IDUs shared needles the last time they injected drugs was the need to share the cost. More than one-third (34.8%) of all IDUs reported they last shared a needle because they "did not have enough money to inject alone." Other reasons mentioned included the unavailability of needles or syringes, pressure from another injector, and the costliness of needles.

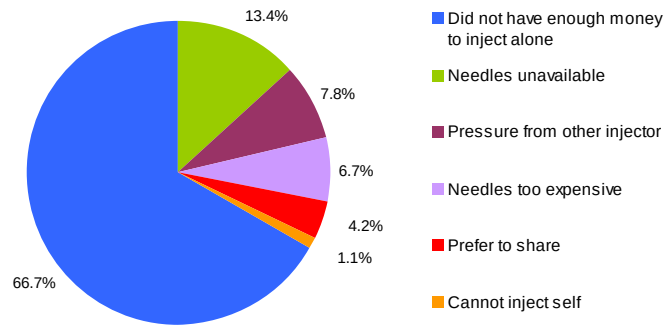

Figure 4. Reasons for sharing needles at last injection among IDUs, Unguja, 2007

The majority of IDUs reported obtaining needles from a pharmacy in the past month (65.9%). IDUs also commonly reported obtaining needles from drug sellers (23.1%) and from other drug users (8.2%). At the time of the survey, no formal health facilities or peer educator programs existed that provided needles to IDUs.

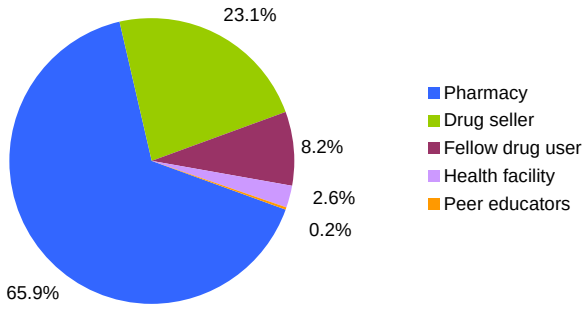

Figure 5. Needle sources among IDUs, Unguja, 2007

Just over half of IDUs (52.7%) reported that they were able to obtain a clean needle any time they needed one. The most common barrier cited to obtaining clean needles was that the vendor was either closed or not around when the needle was needed (54.3%). IDUs also reported that the cost of needles (34.2%), needle stock- outs (18.2%), and distance to the vendor (16.4%) were barriers to access.

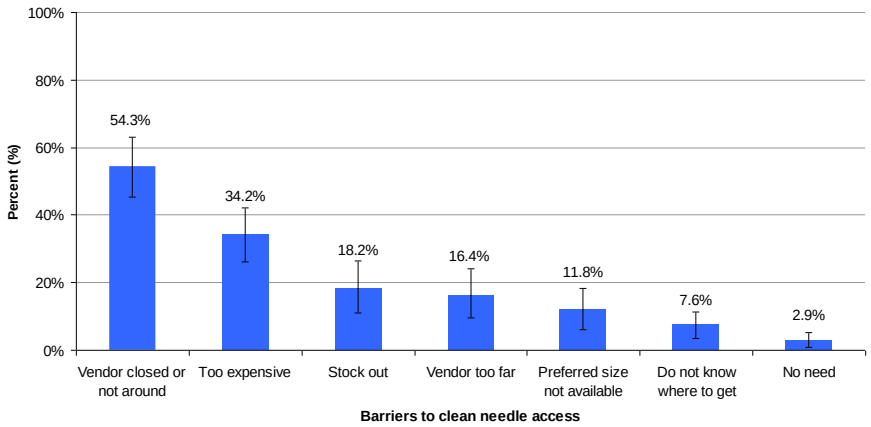

Figure 6. Barriers to accessing clean needles among IDUs, Unguja, 2007

3. Sexual risk behaviors

IDUs were asked about their sexual practices with three different types of sex partners: non-paid sexual partners (consensual), paid partners, and partners who paid IDUs money for sex. Questions about sexual risk were generally asked about anal or vaginal sex with male and/or female partners; therefore, responses are not disaggregated by gender or sexual preference. Among male respondents, 13.2% (N=66) reported they had also participated in the survey of MSM, and five of the 16 female IDUs reported also participated in the FSW study.

Sexual partners

Slightly over half of all IDU participants (52.8%) reported having any sexual partner in the past month (male or female non-paid or transactional[4] partner). Among these, 63.0% reported having two or more partners in that period. Just fewer than half of IDUs (42.8%, N=253) reported sex with any non-paid partner in the past month. Among IDUs reporting a non-paid partner in the past month, 92.1% reported having sex with a spouse or steady partner and 43.2% reported having two or more non-paid partners in the past month. One-fifth of IDUs (20.7%) reported they had paid someone for sex in the past one month, and 16.5% reported being paid by someone to have sex.

[4] Transactional partners include male and female partners participants paid for sex and male and female partners who paid participants for sex.

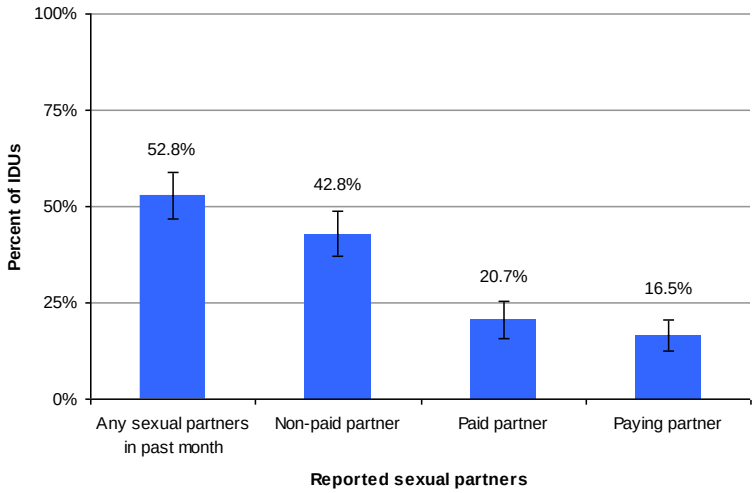

Figure 7. Past month sexual partners among IDUs, Unguja, 2007

Condom use

Just two-thirds of IDUs (65.8%) had ever used a male condom. Condom use was consistently low among IDUs who reported having anal or vaginal sex in the past month. Among those who reported sex with a non-paid partner in the past month, the majority (73.4%) "never" used a condom, and 17.8% reported inconsistent[5] condom use. A similar proportion of IDUs who had paid or received money for sex in the past month reported "never" using a condom (66.7% and 69.1% respectively).

[5] "Inconsistent" condom use includes those participants who stated they used a condom "occasionally" or "most of the time".

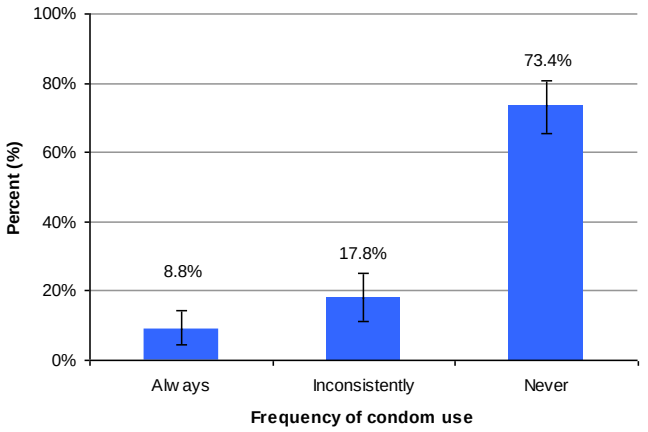

Figure 8. Frequency of condom use with non-paid sex partners among IDU, Unguja, 2007

Although condom use was very low among IDUs, when asked about the accessibility of condoms, almost three-quarters of IDUs (72.0%) stated that they could always get a male condom if they needed one. Only 4.4% reported being unable to access condoms when they needed one and 23.6% stated they had "never needed" a male condom. The most common source where IDUs obtained condoms in the past month were shops (48.7%) followed by pharmacies (44.0%). Only 9.4% of IDUs had obtained condoms from health facilities and 2.7% obtained condoms from an NGO.

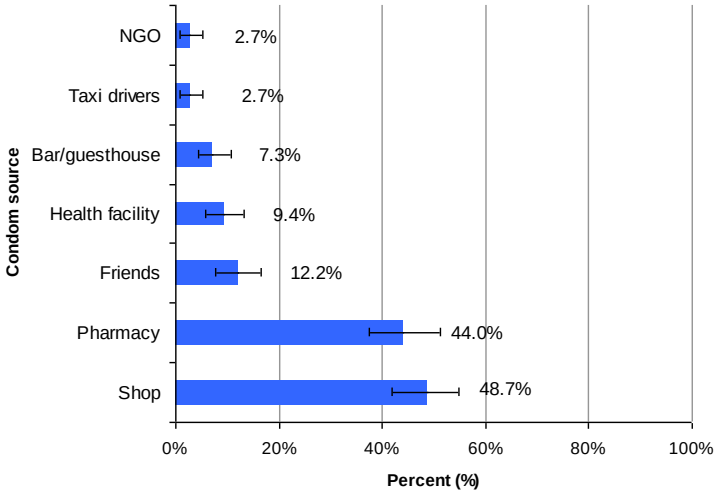

Figure 9. Sources of condoms in last month among IDU, Unguja, 2007

Table 3. Sexual risk behaviors among IDUs, Unguja, 2007

Sexual behaviors	N	%	95% CI
Non-paid sex in past month with a man or woman			
Yes	220	42.8%	36.9, 48.8
No	279	57.2%	51.2, 63.1
Number of non-paid partners in past month			
1 partner	108	56.8%	47.8, 65.1
2 or more partners	104	43.2%	34.9, 52.2
Median number of past month non-paid sex partners		1.0 Min. 1 – Max 8 (IQR. 1.0 – 2.0)	
Frequency of condom use with non-paid partners			
Always	18	8.8%	4.3, 14.3
Inconsistently	34	17.8%	11.3, 24.9
Never	144	73.4%	65.5, 80.9
Paid a man or woman for sex in past month			
Paid for sex	103	20.7%	15.6, 25.6
Did not pay for sex	395	79.3%	74.4, 74.4
Frequency of condom use with paid sex partners			
Always	19	15.6%	7.6, 26.0
Inconsistently	17	17.7%	7.8, 29.4
Never	65	66.7%	53.4, 78.4
Received money for sex in past month			
Yes	96	16.5%	12.7, 20.6
No	403	83.5%	79.4, 87.3
Frequency of condom use with paying sex partner			
Always	20	17.4%	8.9, 28.0
Inconsistently	13	13.5%	6.0, 22.5
Never	60	69.1%	56.9, 79.9
Ever used a male condom			
Yes	320	65.8%	60.9, 71.4
No	178	34.2%	28.6, 39.1
Can always get a male condom when needed			
Yes	331	72.0%	67.0, 77.3
No	23	4.4%	2.0, 7.0
Never needed one	144	23.6%	18.6, 28.6
Total number of partners in past month (paid and non-paid)			
1 partner	78	37.0	28.8, 44.9
2 or more partner	175	63.0	55.1, 71.2

4. Stigma and physical abuse

Most IDUs reported that their family was aware that they injected drugs (90.3%), and 60.3% reported that they had been abandoned by their partner or family as a consequence of their drug use. The majority of IDUs also reported experiencing other forms of stigma including being the subject of gossip (96.2%), name calling, teasing, and insults (85.2%), losing respect (72.3%), and being excluded from social gatherings (71.9%).

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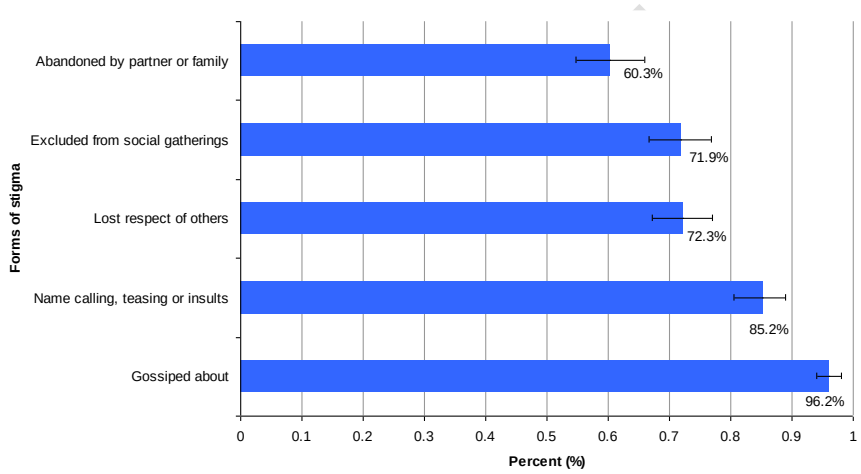

Figure 10. Forms of stigma reported by IDU, Unguja, 2007

More than half of IDUs reported being physically abused in the past 12 months (57.1%) and almost one-third of these (32.6%) reported being beaten by police officers. Friends and family were also commonly identified as perpetrators of physical violence against IDUs in the past year (25.0% and 11.5%, respectively).

Almost three-quarters of IDUs (73.9%) reported they had been arrested in the past 12 months. The majority of these (53.9%) were arrested for drug use, 23.7% were arrested for theft and 17.0% for 'loitering'.

5. HIV and sexually transmitted infections

STI History

When asked what STI symptoms they were aware of, almost half of IDUs (48.9%) reported they did not know of any. About twenty percent (19.9%) of IDUs reported any

symptoms of STI[6] in the six months before the survey. Twenty percent of IDUs (20.6%) reported they had ever been told by a physician or nurse that they had an STI.

HIV knowledge, risk perception and testing

All but one respondent had heard of HIV prior to the survey. Only 8.8% stated it was possible to tell a person was infected with HIV just by looking. Generally, knowledge about sexual risks for HIV transmission was high: 84.4% agreed that using a condom during vaginal sex prevents HIV and 93.1% agreed that having one faithful uninfected partner reduces HIV risk. IDUs were also aware of the risk of HIV transmission through injection practices: 96.3% agreed that sharing needles increases HIV risk and 67.9% agreed that cleaning needles reduces the risk of transmission.

Table 4. HIV knowledge, risk perception and testing among IDUs, Unguja, 2007

HIV knowledge, testing and risk perception	N	%	95% CI
HIV knowledge			
Ever heard of HIV	497	99.7%	99.4, 100.0
Disagrees that one can tell an HIV-infected person by looking	463	91.2%	87.6, 94.6
Agrees having one faithful uninfected partner reduces HIV risk	463	93.1%	89.3, 96.0
Disagrees that one can get HIV from public toilets	391	77.0%	71.3, 82.0
Agrees that using a condom during vaginal sex prevents HIV	418	84.3%	80.1, 89.0
Agrees that using condoms during anal sex prevents HIV	287	63.4%	58.3, 69.0
Agrees that sharing needles increases HIV risk	475	96.3%	94.3, 98.0
Agrees that cleaning needles reduces risk	315	67.9%	62.3, 73.0
Knows where to go for a confidential HIV test	207	43.6%	38.0, 49.2
Risk perception based on current behavior			
High risk	461	91.0%	87.0, 94.4
Medium risk	6	1.9%	0.4, 3.6
Low risk	2	0.5%	0.0, 1.3
No risk	29	6.6%	3.8, 10.1
Ever tested for HIV prior to the survey			
Yes	120	22.0%	17.5, 26.4
No	378	77.9%	73.5, 82.4
STI symptoms in the past 6 months (genital or anal sores/ulcers)			
Yes	91	19.9%	15.3, 24.7
No	397	80.1%	75.3, 84.7

The majority of IDUs (91.0%) believed that they were at high risk for HIV infection based on their current risk behaviors; of these 91.9% felt at risk because they injected drugs. Very few IDUs felt at risk for HIV because of their sexual behaviors: 1.9% felt they were

[6] Any symptoms of STI was defined as anal or genital ulcers/sores or unusual genital discharge.

at risk for HIV infection because they had multiple partners and 3.9% believed they were at risk due to not using a condom.

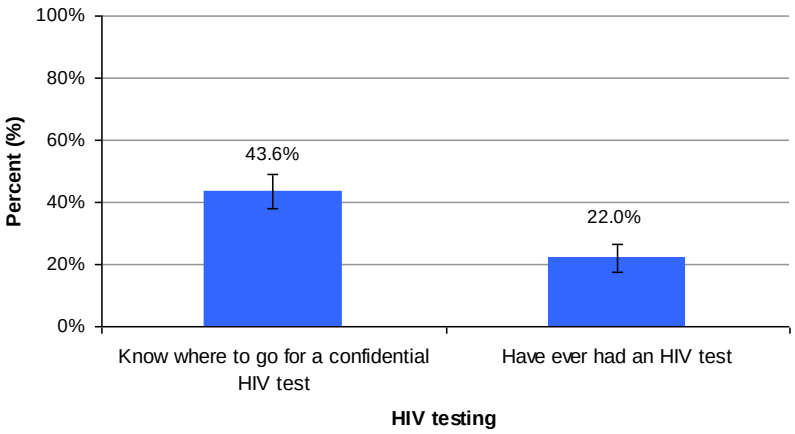

Figure 11. HIV testing among IDUs, Unguja, 2007

Less than half of IDUs (43.6%) knew where to go for a confidential HIV test, and only 22.0% of IDUs had ever been tested for HIV infection. Of those who had ever had an HIV test prior to the survey (N=120), 63.1% had been tested in the past year. The most common reason cited for seeking an HIV test was to “know one’s health status” (60.7%). Some IDUs had also sought an HIV test because they felt sick and suspected HIV infection (10.9%) or had been tested as part of a research study (19.8%).

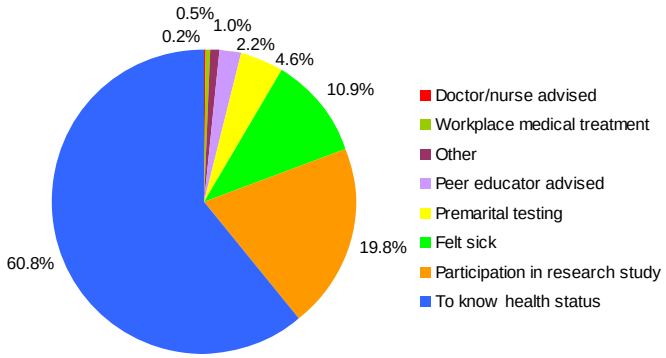

Figure 12. Reasons IDUs sought an HIV test among IDUs who were ever tested, Unguja, 2007

Among those who had never been tested for HIV infection (N=378), the most common reason for not testing was “fear of knowing status” (42.0%), followed by not knowing where to obtain a test (20.5%).

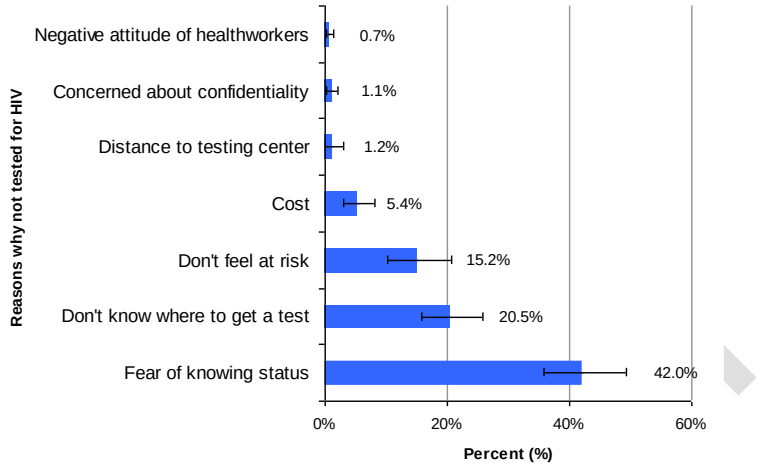

Figure 13. Reasons not tested for HIV among IDUs who were never tested, Unguja, 2007

HIV, hepatitis B & C, and syphilis prevalence and risk factors

HIV prevalence among IDUs was 16.0%; prevalence of HBV was 6.5%; HCV was 26.9% and syphilis was 0.3%.

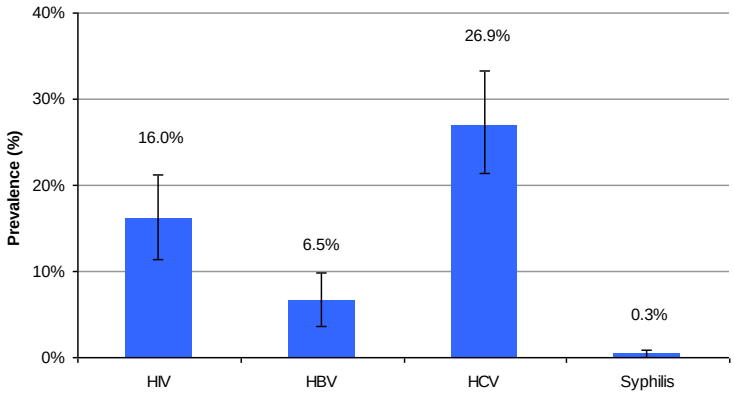

Figure 14. Prevalence of HIV, HBV, HCV, and Syphilis among IDUs, Unguja, 2007

Table 5. Prevalence of HIV, HBV, HCV, and syphilis among IDUs in Unguja, 2007

Disease prevalence	N	%	95% CI
HIV			
Positive	79	16.0%	11.4, 21.2
Negative	416	84.0%	78.8, 88.6
HBV			
Positive	29	6.5%	3.6, 9.8
Negative	466	93.5%	90.2, 96.4
HCV			
Positive	130	26.9%	21.3, 33.3
Negative	365	73.1%	66.7, 78.7
Syphilis			
Positive	2	0.3%	0.0, 0.9
Negative	493	99.7%	99.1, 100.0

Just under half of HIV-positive IDUs were co-infected with HCV (45.1%). Thirteen percent (12.7%) of HIV-positive IDUs were co-infected with HBV.

There was no clear association between HIV infection and age; however, 22.4% of IDUs aged 30-34 years tested positive for HIV compared with 0% of IDUs aged 19 years or younger and 14.7% of IDUs aged 20-24 years. Duration of injection drug use, which can be considered a proxy to length of exposure to HIV, showed some association with HIV infection: only 5.5% of IDUs who reported injecting drugs for 3 years or less were HIV infected in comparison to 16.2% of those who had been injecting drugs for 4-6 years and 16.7% of those who reported injecting drugs for 7 or more years.

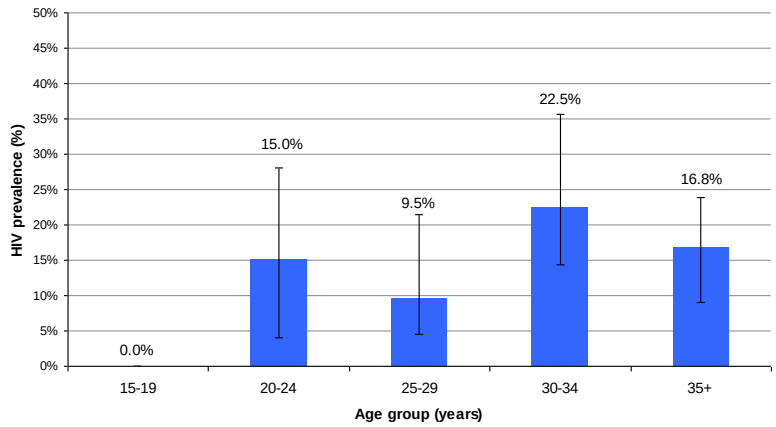

Figure 15. HIV prevalence by age group among IDUs, Unguja, 2007

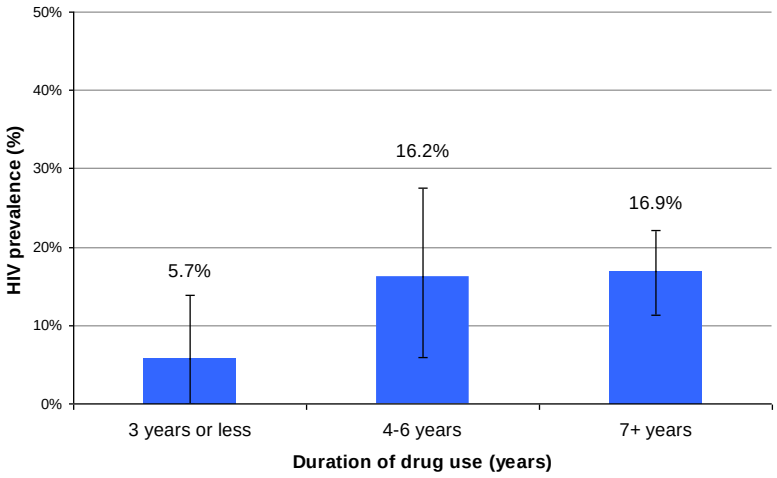

Figure 16. HIV prevalence by duration of drug use among IDUs, Unguja, 2007

IDUs who were currently unemployed or who earned their income through non-formal or illegal employment had higher HIV prevalence reported (22.5%, 20.3%, and 18.2%, respectively) than IDUs who were formally employed or reported 'other' as their source of income (10.4% and 6.9% respectively).

Table 6. Sociodemographic characteristics by HIV prevalence among IDUs, Unguja, 2007

Socio-demographic characteristics	HIV-positive (N)	HIV prevalence (%)	95% CI
Age groups			
15-19 years	0	0	0.0, 0.0
20-24 years	9	14.7	3.7, 27.2
25-29 years	17	9.7	4.8, 23.1
30-34 years	29	22.4	14.2, 35.6
≥ 35 years	24	15.4	8.3, 22.8
Education			
No education	1	3.3	0.0, 29.6
2-7 years	36	24.0	14.8, 33.7
8-10 years	26	12.1	6.3, 19.4
≥ 11 years	16	13.0	5.3, 21.4
Employment			
Formal employment	7	10.4	1.8, 22.0
Non-formal employment	31	22.5	13.7, 31.3
Illegal activities	19	20.3	10.1, 33.1
Unemployed	13	18.2	7.2, 34.1
Other	9	6.9	2.4, 12.2

As sexual and injection-related risk behaviors overlap considerably, it is difficult to assess their respective roles in HIV transmission among IDUs. IDUs who reported consensual (non-paid) sex in the past month had lower HIV prevalence than that of those who did not have consensual sex (10.6% vs. 20.0%). Among those who reported consensual sex in the last month, there was little difference in HIV prevalence among IDUs who had only one partner and those who had two or more partners (8.8% vs. 10.7%).

IDUs who reported never using a condom with a non-paid partner during the last month had higher HIV prevalence (12.5%) when compared with IDUs who reported using condoms inconsistently (8.4%). Only 18 IDUs reported always using a condom with their non-paid partner and none of these were HIV-positive.

Table 7. HIV prevalence by risk behaviors among IDUs, Unguja, 2007

Risk factors	N	% HIV-positive (n)	95% CI
Non-injection drug use in the past 3 months			
Used non-injection drugs	385	16.5% (59)	11.4, 22.6
No drug use	105	13.4% (17)	6.7, 21.3
Needle-sharing in past month			
Shared needles	250	15.4% (43)	10.1, 21.8
Did not share needles	243	16.6% (36)	9.5, 23.5
Duration of injection drug use			
3 years or less	31	5.5% (3)	0, 13.8
4-6 years	85	16.2% (12)	6.1, 28.0
7 years or more	377	16.7% (64)	11.2, 22.1
Non-paid sex in past month with man or a woman			
Yes	217	10.6% (24)	5.3, 17.0
No	278	20.0% (55)	13.3, 27.4
Number of non-paying sex partners in past month			
1 partner	107	8.8% (10)	3.0, 16.2
2 or more partners	102	10.7% (12)	4.2, 18.6
Frequency of condom use with non-paid partners in past month			
Always	18	0% (0)	0, 0
Inconsistently	34	8.4% (4)	0.7, 20.3
Never	141	12.5% (16)	5.4, 21.8
Paid a man or woman to have sex in the past month			
Paid for sex	100	19.4% (18)	8.6, 32.8
Did not pay for sex	394	15.2% (61)	10.6, 20.7
Frequency of condom use with a paid partner in past month			
Always	19	12.9% (3)	0, 30.2
Inconsistently	17	35.6% (4)	2.2, 68.9
Never	62	17.6% (10)	4.7, 33.2
Received money for sex in past month			
Received money for sex	93	10.6% (13)	4.1, 18.4
Did not receive money for sex	402	17.1% (66)	11.9, 22.9
Frequency of condom use with last paying sex partner			
Always	20	5.2% (2)	0, 15.5
Inconsistently	13	35.9% (4)	4.7, 68.8
Never	57	7.4% (5)	1.5, 14.4
Total partners in past month			
1 partner	78	12.9% (9)	3.9, 24.2
2 or more partners	172	13.8% (24)	7.3, 21.8
Ever had an HIV test			
Yes	120	16.0% (18)	7.0, 25.7
No	374	15.8% (61)	10.9, 21.6

6. Discussion and Recommendations

- **High prevalence of HIV, HBV, and HCV:** Prevalence of HIV, HBV, and HCV was high (16.0%, 6.5%, and 25.9%, respectively) Syphilis prevalence was low at 0.3% and comparable to syphilis prevalence rates (0.1%) observed in pregnant women attending antenatal clinics in Zanzibar in 2008.

- **Longer duration of injection drug use was associated with HIV infection:** The majority of IDUs reported using drugs for seven years or longer, indicating a mature epidemic of injection drug use in Unguja. Duration of drug use served as a proxy for exposure to HIV. Those that reported using drugs for three years or less were less likely to be infected with HIV.
- **High-risk injection drug use practices:** 98.4% of IDUs reported injecting several times a day and 53.8% reported sharing a used needle in the past month. The frequency of injecting drugs and reported rates of needle-sharing suggest opportunities for HIV transmission. There is a need for comprehensive services including harm reduction strategies, increased access to clean needles, and education about needle-cleaning.
    - HIV prevention programs targeting injection drug use should include programs to reduce needle-sharing or promote needle-cleaning.
    - IDUs report many barriers to accessing clean needles which are primarily available through pharmacies. Programs should address the need to increase IDUs access to clean needles.
    - Existing peer education and outreach programs can be used to disseminate information about how needles and syringes can be cleaned, and reinforce injection safety among IDUs.
- **High levels of risky sexual behaviors:** 52.8% of IDUs reported sex with a male or female partner in the past month. Among these, 63.0% reported having two or more partners in that period and nearly three-quarters of IDUs (73.4%) reported they "never" used condoms with any partner type.
    - Behavior change interventions and communications aimed at partner reduction as well as promotion of condom use among IDUs are urgently needed. The fact that IDUs perceive themselves at risk because of their injection drug use may leave HIV-uninfected IDUs vulnerable to acquiring HIV and STIs through sexual transmission and increase the risk of HIV-infected IDUs transmitting the infection to their sexual partners.
    - Prevention and risk reduction counseling should be delivered by peer educators and outreach workers in existing IDU programs. In addition, brief prevention messages that reinforce the adoption of safe sexual and injection behaviors should be delivered by trained health care providers providing services to IDUs.
    - Currently, access to condoms is largely through the private sector. Condom promotion and distribution in the public sector through public health facilities should be improved. For example, access to condoms at public health facilities (e.g., in waiting rooms and toilets) should be expanded and condoms

should be promoted and distributed when health care workers are in contact with and providing services to IDUs.

- **Overlap of high risk drug use and sexual risk behaviors:** Due to overlapping drug use and sexual risk behaviors, associations between HIV prevalence and specific risk behaviors are difficult to assess; however, findings demonstrate that IDUs are a sexually active population with both same and opposite sex partners who may or may not be IDUs themselves. This overlap suggests a potential bridge for HIV transmission beyond the drug-using population. Substance abuse services and harm reduction interventions must integrate HIV testing and sexual prevention activities.
- **Low rates of HIV testing:** IDUs have good levels of knowledge about HIV transmission and perceive themselves to be at high risk for HIV; however, only 22.0% of IDUs had ever had an HIV test prior to the survey.
    - HIV Voluntary Counseling and Testing (VCT) for IDUs may need to be addressed in two ways: (a) promotion of use of existing services, with additional training for counselors on how to provide quality VCT services for this population, and (b) bringing VCT services to the IDU population through mobile services that can reach non-traditional locations for those IDUs who may have concerns about accessing public or private health facilities.
- **High prevalence of hepatitis B and C and HIV/HCV co-infection:** While HCV prevalence was found to be particularly high among IDUs (26.9%), HBV prevalence was also substantial (6.5%). Formal guidelines and interventions for hepatitis prevention and management of both hepatitis and hepatitis-HIV co-infection are needed. Guidelines and interventions should be comprehensive, including hepatitis education and prevention, HIV-hepatitis counseling, screening for HBV and HCV and referral for services where appropriate and available, provisions for HBV vaccination, promotion of safe sex and safe injection practices, and overall integration of hepatitis prevention into HIV prevention programs. The possibility of piloting HBV-HIV co-infection management and treatment programs is currently being explored.
- **Low levels of knowledge of signs or symptoms of STIs:** Despite relatively low syphilis prevalence, no data are currently available about prevalence of other STIs among IDUs. The findings that IDUs have little knowledge about signs or symptoms of STIs may result in IDUs not seeking advice and treatment when infected, thus increasing the risk of acquiring or transmitting HIV and other STIs. Systematic screening for STIs should be integrated in programs providing services to IDUs; health facility-based services should consider including systematic physical examinations for STIs as signs or symptoms may not be reported. Findings confirm that health care workers have played an important role in detecting STIs in about 20.6% of study participants.

Men who have Sex with Men (MSM)

From April to June 2007, 509 MSM were enrolled into the RDS survey.

1. Socio-demographic characteristics

The median age of respondents was 28 years. The median number of years of education was 10 years.

Approximately forty percent of MSM (39.8%) were formally employed. Just over half of MSM (51.7%) earned their income through non-formal employment (defined as petty trading or 'self-employed') and 6.2% were currently unemployed.

Almost half of MSM reported they were currently living with relatives (47.8%), while 12.0% were living alone. Additionally, 28.8% of MSM were currently living with their boyfriend and 7.3% with their wife or girlfriend.

Just under one-third of MSM (28.8%) were married or reported living with their partner, while 12.8% were formerly married (separated, divorced or widowed). The majority of participants reported that they had never been married (58.3%).

Table 1. Socio-demographic characteristics of MSM, Unguja, 2007

Socio-demographic characteristics	N	%	95% CI
Age (years)			
15-19	45	9.9%	6.3, 13.9
20-24	127	24.1%	19.4, 29.2
25-29	113	22.1%	17.7, 26.8
30-34	91	20.8%	16.1, 25.6
≥ 35	133	23.1%	18.4, 28.2
Median age in years (IQR)		28 years (IQR: 22 – 34) Min. 15 – Max. 70	
Education (years completed)			
2-7 years	101	20.2%	15.8, 25.0
8-10 years	206	44.3%	38.6, 49.6
≥ 11 years	202	35.5%	30.7, 40.8
Median education in years (IQR)		10 years (IQR: 8-11) Min. 2 – Max 15	
Marital status			
Married or living with partner	121	28.8	24.0, 33.8
Separated/divorced/widowed	68	12.8	9.4, 16.6
Never married	320	58.3	52.9, 63.7
Current living arrangement			
Alone	79	12.0%	8.4, 15.7
Wife/girlfriend	42	7.3%	4.5, 10.2
Boyfriend	129	28.8%	24.1, 34.2
With relatives	241	47.8%	42.6, 53.1
With friends	12	2.8%	1.2, 4.9
Other	4	1.3%	0.0, 3.0
Gender of live-in partner			
No live-in partner	263	48.7%	43.3, 54.3
Male	166	38.0%	33.0, 43.8
Female	70	13.3%	9.4, 16.8
Employment			
Formal	216	39.8%	34.9, 45.1
Informal	231	51.7%	46.4, 56.7
Illegal activities	6	0.8%	0.1, 1.6
Unemployed	34	6.2%	3.8, 8.9
Other	6	1.6%	0.3, 3.4
Income (TZS)			
<50,000	137	31.1%	26.1, 37.0
50,000 – 120,000	247	53.8%	47.8, 59.1
120,001 – 200,000	59	11.1%	7.8, 14.6
≥ 200,001	25	4.0%	2.1, 6.2

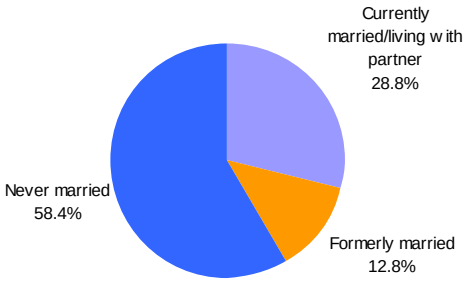

Figure 1. Marital status of MSM, Unguja, 2007

2. Sexual partnerships and risk behavior

The median age of sexual debut was 18 years and the majority of MSM (59.5%) reported their first sexual partner was a man.

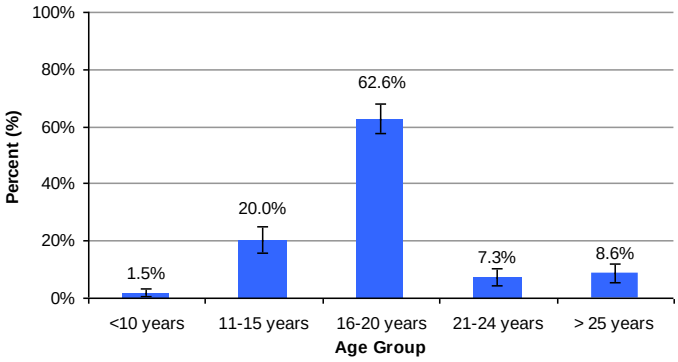

Figure 2. Age of sexual debut among MSM, Unguja, 2007

Sex in exchange for money was very commonly reported among MSM. Over two-thirds of MSM (68.4%) reported paying for sex in the past year. In the month prior to the survey, 34.0% of MSM reported paying a man to have oral or anal sex, while 63.9% reported being paid by a man to have oral or anal sex. Overall, three-quarters (77.5%) reported transactional sex with a male partner (being paid or paying for anal or oral sex) in the last month.

Among MSM who reported consensual male sex partners in the past month, multiple partners were very common. Just under half of respondents (47.8%) reported having 2 or more non-paying male insertive sex partners and one-quarter (25.7%) reported 2 or more non-paying male receptive sex partners in the past month. The median number of male sexual partners in the past month was 3.

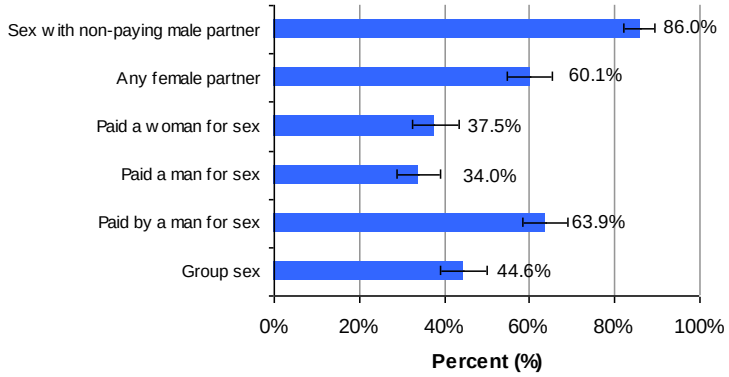

Figure 3. Sexual partnerships reported by MSM, Unguja, 2007

Sexual activity, including transactional sex, with women was common among MSM; 71.2% of participants reported having oral, vaginal or anal sex with a woman in the past one year. In the month prior to the survey, 37.5% of MSM reported paying women for sex.

Table 2. Sexual behaviors among MSM, Unguja, 2007

Sexual Behaviors	N	%	95% CI
Median age of sexual debut in years (IQR)	18 (16-19)	--	--
Gender of first sexual partner			
Male	314	59.5	53.9, 65.2
Female	195	40.5	34.8, 46.1
Bought sex in the past one year			
Yes	336	68.4	63.1, 73.8
No	171	31.6	26.2, 36.9
Been paid for sex in the past one year			
Yes	396	77.5	72.6, 81.9
No	113	22.5	18.1, 27.4
Number non-paying male insertive sex partners in past month			
None	109	21.1	16.7, 26.0
1	142	31.0	25.8, 36.4
≥ 2	258	47.8	42.4, 53.2
Median number of non-paying male insertive sex partners in past month (IQR)		2 (IQR: 1-2) Min.0 – Max.15	
Number of non-paying male receptive sex partners in past month			
None	295	56.9%	50.9, 62.6
1	77	17.4%	13.1, 21.9
≥ 2	137	25.7%	21.1, 30.7
Median number of non-paying male receptive sex partners in past month (IQR)		2 (IQR: 1-2) Min. 0 – Max. 20	
Exclusive sex with males in the last year			
Males and female	352	71.2	67.1, 75.4
Exclusively males	156	28.3	24.6, 32.9
Number of non-paid female sex partners in the past month			
None	269	55.4%	50.4, 60.5
1	91	18.2%	14.3, 22.4
≥ 2	149	26.4%	22.2, 30.5
Median number of non-paid female sex partners in the past month (IQR)		2 (IQR: 1-4) Min. 0– Max. 15	
Condom use last insertive sex with non-paying male partner			
Yes	110	25.6	20.6, 31.7
No	300	74.4	68.3, 79.4
Condom use last receptive sex with non-paying male partner			
Yes	49	15.6	10.6, 21.1
No	259	84.4	78.9, 89.4
Condom use last sex with non-paying female partner			
Yes	94	22.4	18.5, 26.7
No	324	77.6	73.3, 81.5
Condom use last time paid woman for sex			
Yes	56	29.6	23.1, 37.0
No	128	70.4	63.0, 76.9
Condom use last time paid man for sex			
Yes	60	22.3	17.3, 27.4
No	162	77.7	72.6, 82.7
Condom use last time paid by a man for sex			
Yes	103	25.1	20.9, 29.6
No	293	74.9	70.4, 79.1

Condom use last time paid by a woman for sex			
Yes	41	35.7	25.1, 45.7
No	95	64.3	54.3, 74.9

Reported condom use at last sexual intercourse was generally low with both non-paying male (insertive 25.6%, receptive 15.6%) and non-paying female partners (22.4%). When asked how often they used condoms with various partner types, between 64.6% and 74.9% of participants reported they “never” used a condom.

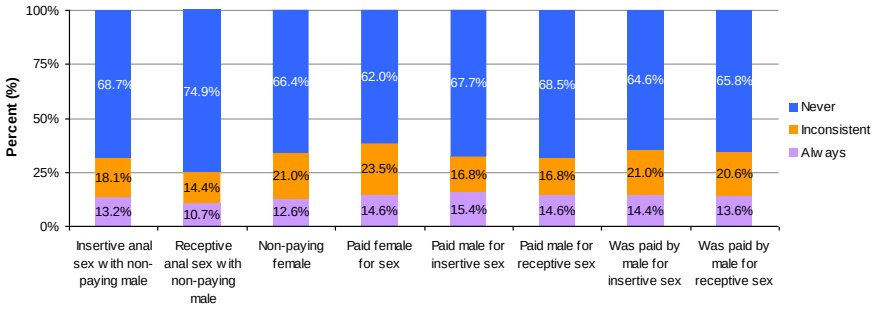

Figure 4. Frequency of condom use by type of sexual encounter among MSM, Unguja, 2007

Only 2.4% of respondents demonstrated that they had a condom during their interview and 57.4% said they did not use condoms. Half of MSM (50.1%) who reported using condoms had obtained them in a shop. A further 17.3% purchased condoms at pharmacies and 12.1% of MSM said they couldn’t get a condom any time they needed one.

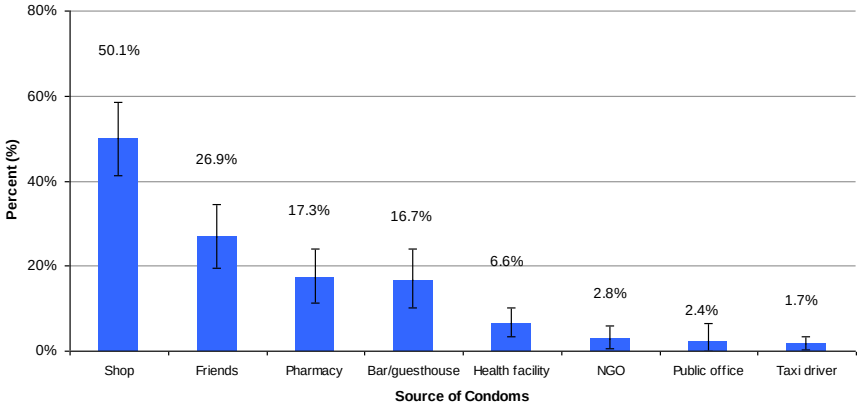

Figure 5. Condom sources among MSM, Unguja, 2007

The majority of MSM (82.4%) reported they had ever used lubricant during sex. Among these, 80.6% reported using Vaseline or another petroleum-based lubricant at last sex. Only 6.8% used a water-based condom lubricant, while 8.4% reporting using saliva to lubricate during sex. Of those who used lubricant during sex, 13.5% reported using a condom at the time.

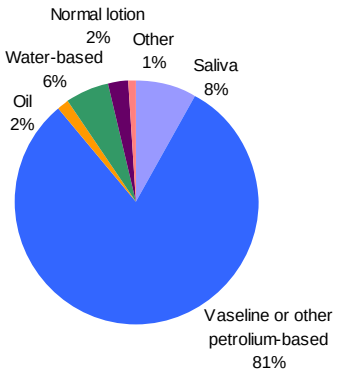

Figure 6. Type of lubricant used at last sex among MSM, Unguja, 2007

3. Drug use behavior

A majority of MSM (60.3%) reported using any drugs other than alcohol in the past three months, and 13.9% of MSM reported using injection drugs. Among those MSM reporting injection drug use in the past three months, 59.9% reported using a needle or syringe that someone else had used.

Table 3. Drug use behaviors among MSM, Unguja, 2007

Drug use behavior	N	Percent	95% CI
Drug use in the past 3 months			
Drug use	308	60.3	54.3, 66.1
No drug use	201	39.7	33.9, 45.7
Injection drug use in the past 3 months			
Injection drug use	66	13.9	9.8, 18.1
No injection drug use	443	86.1	81.9, 90.2
Used a needle or syringe after someone else used it			
Yes	40	59.9	44.4, 74.6
No	25	40.1	25.4, 55.6
Passed needle or syringe to someone else after using it			
Yes	45	68.2	54.3, 81.5
No	20	31.8	18.5, 45.7

MSM participants who injected drugs also reported higher risk sexual behaviors than MSM who did not inject drugs; MSM IDUs were more likely than non-injecting MSM to have multiple male sex partners (45.5% vs. 23.2%, respectively, reported multiple

consensual male insertive partners) and less likely to have used a condom at last sex (2.8% vs. 25.9% used a condom with their last female partner, respectively).

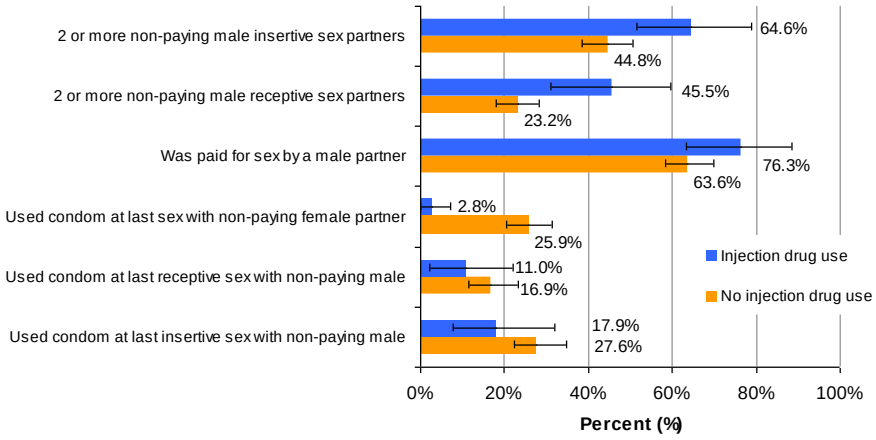

Figure 7. Sexual behavior among injection drug using MSM and non-injecting MSM, Unguja, 2007

4. Physical abuse

One-third of MSM (35.2%) reported that they had been beaten in the last 12 months. The majority (50.2%) reported they were beaten by a family member while 18.6% were beaten by the police. One-quarter of MSM (25.0%) had been arrested in the past 12 months. Among these, 33.7% reported being arrested for stealing, 26.4% for drug use, 16.8% for aggravated assault, and 12.7% for "loitering."

5. HIV and STIs

STI History

One-fifth of MSM (20.2%) reported any symptoms of STI (unusual genital discharge or genital ulcers) in the previous six months. Among those reporting symptoms, just over half (57.5%) sought medical care. Only 3.9% reported adopting safer sexual behaviors (told partner, stopped having sex, or used condoms).

HIV knowledge, risk perception and testing

All but one respondent had ever heard of HIV at the time of the survey. Knowledge about HIV was generally high; 91.6% agreed that having sex with one faithful uninfected partner reduces risk, and 87.8% and 77.4%, respectively, agreed that using a condom during vaginal and anal sex prevents HIV transmission.

The majority of MSM (62.7%) believed they were at high risk for HIV due to their sexual or drug-using behaviors. Among MSM who reported feeling any level of risk for HIV infection (N=371), 65.3% reported feeling at risk because of inconsistent condom use, and 30.5% felt at risk because they had multiple sex partners.

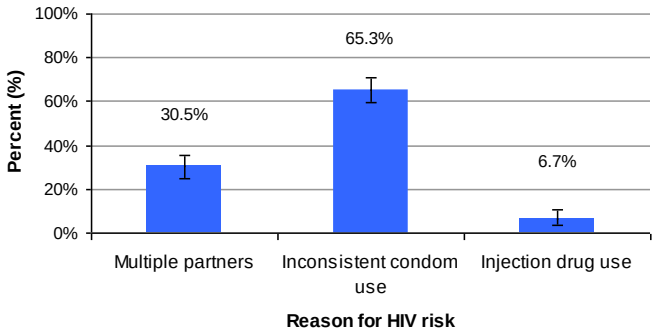

Figure 8. Reason for perceived high HIV risk among MSM, Unguja, 2007

More than half of MSM (55.9%) knew where to get a confidential HIV test, however only 18.8% of MSM reported ever having an HIV test prior to the survey.

Table 4. HIV testing a risk perception among MSM, Unguja, 2007

HIV testing and risk perception	N	Percent	95% CI
Risk perception based on current behaviors			
High risk	288	62.7	57.4, 68.7
Medium risk	26	6.9	3.8, 10.1
Low risk	57	10.3	7.2, 13.8
Not at risk	112	20.1	15.6, 24.5
Reasons for feeling at risk			
Multiple sex partners	134	31.5	26.0, 37.0
Inconsistent condom use	251	64.8	59.2, 70.8
Injection drug use	25	0.6	3.3, 9.3
Ever tested for HIV prior to survey			
Yes	112	18.8	15.2, 23.1
No	396	81.2	76.9, 84.8
STI symptoms in the past 6 months			
Yes	110	20.8	15.9, 24.7
No	399	79.2	75.3, 84.1

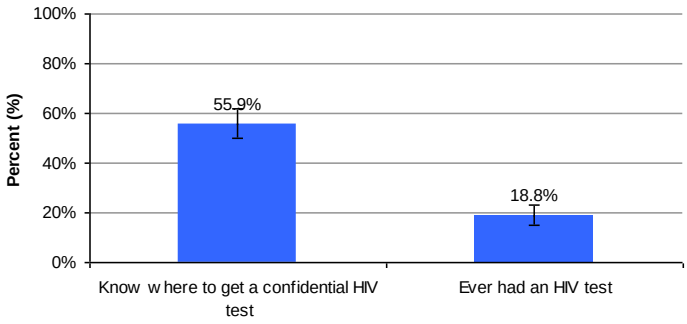

Figure 9. HIV testing among MSM, Unguja, 2007

Among those who had ever had an HIV test, 17.2% decided to do so under the advice of their doctor or nurse, 37.4% were following the advice of a peer educator and 8.4% sought testing because they felt sick and suspected HIV infection.

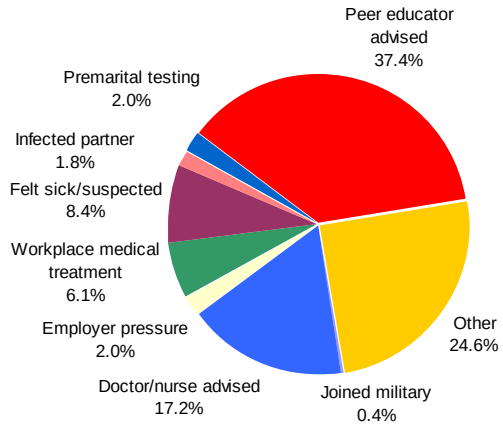

Figure 10. Reasons for HIV testing among MSM, Unguja, 2007

The most commonly cited reasons for not seeking testing among MSM who had never been tested were fear of learning one's HIV status (45.9%), followed by not feeling at risk for HIV (21.5%) and not knowing where to go for a confidential HIV test (19.3%).

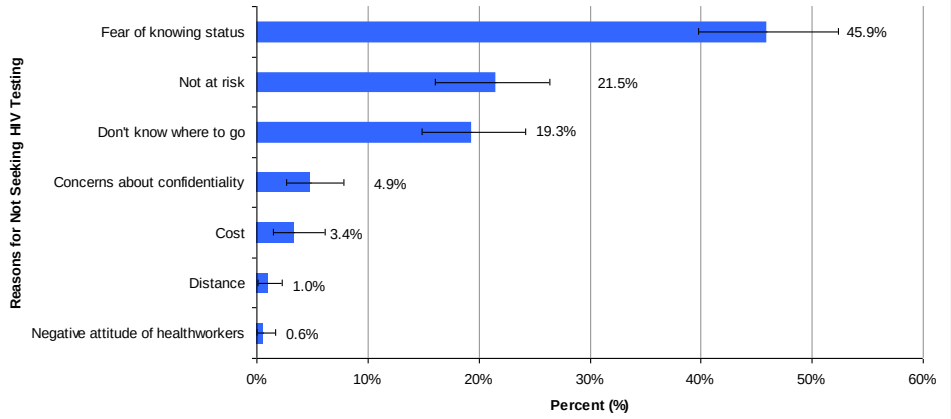

Figure 11. Reasons for not seeking HIV testing among MSM, Unguja, 2007

HIV and STI prevalence and risk factors

The prevalence of HIV infection was 12.3% and HCV and HBV infection prevalence was 14.7% and 4.6%, respectively. Syphilis infection prevalence was 0.2%. Among all HIV-infected MSM, 43.0% were co-infected with HCV and 6.5% were co-infected with HBV.

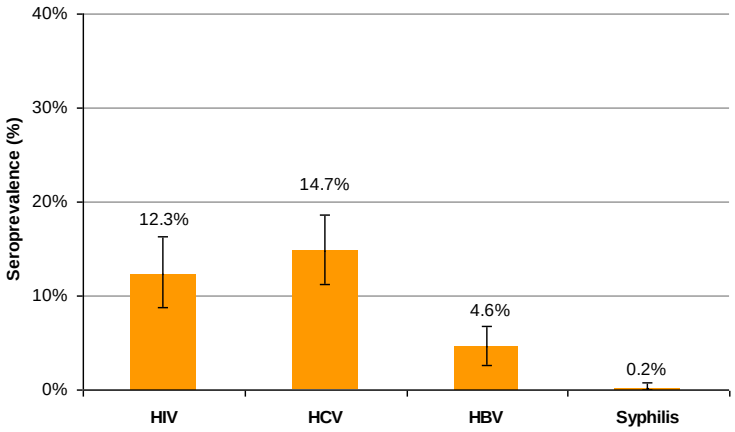

Figure 12. Seroprevalence of HIV, HCV, HBV, and syphilis among MSM, Unguja, 2007

Table 5. Disease prevalence among MSM, Unguja, 2007

Disease prevalence	N	%	95% CI
HIV			
Positive	65	12.3	8.7, 16.3
Negative	444	87.7	83.7, 91.3
HBV			
Positive	24	4.6	2.6, 6.8
Negative	485	95.4	93.2, 97.4
HCV			
Positive	74	14.7	11.2, 18.6
Negative	435	85.3	81.4, 88.8
Syphilis			
Positive	2	0.2	0.0, 0.7
Negative	507	99.8	99.3, 100.0

HIV prevalence was highest among MSM aged 35 years or older (15.5%) compared with other age groups; however, there was no significant association between age and HIV infection.

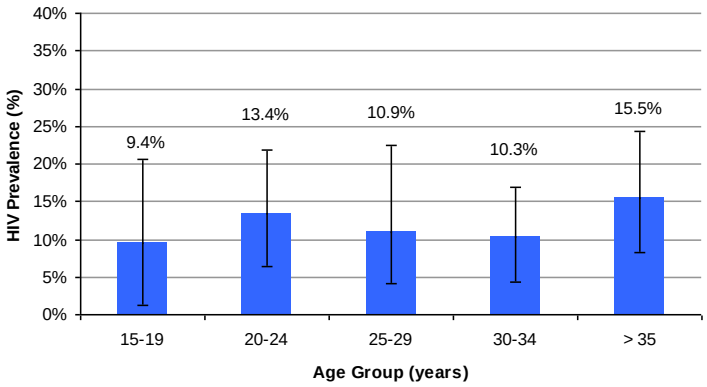

Figure 13. HIV prevalence by age group among MSM, Unguja, 2007

HIV prevalence decreased with increased level of education. MSM who had completed up to primary school education had higher HIV prevalence (16.7%) compared with those who had completed up to pre-secondary (12.1%) or secondary education (8.2%).

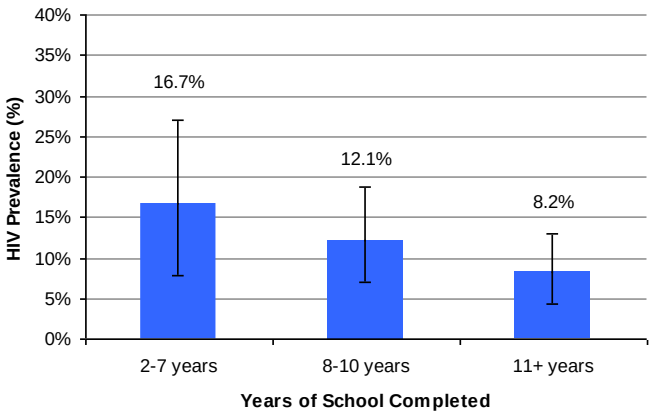

Figure 14. HIV prevalence by years of school completed among MSM, Unguja, 2007

MSM who were aged 15 years or younger at first sex had higher HIV prevalence (16.5%) than those who first had sex between 16 to 24 years of age (10.7%) or later (11.2%).

Table 6. HIV prevalence by socio-demographic characteristics among MSM, Unguja, 2007

Socio-demographic characteristics	HIV-positive (N*)	HIV prevalence (%)	95% CI
Age			
15-19	4	9.4	1.3, 20.7
20-24	13	13.4	6.3, 21.9
25-29	13	10.9	4.2, 22.5
30-34	14	10.3	4.4, 17.0
≥ 35	21	15.5	8.2, 24.3
Marital status			
Married	17	13.1	6.9, 19.7
Separated/divorced/widowed	10	13.0	5.0, 23.8
Never married	38	11.8	7.3, 17.0
Education			
2-7 years	19	16.7	7.9, 27.1
8-10 years	26	12.1	7.1, 18.8
11 + years	20	8.2	4.4, 13.0
Gender of live in partner			
No live in partner	36	13.9	9.0, 19.6
Male	20	12.7	7.2, 18.3
Female	8	10.3	3.6, 19.4
Source of Income			
Formal sector	25	11.7	6.5, 17.4
Other informal sector	34	13.3	8.3, 18.3
illegal activities	0	2.7	0, 0
unemployed	4	7.7	1.1, 17.3
Gender of first sexual partner			
Male	47	15.1	10.1, 21.0
Female	18	8.0	4.2, 12.3
Age at first sex			
15 years and younger	19	16.5	8.7, 25.2
16 to 24 years	41	10.7	6.8, 14.5
25 year or older	4	11.2	0, 24.1

Higher HIV prevalence was found among MSM who reported two or more non-paying partners than HIV prevalence of MSM with one or fewer non-paying partners (insertive partners: 16.3 vs. 8.2%; receptive partners: 21.3% vs. 8.8%). Among MSN who reported sex with male partners (either non-paying or transactional) in the past month, HIV prevalence was lower among those with one to two partners (8.1%) than those with three to five partners (14.1%) and those with six or more partners (19.3%).

HIV-infected MSM were more likely to report symptoms of an STI in the last six months than HIV-uninfected MSM (22.3% vs. 10.0%, respectively). HIV prevalence was higher among MSM who had injected drugs in the past three months (25.1%) than among those who did not inject drugs in the past three months (10.3%).

HIV prevalence was high among both MSM who felt they were at medium or high risk for HIV infection (14.3%) and MSM who felt they were at low or no risk for HIV infection (8.8%).

Table 7. HIV prevalence by risk behaviors among MSM, Unguja, 2007

Risk factors	HIV-positive (N*)	HIV prevalence (%)	95% CI
Non-paying male insertive sex partners in past month			
1 or less	16	8.2	3.9, 13.3
2 or more	40	16.3	10.3, 21.7
Non-paying male receptive sex partners in past month			
1 or less	31	8.8	5.3, 13.0
2 or more	25	21.3	12.6, 30.0
Paid for sex with a woman in the past month			
Yes	14	7.0	3.1, 12.2
No	50	15.7	10.7, 21.3
Paid for sex with another male in the past month			
Yes	25	13.9	8.0, 19.9
No	40	12.3	7.9, 17.4
Was paid for sex by another man in the past month			
Yes	46	13.4	8.9, 18.1
No	19	10.1	4.6, 16.9
Group sex in past month			
Yes	19	13.7	7.1, 20.4
No	46	12.5	8.4, 17.0
Number of sex partners in past month			
0 partners	3	14.7	0, 39.0
1-2 partners	14	12.6	5.8, 20.8
3-5 partners	21	12.2	6.5, 18.5
6 or more partners	27	12.5	7.7, 17.7
Number of male sex partners in past month			
0 partners	5	11.7	1.2, 26.5
1-2 partners	16	8.1	4.1, 13.4
3-5 partners	25	14.1	8.0, 20.0
6 or more partners	19	19.3	10.8, 28.8
Number of female sex partners in past month			
0 partners	33	15.3	9.1, 22.3
1-2 partners	19	13.1	7.4, 19.5
3-5 partners	7	6.2	2.1, 10.9
6 or more partners	6	7.7	2.0, 15.4
Ever had an HIV test			
Yes	12	10.5	4.4, 16.7
No	53	13.3	9.4, 17.9
STI symptoms in the past 6 months			
Yes	21	22.3	12.7, 32.5
No	44	10	6.6, 13.8
Drug use			
Injection drug use	16	25.1	11.9, 39.8
No injection drug use	49	10.3	7.0, 13.8
HIV risk perception			
Med or high risk	47	14.3	9.7, 19.2
No or low risk	16	8.8	3.4, 16.9

6. Discussion and Recommendations

- **High HIV prevalence:** HIV prevalence among MSM was 12.3%. Syphilis prevalence was low at 0.2% and comparable to syphilis prevalence rates (0.1%) observed in pregnant women attending antenatal clinics in Zanzibar in 2008. HBV and HCV prevalence were also high (4.6% and 14.7%, respectively).

- **High rates of high risk sexual behaviors:**
    - **Transactional sex:** Sex in exchange for money was commonly reported among MSM; 63.9% reported being paid by a man to have anal or oral sex in the last month.
    - **Multiple partners:** Substantial proportions of MSM reported having two or more sexual partners in the month prior to the survey.
    - **Low rates of condom use:** Condom use at last sexual encounter with male and female paying and non-paying partners was low, ranging from 15.6% to 35.7%. Between 62.0% and 74.9% of MSM reported never using a condom with different partner types. Condom use messages do not appear to have penetrated this population and should be a focus of targeted prevention programming.

  The mixture of and co-existence of multiple high-risk behaviors among MSM is cause for concern. Effective behavior change interventions and communications for this particular target group are urgently needed to address risk associated with transactional sex, multiple partnerships, condom and lubricant use and others. As with other groups, any efforts which are established must take into account the challenge of reaching a group that may be reluctant to identify themselves for fear of legal or social persecution. However, the experience of this survey found that peer networks were active and effective avenues to approach MSM were available when their protection was assured.

  As injection drug use and transactional sex are occurring in the MSM population, additional efforts should be made to sensitize and train staff and volunteers to integrate counseling and other services for MSM into existing IDU and SW programs. However, such efforts may not sufficiently address the needs for this particular group in the absence of specific programs targeting MSM or substantial broadening of IDU and SW programs.

- **High rates of bisexual activity:** Sex with women in the last year was reported by 71.2% of MSM. High levels of bisexual activity highlight the close sexual interface between MSM and the general population. In combination with high risk sexual behaviors, this raises concerns about the potential bridging role of MSM in disseminating HIV infection into the general population.

- **High reported rates of drug use and injection drug use:** 60.3% of MSM reported drug use of any kind and 13.9% reported injection drug use. Among injection drug users, reported needle-sharing was substantial; 59.9% reporting using a needle or syringe after someone else had used it. Injection drug use was associated with higher HIV prevalence among MSM (25.1% among MSM who injected drugs vs. 10.3% among non-injecting MSM).

- **Limited access to HIV testing:** Only 18.8% MSM had ever had an HIV test prior to the survey, although 55.9% were aware of where to get a confidential HIV test.

  Continued expansion and promotion of HIV VCT services specifically developed to target high risk groups are needed.

  - VCT centers could present a good setting to provide both safer sex counseling and HIV counseling and testing for MSM as VCT services guarantee confidentiality. This would require additional training of counselors on issues such as safe anal sex and the acceptance of MSM without prejudice. Record-keeping would need to ensure safety of client records considering the current legal status of homosexual activity on Zanzibar.

- **High prevalence of hepatitis B and C and HIV/HCV co-infection:** Given fair levels of HBV and HCV in the MSM population, formal guidelines and interventions for hepatitis prevention and management of both HBV- and HCV-HIV co-infection are needed. Guidelines and interventions should include screening for HBV and HCV with referral for services where appropriate and available, provisions for HBV vaccination, promotion of safe sex and safe injection practices, and overall integration of hepatitis prevention into HIV prevention programs. The possibility of piloting a HBV-HIV co-infection management and treatment program is currently being explored.

Female Sex Workers (FSWs)

A total of 379 FSWs residing in Unguja Island enrolled in the survey.

1. Socio-demographic Characteristics

Just over one-quarter of FSWs (27.4%) were between the ages of 20-24 years, and the majority of FSWs were under the age of 30. FSWs ranged in age from 15 to 56 years and the median age was 26 years.

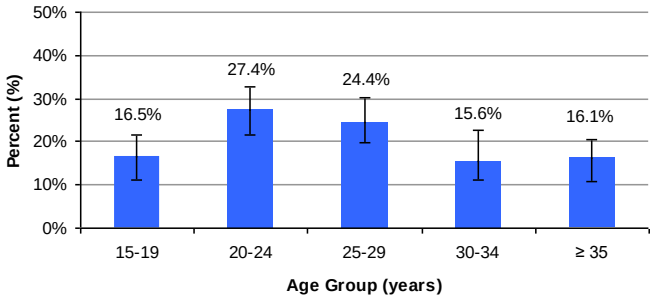

Figure 1. Age of FSWs, Unguja, 2007

The majority of FSWs earned less than 120,000 TZS monthly, with 25.6% reporting a personal income of less than 50,000 TZS. Only 14.4% of FSWs had a monthly income of more than 200,000 TZS.

The majority of FSW (73.9%) earned their income primarily from sex work while 20.6% of FSW earned income through private income generating activities. The median monthly income among FSWs was 120,000 TZS.

Table 1. Socio-demographic characteristics of FSWs, Unguja, 2007

Socio-demographic characteristics	N	%	95% CI
Age			
15-19 years	48	16.5%	11.1, 21.7
20-24 years	100	27.4%	21.5, 32.9
25-29 years	99	24.4%	19.7, 30.1
30-34 years	57	15.6%	11.2, 22.5
≥ 35 years	75	16.1%	10.7, 20.5
Median age in years (IQR)		26 years (IQR. 21.75 – 32) Min. 15 – Max. 56	
Education			
1-7 years	167	48.5%	41.6, 55.3
8-10 years	128	32.8%	27.7, 39.0
≥ 11 years	74	18.6%	13.8, 23.3
Median education in years completed (IQR)		9 years (IQR: 7 – 10) Min. 1 – Max. 15	
Current living situation			
Alone	230	60.0%	54.0, 67.0
Husband/boyfriend	16	2.6%	1.2, 4.4
Family	31	5.8%	3.3, 8.4
Friends/other FSWs	79	25.2%	18.9, 30.9
No fixed address	22	6.4%	3.7, 9.3
Alternative sources of income			
No other income	262	73.9%	67.8, 78.9
Private business	93	20.6%	15.5, 26.4
Other	22	5.5%	3.4, 8.5
Personal income (TZS)			
< 50,000	94	25.6%	19.6, 31.0
50,000 – 120,000	108	31.5%	25.6, 38.0
120,001 – 200,000	106	28.5%	23.4, 35.0
≥ 200,001	61	14.4%	10.1, 18.6
Median income in TZS		120,000 TZS (IQR: 50,000 – 200,000) Min. 60 – Max 500,000	

Almost half (48.5%) of FSW had completed primary level education or less (1-7 years). FSW completed a median 9 years of education, within a range of 1 to 15 years.

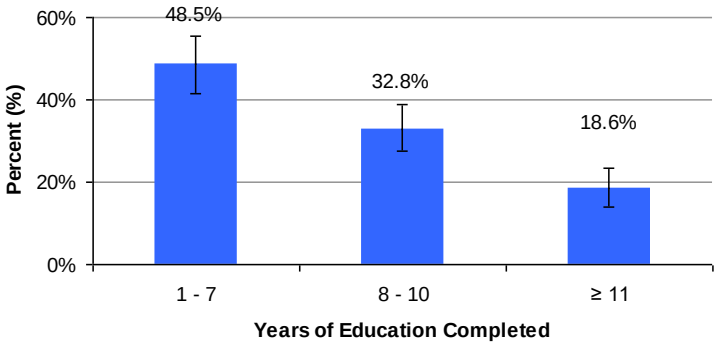

Figure 2. Years of education completed among FSWs, Unguja, 2007

A total of 230 FSWs (60.0%) reported living alone, 25.2% lived with friends or other FSWs, and 6.4% of FSWs reported no fixed address.

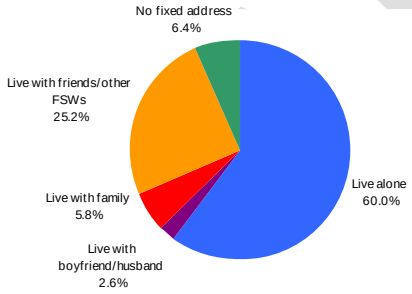

Figure 3. Living situation among FSWs, Unguja, 2007

2. Sexual history and profile of sex work

The majority of FSWs (72.8%) reported that they first sold sex before the age of 25 years. The median duration of sex work was five years. At the time of the survey, 42.1% of FSWs had been engaged in sex work for three years or less while 16.9% reported selling sex for ten years or more.

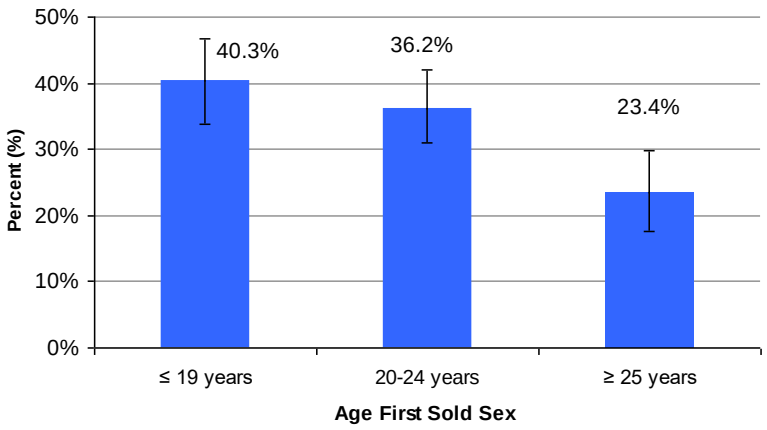

Figure 4. Age first sold sex among FSWs, Unguja, 2007

The median age of sexual debut among FSWs was 17 years. Just under one-third (32.0%) of study participants reported that their first sexual experience occurred between the ages of 10-15 years.

A little over half of respondents (50.4%) reported that they entered sex work because they needed money to support their family or to pay a debt. Another 18.4% of FSWs started selling sex after being abandoned by their families and/or husbands. Only 0.7% reported that they were 'forced' into selling sex.

FSWs most commonly reported meeting their clients in guesthouses (30.3%), as well as nighttime social settings such as bars (29.1%) and discos (26.8%). Almost half of FSWs (48.2%) had an "agent" or pimp to help manage clients.

Table 2. Sexual history and sex work among FSWs, Unguja, 2007

Sexual history and sex work	N	%	95% CI
Age at sexual debut			
≤ 15 years	123	32.0%	25.4, 38.7
16-20 years	216	57.1%	50.2, 63.8
≥ 21 years	38	11.0%	7.7, 14.9
Median age at sexual debut (years)		17 years (IQR: 15-19 years) Min. 19 – Max. 35 years	
Age at first selling sex (N=377)			
≤ 19 years	146	40.3%	30.1, 42.6
20-24 years	141	36.2%	30.7, 42.0
≥ 25 years	91	23.4%	21.3, 33.8
Median age when first sold sex		20 years (IQR: 18-24 years) Min. 11 – Max. 40 years	
Duration of selling sex			
≤ 3 years	146	42.1%	35.9, 48.0
4-6 years	90	25.3%	20.0, 31.3
7-9 years	64	15.7%	11.6, 20.8
≥ 10 years	77	16.9%	12.1, 21.6
Median duration of selling sex (years)		5 years (IQR: 2 – 8.5 years) Min. 0 – Max. 32 years	
Reasons for entering sex work			
Need money to support family/pay debt	189	50.4%	43.9, 57.2
Abandoned by family/husband	78	18.4%	13.9, 23.5
Good income	61	16.2%	11.9, 21.1
Like to do/friend or family doing it	48	14.3%	9.5, 18.7
Forced	2	0.7%	0.0, 1.7
Primary meeting place for clients			
Pub/bar	104	29.1%	23.6, 35.0
Disco	90	26.8%	21.6, 32.5
Guesthouse/Private rooms	136	30.3%	24.6, 36.1
Hotel	26	8.1%	4.5, 12.1
Other	23	5.7%	3.0, 9.0
Number of clients on last day of sex work			
1	35	10.2%	6.5, 14.0
2	122	37.8%	31.7, 43.9
3	166	39.6%	33.9, 45.8
≥ 4	55	12.4%	8.8, 16.3
Median number of clients on last day of work		3 (IQR: 2 – 3) Min. 1 – Max. 10 years	
Has an "agent" or pimp			
Yes	182	48.2%	42.1, 55.0
No	196	51.8%	45.0, 57.9

The majority of FSWs reported having two or three clients on their last day of sex work (37.8% and 39.6%, respectively), while 12.4% of FSWs reported selling sex to four or more clients on their last day of work. The median number of sex clients served on the last day of work was three.

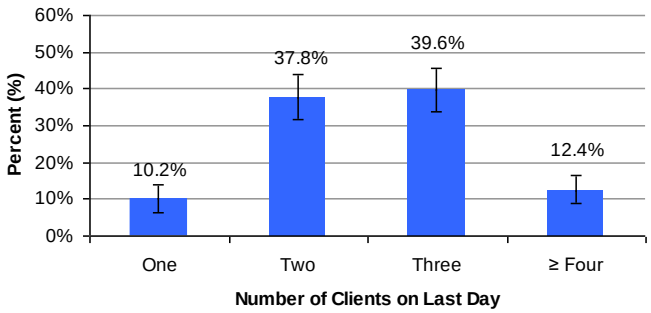

Figure 5. Number of clients on last day of work among FSWs, Unguja, 2007

FSWs reported earning a median of 5,000 TZS (~ $4 USD) for their last sex act with a client, ranging from a low of 1,000 to a high of 70,000 TZS. FSWs reported that the median minimum price charged for sex was 3,000 TZS and the median maximum price charged for sex was 15,000 TZS.

3. Sexual risk behaviors

FSWs were asked about several different partner types and their sexual practices and risk behaviors with each type. Sexual partners were classified as 'steady' (spouse or boyfriend), casual non-paying partner, one-time client, regular client, and tourist or foreigner. In the past month, virtually all FSWs (96.7%) reported sex with a one-time client. Approximately half of FSWs reported having sex with a regular client (57.6%) and/or a steady sex partner (48.9%). One quarter of FSWs reported having sex with a tourist/foreigner (26.7%) and/or a casual non-paying partner (23.9%).

Table 3. Sexual risk behaviors among FSWs, Unguja, 2007

Sexual risk behaviors	N	%	95% CI
Condom use at last sex			
Yes	233	55.7%	48.3, 63.1
No	146	44.3%	36.9, 51.7
Reasons for not using a condom at last sex			
Didn't think about it	15	8.2%	4.1, 13.7
Don't like the feel of it	17	8.5%	3.8, 14.3
Didn't have any condoms	17	10.4%	4.8, 16.8
Partner objected	66	42.5%	33.8, 52.0
Trust my partner	12	15.8%	7.3, 25.9
Too expensive	2	1.4%	0.0, 3.0
Condoms don't work	3	3.0%	0.0, 6.2
Frequency of condom use last month by partner type			
Steady			
Always	68	26.2%	20.1, 33.2
Sometimes	29	15.3%	9.3, 21.6
Never	134	58.5%	50.2, 66.4
Casual non-paying			
Always	24	28.1%	16.4, 39.8
Sometimes	26	36.7%	25.0, 50.0
Never	34	35.2%	23.5, 47.7
Regular client			
Always	131	44.1%	36.3, 51.6
Sometimes	60	24.3%	17.6, 31.2
Never	83	31.6%	25.1, 39.3
One-time client			
Always	188	47.1%	40.6, 53.1
Sometimes	93	28.5%	22.9, 34.4
Never	90	24.4%	19.0, 30.9
Tourist/foreigner			
Always	61	46.9%	36.1, 58.1
Sometimes	21	22.7%	14.1, 32.1
Never	29	30.4%	2.0, 41.2
Number of sex partners in past month			
1-5	137	38.3%	31.6, 44.6
6-10	103	25.6%	20.4, 31.1
11-20	41	10.4%	7.3, 14.3
21-30	33	8.9%	5.7, 12.3
$\geq$ 31	62	16.8%	12.2, 22.1
Can obtain a male condom when needed			
Yes	301	85.4	81.6, 89.3
No	55	14.6	10.7, 18.4
Ever used a female condom			

Yes	30	6.5	3.9, 9.3
No	348	93.5	90.7, 96.1

Just over half of FSWs (55.7%) reported using condoms the last time they had sex. Male condoms were most commonly used while only 6.5% of FSWs reported ever using a female condom. Condom use varied considerably depending on the type of sexual partner. Condom use in the past month was least consistent[7] with steady partners (26.2% reported they always used a condom) and most consistent with tourists/foreigners (46.9% always used a condom).

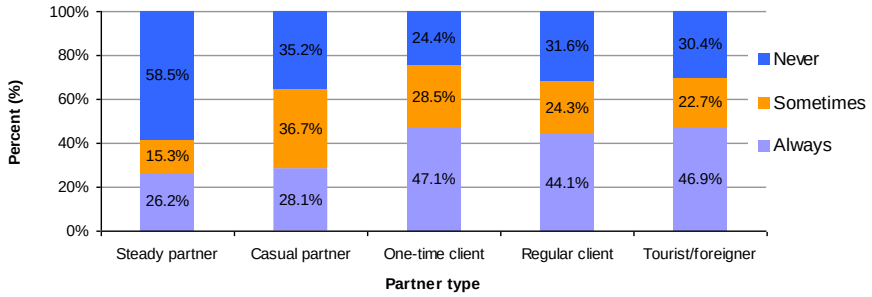

Figure 6. Frequency of condom use by partner type among FSWs. Unguja, 2007

4. Drug use

A total of 9.6% of FSWs reported using any drugs and only 2.8% reported injecting drugs in the three months prior to the survey. A larger proportion of FSWs suspected their sex partners of using drugs; 6.7% of FSWs suspected that a tourist or foreigner client was an IDU, while 17.6% and 15.4% of FSWs suspected their non-paying casual partners and steady partners, respectively, of injection drug use.

[7] Consistent condom use was defined as “always using a condom” during sex.

Table 4. Drug use among FSWs and suspected drug use of their partners, Unguja, 2007

Drug use	N	%	95% CI
Used any drugs in past 3 months			
Yes	45	9.6	6.4, 13.5
No	334	90.4	86.5, 93.6
Used injection drugs in past 3 months			
Yes	17	2.8	1.1, 5.0
No	362	97.2	95.0, 98.9
Suspects sex partner uses any drugs by partner type			
Steady			
Yes	48	18.5	12.9, 24.5
No	184	81.4	75.3, 87.0
Don't know	3	0.2	0.0, 0.5
Suspects injection drug use	40	15.4%	10.7, 20.7
Casual non-paying			
Yes	24	19.7	12.5, 28.7
No	71	76.4	67.5, 84.2
Don't know	5	3.9	0.2, 8.1
Suspects injection drug use	21	17.6	10.7, 25.9
Regular Client			
Yes	36	13.1	8.6, 18.3
No	231	86.9	81.7, 91.4
Don't know	0	0	n/a
Suspects injection drug use	31	11.4%	7.6, 15.6
One-time client			
Yes	58	17.1	12.4, 22.5
No	248	65.7	59.8, 71.6
Don't know	65	17.2	12.8, 21.7
Suspects injection drug use	42	10.9%	7.8, 14.6
Tourist/foreigner			
Yes	18	15.4	9.0, 23.0
No	80	75.8	66.7, 83.6
Don't know	14	8.8	4.3, 14.2
Suspects injection drug use	14	12.8%	6.8, 19.6

5. Stigma and physical abuse

A significant percent of FSWs (37.2%) reported experiencing physical violence in the past year. Among those FSWs who reported being beaten in the past year, 39.4% were beaten by their steady partner (boyfriends or husband), and 28.5% were beaten by a one-time sex partner.

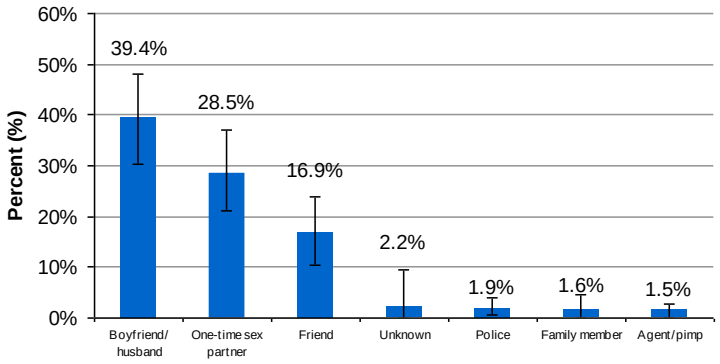

Figure 7. Persons who beat FSWs in the past year, Unguja, 2007

Almost a quarter (23.3%) of FSWs reported being arrested in the last year. Among these, 34.7% were arrested for selling sex, and 37.1% were arrested for loitering.

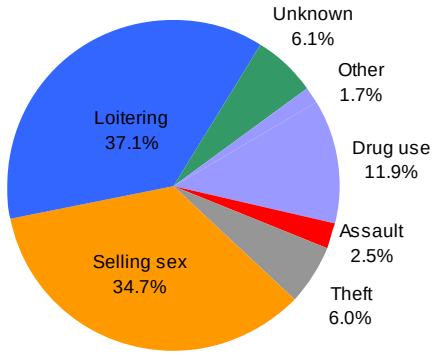

Figure 8. Reason for arrest among FSWs who were arrested in the last year, Unguja, 2007

6. HIV and sexually transmitted infections

STI History

Fifteen percent of FSWs (15.3%) self-reported symptoms of an STI (unusual genital discharge or genital ulcers) in the past six months, and 14.3% reported that they had ever had an STI diagnosed by a physician or nurse.

HIV knowledge and attitudes

Nearly all FSWs had ever heard of HIV/AIDS (99.1%), and few (9.7%) thought it was possible to identify an HIV-infected person by looking at him or her. Knowledge about HIV transmission was high, though a considerable proportion of FSWs disagreed with certain statements about protective behaviors for HIV infection; 23.6% disagreed that one could reduce the risk of HIV transmission by having sex with one faithful and uninfected partner. Further, 20.5% and 37.9% disagreed that using condoms could prevent HIV transmission during vaginal and anal sex, respectively.

Less than one-third of FSWs (30.6%) felt that a person with HIV should feel ashamed of their status. When asked about stigma commonly associated with HIV, 62.7% of FSWs felt that people with HIV were promiscuous, and 26.4% thought that HIV/AIDS was a punishment for bad behavior. Just over one-third of respondents (36.9%) agreed that FSWs were responsible for spreading HIV in the community.

Testing and risk perception

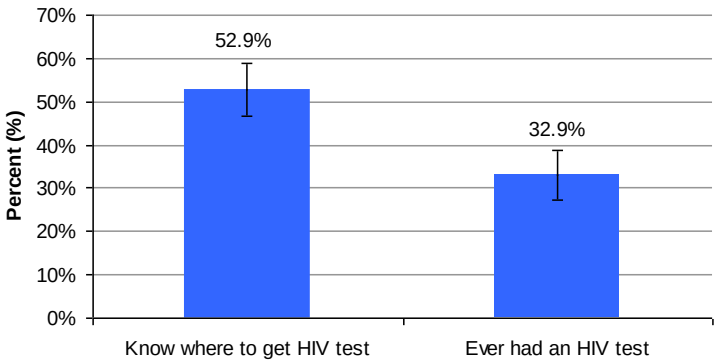

Figure 9. HIV testing among FSWs, Unguja, 2007

The majority of FSWs (83.8%) felt that they were at high risk for HIV infection based on their current behaviors. Only 5.4% felt that they were not at risk for HIV. Among those who felt any level of HIV risk, the majority attributed their risk to having multiple sex partners (87.9%), while 10.8% felt they were at risk because of inconsistent condom use and less than 1% felt at risk because they either injected drugs or had sex with IDUs (0.5% and 0.8%, respectively). Although more than half of FSWs (52.9%) were aware of where to get a confidential HIV test, only 32.9% had ever had an HIV test, and of these, 44.9% had been tested more than one year before the survey.

Table 5. HIV knowledge, testing and risk perception among FSWs, Unguja, 2007

HIV knowledge, testing and risk perception	N	%	95% CI
HIV knowledge			
Ever heard of HIV	377	99.1%	97.4, 100.0
Disagrees one knows an HIV-infected person by looking	345	90.3%	85.8, 94.2
Agrees having one faithful uninfected partner reduces HIV risk	297	76.4%	70.6, 81.9
Disagrees that one can get HIV from public toilets	354	94.1%	91.7, 96.7
Agrees that using a condom during vaginal sex prevents HIV	305	79.5%	74.3, 84.4
Agrees that using condoms during anal sex prevents HIV	246	62.1%	55.7, 68.1
Agrees that sharing needles increases HIV risk	300	81.0%	76.0, 85.4
Agrees that cleaning needles reduces risk	157	41.2%	34.8, 48.0
HIV Stigma			
People with HIV/AIDS should be ashamed of themselves	130	36.5%	30.6, 43.1
I would feel ashamed if someone in my family had HIV/AIDS	123	35.4%	29.2, 41.8
I would feel ashamed if I were infected with HIV/AIDS	129	35.0%	29.3, 41.6
People with HIV/AIDS are promiscuous	246	62.7%	56.8, 68.2
It is female sex workers who spread HIV in the community	140	36.9%	30.6, 44.1
HIV/AIDS is punishment for bad behavior	113	32.0%	26.4, 37.5
Risk perception based on current behavior			
High risk	325	83.8%	78.7, 88.7
Medium risk	31	9.2%	5.4, 13.5
Low risk	5	1.6%	0.3, 3.2
No risk	17	5.4%	2.9, 8.3
Reasons for feeling at risk for HIV infection			
Frequently change partners	318	87.9%	83.6, 92.0
Inconsistent condom use	38	10.8%	6.9, 14.9
Injection drug use	3	0.5%	0.0, 1.2
Sex partners use injection drugs	2	0.8%	0.0, 2.0
Ever tested for HIV prior to the survey			
Knows where to obtain an HIV test	206	52.9%	46.7, 58.9
Ever had an HIV test	138	32.9%	27.3, 38.6
STI symptoms in the past 6 months			

Yes	58	15.3%	10.3, 20.0
No	321	84.7%	80.0, 89.7

HIV and STI infection and associated risk factors

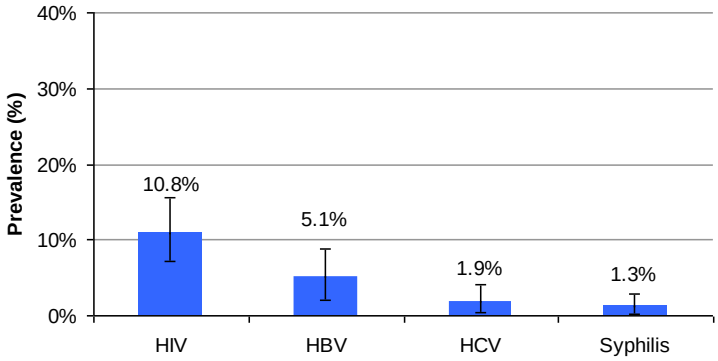

Figure 10. HIV, HBV, HCV, and syphilis prevalence among FSWs, Unguja, 2007

The prevalence of HIV among FSW was 10.8%. HBV prevalence was 5.1%, HCV prevalence was 1.9%, and syphilis prevalence was 1.3%.

Table 6. HIV, HBV, HCV, and syphilis prevalence among FSWs, Unguja, 2007

Disease prevalence	N	%	95% CI
HIV			
Positive	47	10.8%	7.2, 15.6
Negative	332	89.2%	84.4, 92.8
HBV			
Positive	14	5.1%	2.1, 8.9
Negative	365	94.9%	91.1, 97.9
HCV			
Positive	11	1.9%	0.4, 4.1
Negative	368	98.1%	95.9, 99.6
Syphilis			
Positive	4	1.3%	0.2, 2.8
Negative	375	98.7%	97.2, 99.8

HIV prevalence increased with age, with the highest prevalence among FSWs aged 35 years and older (26.6%).

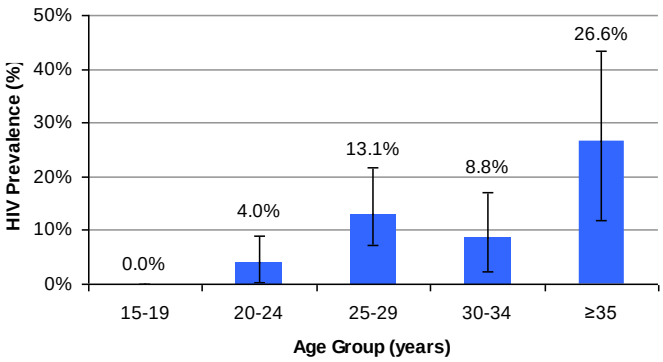

Figure 11. HIV prevalence by age group among FSWs, Unguja, 2007

HIV prevalence is highest among FSWs with less education:16.7% of those who completed some primary education (1-7 years) were HIV-infected compared with 3.1% of those who completed 8-10 years of school and 7.1% of those who completed 11 or more years of school.

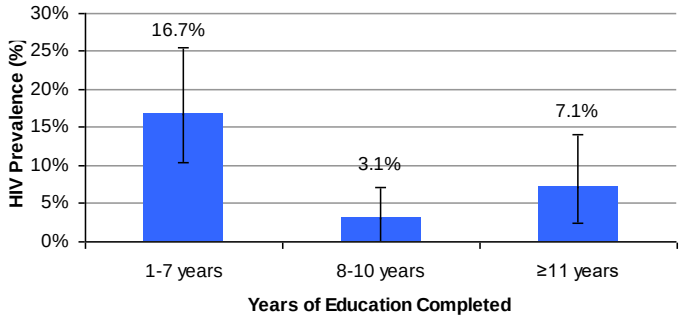

Figure 12. HIV prevalence by years of education completed among FSWs, Unguja, 2007

HIV prevalence was higher among FSWs who started selling sex at older ages: 20.1% of women who started selling sex when aged 25 years or older were HIV-positive compared with 3.4% of those who started selling sex before the age of 20 years.

Table 7. HIV prevalence by socio-demographic characteristics among FSWs, Unguja, 2007

Socio-demographic characteristics	HIV-positive N	HIV prevalence %	95% CI
Age group			
15-19 years	0	0.0%	0.0, 0.0
20-24 years	4	4.0%	0.4, 8.9
25-29 years	15	13.1%	7.2, 21.6
30-34 years	11	8.8%	2.2, 17.0
≥ 35 years	17	26.6%	11.9, 43.3
Education			
1-7 years	31	16.7%	10.4, 25.3
8-10 years	7	3.4%	0.2, 7.9
≥ 11 years	8	7.4%	2.6, 14.0
Income			
≤ 50,000	11	7.4%	2.2, 14.0
50,001 - 120,000	16	18.0%	8.5, 28.5
120,001 - 200,000	15	10.3%	5.4, 16.8
≥ 200,001	3	2.0%	0.0, 8.8
Age at first selling sex			
≤ 19 years	7	3.4%	0.7, 7.6
20-24 years	20	10.6%	6.4, 17.4
≥ 25 years	19	20.1%	9.6, 31.4

HIV prevalence among FSWs increased with duration of selling sex: 3.6% of FSWs who reported selling sex for three years or less were HIV-infected compared with 18.0% of those who were engaged in sex work for 7 to 9 years and 28.6% of those who reported selling sex for 10 years or more.

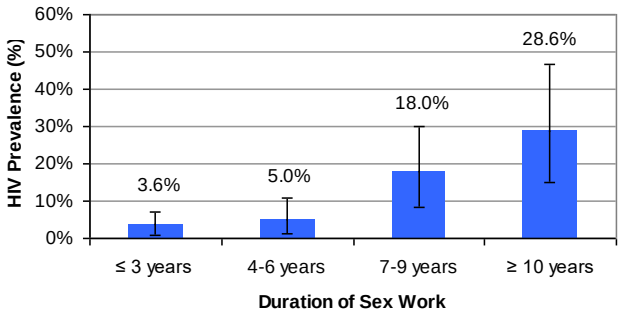

Figure 13. HIV prevalence by duration of sex work among FSWs, Unguja, 2007

HIV prevalence was higher among FSWs who reported injecting drugs compared to FSWs who did not inject drugs in the past three months (26.4% vs. 10.2%). However, there was little difference in HIV prevalence among FSWs who reported using non-injectable drugs and those who did not use drugs at all in the past three months (15.7% and 10.3%, respectively).

Table 8. HIV prevalence by risk behaviors among FSWs, Unguja, 2007

Risk factors	HIV-positive (N*)	HIV prevalence (%)	95% CI
Duration of selling sex			
3 years or less	7	3.6%	0.9, 7.2
4-6 years	9	5.0%	1.1, 10.9
7-9 years	10	18.0%	8.3, 29.8
25 years or more	21	28.6%	15.0, 46.6
Number of clients on last day worked			
One	2	5.0%	0.0, 16.0
Two	19	14.2%	6.9, 24.6
Three	18	8.3%	4.5, 13.6
Four or more	8	12.7%	3.2, 23.1
Condom use at last sex			
Yes	13	9.3%	5.5, 14.2
No	34	12.8%	5.7, 22.1
Frequency of condom use with steady partner			
Always	14	9.5%	2.2, 18.4
Inconsistently	3	22.0%	0.0, 44.7
Never	14	6.7%	3.3, 12.1
Frequency of condom use with casual non-paying partners			
Always	5	25.8%	0.0, 56.9
Inconsistently	4	11.4%	0.0, 28.6
Never	3	4.4%	0.00, 12.1
Frequency of condom use with one-time clients			
Always	21	7.3%	3.8, 12.0
Inconsistently	16	18.4%	8.4, 31.1
Never	9	10.6%	4.6, 17.5
Frequency of condom use with regular clients			
Always	22	8.3%	3.5, 14.3
Inconsistently	8	9.5%	2.7, 19.3
Never	8	9.0%	3.5, 15.1
Frequency of condom use with tourists/foreigners			
Always	10	8.9%	1.2, 20.0
Inconsistently	3	3.8%	0.0, 17.2
Never	3	8.7%	0.0, 19.5
Non-injection drug use in the past 3 months			
Used non-injection drugs	8	15.7%	4.0, 31.8

No drug use	39	10.3%	6.6, 15.3
Injection drug use			
Used injection drugs	41	26.4%	0.0, 58.3
Did not use injection drugs	6	10.2%	6.5, 14.9
Ever had an HIV test prior to survey			
Yes	20	9.8%	5.3, 15.9
No	27	11.9%	7.1, 17.7

7. Discussion and Recommendations

- **High HIV prevalence:** HIV prevalence was 10.8%, much higher than that of the general population (< 1%). Hepatitis B infection prevalence was also relatively high (5.1%), while prevalence of HCV and syphilis were lower (1.9% and 1.3%, respectively).
- **FSWs are young and have low rates of education:** 68.3% of FSWs were under the age of 30 years and the median age was 26 years. Almost half of FSWs (48.5%) had completed less than 8 years of education.
    - Findings that almost one-third of FSWs (32.0%) had their sexual debut at very young ages, between 10 and 15 years of age, and 40.3% of FSWs started selling sex at 19 years or younger are cause for concern. Existing programs for FSWs need to examine whether young FSWs are reached through existing interventions and services. In addition, youth programs should enhance activities and support for young girls at risk based on the findings from this survey.
- **Sex work is the unique source of income for 73.9% of FSWs**: FSWs reported selling sex for a median of 5 years and 50.4% started selling sex in order to earn money to support their family or pay off a debt. An additional 18.4% reported starting sex work after being abandoned by their families or husbands.
    - Structural interventions and commitment from relevant authorities and programs are needed to support single women and improve their access to formal employment, income-generating activities, and/or other sources of support that do not put them at risk.
- **FSWs report meeting clients in guesthouses, pub/bars, and discos:** These common areas where FSWs meet clients highlight opportunities for targeted outreach activities.
    - Outreach and communication activities should consider working with both FSWs and their current and potential clients at the locations where FSWs reported meeting clients. Accessing venues by engaging owners and managers may provide opportunities for male and female condom promotion and distribution and other interventions.
- **FSWs reported several different partner types**: FSWs reported a median of 3 clients on their last day of work and 61.7% of FSWs reported six or more partners in the last month. Half of FSWs reported having a steady non-paying partner (48.9%) while 23.9% reported having casual non-paying partners. Paying

clients and non-paying partners present potential transmission routes to the general population.

  - HIV prevention counseling and interventions should be designed to raise awareness among FSWs about the risks of unsafe sexual relations with all their partners. Non-paying steady partners of FSWs may not fully perceive or know of their risk for HIV infection nor understand the need to prevent HIV transmission. These findings reinforce the need for programs to work with both FSWs and their sexual partners, including targeted prevention messages for clients and non-paying partners of FSWs.

- **Moderate rates of condom use and variation by partner:** 55.7% of FSWs reported using condoms the last time they had sex. Consistent condom use ('always used a condom') was highest with foreigners (46.9%) and lowest with steady partners (26.2%). The most common reason reported by FSWs for not using a condom was partners' objection to using one (42.5%). Prevention activities promoting condom use should include condom use empowerment and should provide practical tools to improve condom use among clients and other sexual partners of FSWs.
- **Low rates of HIV testing despite high perception of HIV risk:** Though the majority of FSWs perceived themselves at high risk of HIV infection, only 32.9% of FSWs had ever had an HIV test. Only half of FSWs (52.9%) were aware of where they could access a confidential HIV test. HIV testing should be expanded, and promotion of HIV testing should highlight links to treatment and other services in order to encourage FSW to access all services.
  - HIV Voluntary Counseling and Testing (VCT) for FSWs will most likely need to be addressed in two ways: (a) promotion of increased use of existing services, with additional training of counselors on how to receive and provide quality VCT services for FSWs, and (b) increasing accessibility of VCT services to FSWs through mobile services that can reach non-traditional locations for those who may have fear or other concerns about accessing public or private health facilities.
- **Physical abuse by male clients and other sex partners is common:** 62.8% of FSWs reported experiencing physical violence in the past 12 months. Among these, 39.4% reported being beaten by their steady partner and 28.5% by a one-time sex partner. Violence against sex workers may undermine HIV prevention efforts where FSWs do not have the autonomy to make protective decisions about issues such as condom use. Physical violence may also be linked to sexual violence which, in turn, may increase risk of HIV infection. HIV prevention efforts should include education or community mobilization focused on reducing or responding to violence among FSWs.
- **Potential bridging between FSW and IDU populations:** Injection drug use among FSWs was low (2.8%); however, higher proportions of FSWs suspected injection drug use among their sexual partners (10.9% to 17.6%). This indicates a potential bridge for HIV transmission between FSWs and their IDU clients. Whether or not FSWs themselves are using drugs, education interventions should emphasize the increased risk of HIV infection associated with injection drug use.

- **Potential bridging between FSWs and the general population:** FSWs have many different types of paying and non-paying sexual partners who might provide a bridge for HIV transmission between FSWs, other high risk groups, and the general population. Reports of specific risk behaviors such as condom use depend considerably on sexual partner type. In addition, the high prevalence of physical abuse by sexual partners indicates that some FSWs may not be able to make protective choices. When designing interventions, it is crucial not to overlook the important role that clients and other partners of FSWs can play in the spread or prevention of HIV transmission. Where possible, prevention programs should be expanded to include male clients and other sexual partners of FSWs.

CONCLUSIONS AND RECOMMENDATIONS

Study findings clearly identify and confirm the need for urgent establishment and expansion of programs for MARPs (IDU, MSM, and FSWs). While it is acknowledged that other vulnerable groups exist on Zanzibar these three groups are much less likely to have access to care and less likely to use care when it is available because of stigma and criminalization. At the time the studies were conducted prevention efforts had clearly not sufficiently reached these MARPs and also need to urgently be brought to scale.

These results support the need to develop a minimum package for prevention, care, and treatment of HIV infection that is tailored specifically for each target population. As described earlier, this package should build on existing services and integrate important messages on how to reduce sexual and drug use risk, particularly among individuals that engage in multiple risk behaviors. In addition, the promotion of skills and tools for safe injection, MAT for treatment of injection drug users, condoms distribution, routine STI screening and treatment, and linkages to appropriate HIV care and treatment services should be included. This package will need to be appropriately defined and adapted according to the unique context and risks identified for each population, endorsed by appropriate stakeholders in Zanzibar, and once implemented, monitored appropriately.

We found a substantial level of reported abuse in all populations, highlighting the social vulnerability of these stigmatized populations in Zanzibar and its potential impact on individual risk-taking behavior. Individual interventions to prevent abuse should include direct structural, psychosocial, and clinical services to protect abused individuals from perpetrators, as well as economic and social empowerment services to help individuals build protective skills to reduce abuse in their relationships and life contexts. On a larger scale, to appropriately address this issue in the overall population and influence broader change in the community, structural interventions that increase public awareness and implementation of public campaigns that challenge the acceptability of abuse are needed in the community. Additionally, these interventions could be strengthened by involving the police to help protect the rights of individuals; however, it is recognized that bias may exist within these groups and the police will also need to be educated to reduce discrimination.

The first round of behavioral and biological surveillance surveys conducted among most at risk populations (MARPs) in Zanzibar successfully captured a representative sample of MSM, FSWs, and IDUs in Unguja, Zanzibar, serving as a foundation for the establishment of a MARPs surveillance system in Zanzibar. These baseline surveys have provided important epidemiologic data to better understand the current context of the HIV epidemic in Zanzibar and will be used by policy makers to prioritize where to target their resources for HIV prevention. It is recommended that these surveys be repeated every three years to appropriately monitor HIV, STI, and behavioral trends in these populations, as well as to assess the impact of existing interventions. In addition, we recommend that these surveys be implemented in other regions in Zanzibar, including Pemba island, as well as Mainland Tanzania in settings where high risk groups are known to exist. As more countries in Africa consider behavioral surveys among high risk populations, it is hoped that the Zanzibar experience can serve as a good model for countries, highlighting the importance of conducting surveillance among these hard to reach, marginalized populations to minimize HIV infection in these groups and in the broader population.

REFERENCES

1. UNODC, Commission on Narcotic Drugs. Complementary drug-related data and expertise to support the global assessment by Member States of the implementation of the declarations and measures adopted by the General Assembly at its twentieth special session. Report by East African Community. Commission on Narcotic Drugs, Fifty-first session, Vienna, 10-15 March 2008 . 2-22-2008. 7-13-2009.
   Ref Type: Electronic Citation

2. Report on the Epidemiology and Socio-Economic Effects (Implications) of Substance Use in Relation to HIV and Related Blood Borne Infections in Zanzibar. 77-89. 2007. Zanzibar, United Republic of Tanzania, Zanzibar AIDS Control Programme, Ministry of Health and Social Welfare.
   Ref Type: Report

4. Ross MW, McCurdy SA, Kilonzo GP, Williams ML, Leshabari MT. Drug Use Careers and Blood-borne Pathogen Risk Behavior in Male and Female Tanzanian Heroin Injectors. *Am J Trop Med Hyg* 2008;79:338-43.

5. Williams M, McCurdy S, Atkinson J, Kilonzo G, Leshabari M, Ross M. Differences in HIV Risk Behaviors by Gender in a Sample of Tanzanian Injection Drug Users. *AIDS and Behavior* 2007;11:137-44.

6. Wade AS, Kane CT, 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. [Miscellaneous]. *AIDS* 2005;19:2133-40.

7. Baral S, Trapence 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:e4997.

8. Baral S, Sifakis 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 Med* 2007;4:e339.

9. Sanders EJ, Graham SM, 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. [Miscellaneous]. *AIDS* 2007;21:2513-20.

10. Sharma AS, Bukusi EMMMP*, 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. [Miscellaneous]. *Sexually Transmitted Diseases* 2008;35:352-54.

11. van Griensven F, Sanders EJ. Understanding HIV Risks Among Men Who Have Sex With Men in Africa. [Editorial]. *Sexually Transmitted Diseases* 2008;35:355-56.

12. Ghys PD, Jenkins C, Pisani E. HIV surveillance among female sex workers. *AIDS* 2001;15:S33-40.

13. Kapiga SH, Sam NE, Shao JF, Renjifo B, Masenga EJ, Kiwelu IE, Manongi R, Fawzi W, Essex M. HIV-1 Epidemic Among Female Bar and Hotel Workers in Northern Tanzania: Risk Factors and Opportunities for Prevention. *JAIDS Journal of Acquired Immune Deficiency Syndromes* 2002;29:409-7.

14. Riedner G, Rusizoka M, Hoffmann O, Nichombe F, Lyamuya E, Mmbando D, Maboko L, Hay P, Todd J, Hoelscher M, Grosskurth H. Baseline survey of sexually transmitted infections in a cohort of female bar workers in Mbeya Region, Tanzania. *Sex Transm Infect* 2003;79:382-87.

15. Saidi H.Kapiga, Noel E.Sam, John F.Shao, Boris Renjifo, Elisante J.Masenga, Ireen E.Kiwelu, Rachel Manongi, Wafaie Fawzi, and Max Essex. HIV-1 Epidemic Among Female Bar And Hotel Workers in Northern Tanzania: Risk Factors and Opportunities for Prevention. JAIDS Journal of Acquired Immune Deficiency Syndromes 29, 409-417. 2002. Philadelphia, Lippincott Williams & Wilkins, Inc.
Ref Type: Generic

16. Trong T.H.Ao, Noel E.Sam, Elisante J.Masenga, George R.Seage III, and Saidi H.Kapiga. 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 33[3], 163-169. 2006. American Sexually Transmitted Diseases Association.
Ref Type: Generic