PSYCHOACTIVE SUBSTANCE USE AND HIV RISK AMONG MEN WHO HAVE SEX WITH MEN, TRANSGENDER WOMEN & HIJRA POPULATIONS IN INDIA

FRONTLINE AIDS

Alliance India

Acknowledgement

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ABBREVIATIONS

AIDS	Acquired Immune Deficiency Syndrome
ART	Anti-Retroviral Therapy
ARTC	Anti-Retroviral Treatment Centre
ARV	Anti-Retroviral
CSC	Care and Support Centre
CD4	Cluster of differentiation 4
CDC	Centre for Disease Control
CHC	Community Health Centre
CST	Care and Support Treatment
FSW	Female Sex Worker
HIV	Human Immunodeficiency Virus
HRG	High Risk Group
IBBS	Integrated Biological and Behavioural Surveillance
ICTC	Integrated Counselling and Testing Centre
IDU/PWID	Injecting Drug User/People Who Inject Drugs
KP	Key Population
LAC	Link ART Centre
LSD	Lysergic acid diethylamide
MSM	Men who have Sex with Men
NACO	National AIDS Control Organization
NACP	National AIDS Control Program
NGO	Non-Governmental Organization
OST/OAT	Opioid Substitution Therapy/Opioid Agonist Treatment
OR	Odds Ratio
PHC	Primary Health Centre
PLHIV	People Living with HIV/AIDS
TGW + H	Transgender Woman + Hijra
TGM	Transgender Man
WHO	World Health Organisation

ABSTRACT

Human Immunodeficiency Virus is a public health concern, with nearly 38 million individuals living with HIV globally. In India the pandemic is concentrated among certain groups, the so-called "High-risk groups" also known as the Key Population. Men who have Sex with Men and Transgender Women are two such communities that belong to Key populations. Studies have shown that substance use is immensely popular among both MSM and TG, and when adding into consideration risky sexual behaviours under influence the HIV risk among MSM and TGW will increase.

In July 2021, Alliance India with support from Frontline AIDS started a study to understand the intersectionality of substance use, sexual history and Gender identity on HIV risk among MSM and TGW populations in India. The objectives of the study were two-fold, to understand the multilevel (individuals, group, environment) associations between substance use and HIV and to use our findings to develop a policy brief to share recommendations with relevant policy makers.

A case-control study was initiated, cases being those adult KP's (MSM, TGW) who were screened positive for HIV in the last 6 months before the interview and our controls being those adult KP's who were screened negative for HIV in the last 6 months before the interview. A questionnaire was developed using a number of standardized tools as a base that gathered information, from 264 individuals (MSM & TGW), pertaining to socio-demographic profiles, substance use history (lifetime & last 6months), sexual history (last 6 months), Stigma and violence faced based on identity, and health service utilization.

The study observed that the proportion of HIV positive (54%) MSM & TGW who consumed psychoactive substances in the last 6 months was found to be significantly higher than HIV negative (44%) MSM & TGW who consumed substances in the same period. Furthermore, the consumption of these substances increased the risk of HIV by 2 times amongst HIV positive individuals (aOR – 2.45, p = 0.043). It was observed that Alcohol was the most popular substance followed by Cannabis use in both cases and controls. Approximately 10% HIV positive and 5% HIV negative individuals were injecting substance users. The popular combination of substances among cases was found to be similar for both MSM and TG, Alcohol + Cannabis combination (19%) used for/before sexual intercourse. Individuals who were forced to have sex without a condom (AOR: 1.96; 95% CI: 1.05 – 3.67) had higher odds of being HIV positive. A higher proportion of HIV negative individuals received condoms (37%) from the peer educators through the existing government programs as compared to the HIV positive individuals (24%) (p = 0.009).

In conclusion, the team found that a significantly higher number of HIV seropositive individuals used deaddiction services (48%) and as the majority (73%) of the individuals graduate from alcohol to cannabis within 1 – 2 years and harder drugs within 2 - 8 years, new strategies and program should be developed to intervene during this period of transition to reduce the risk of contracting HIV.

INTRODUCTION

HIV/AIDS continues to be a global public health concern, according to the UNAIDS 2020[1] report, an estimated 37.7 million individuals are living with HIV globally. In India, with the third-highest burden approximately 2.1 million individuals[2] are living with HIV. However, it has been observed that the epidemic in the country is concentrated among "High-risk groups" of Men who have Sex with Men, Transgender Women, People who use/inject drugs and Sex workers. According to the National AIDS Control Organisation (NACO) "Sankalak" report 2020[3], an evidence-driven report detailing the national AIDS response towards the 2030 goal, the prevalence of HIV among KPs (TGW + H, MSM and Sex Workers) is 6 to 13 times higher than the adult working population. In the same context, KPs often use psychoactive substances which increase their risk of contracting HIV infection by 2 to 7 times[4,5].

According to the World Health Organisation (WHO)[6], psychoactive substances are those that lead to an alteration in a person's mood, consciousness, cognition and behaviour. Depending on their mode of action, these substances can be classified into three major categories; Stimulants, Depressants and Hallucinogens. Some relevant examples of these substances are Alcohol, Cocaine, Opioids (Heroin, Methadone), Amphetamine Type Stimulants or ATS (Ecstasy, MDMA), and Inhalants (paint thinner, glue, and petrol), pharmaceutical sedatives (sleeping pills) and Hallucinogens (LSD, mushrooms).

Substance use has a very close relationship with HIV. IDU (Injecting Drug Users) has a direct association with HIV due to sharing of needles, but, all psychoactive substances taken via any route (drinking, smoking, inhaling, ingesting) that directly affect the judgement of an individual can lead to risky sexual behaviours (Multiple partners/Unsafe sex) that in turn may lead to transmission of HIV[7].

The National (Integrated Biological and Behavioural Surveillance)[8,9], was conducted pan India in 2015 – 16 and collected key information on various parameters like sex work, substance use, sexual activity, HIV, stigma/discrimination, condom use, and service utilization among "high-risk groups". The report suggested that close to one-third of Sex workers used Alcohol in the last 12 months, among these 61% reported that they consumed alcohol before or during sex, while 2% reported the use of injecting substances, and half of these users reported that they had shared needles and syringes. Overall, 51 % of MSM reported consuming alcohol, 56% of these users reported use before or during sex, and 3% reported use of injecting substances. More than half of TGW reported consumption of alcohol, 10% reported use of injecting substances and 36% of those reported sharing of needles and syringes.

Figure 1 – Schematic representation of multi-risk behaviour pattern (Pradeep Kumar, Santhakumar Aridoss et. Al.4)

The UNAIDS 2016 "Prevention gap report"[10] mentions that transgender people (TG) are one of the groups most affected by HIV/AIDS (49 times more likely). Global estimates stand at 19% of all Transgender women (TGW) who are living with HIV and data from some countries (Latin America and the Caribbean) state that HIV prevalence is higher among TGW sex workers than among non-transgender male/female sex workers.
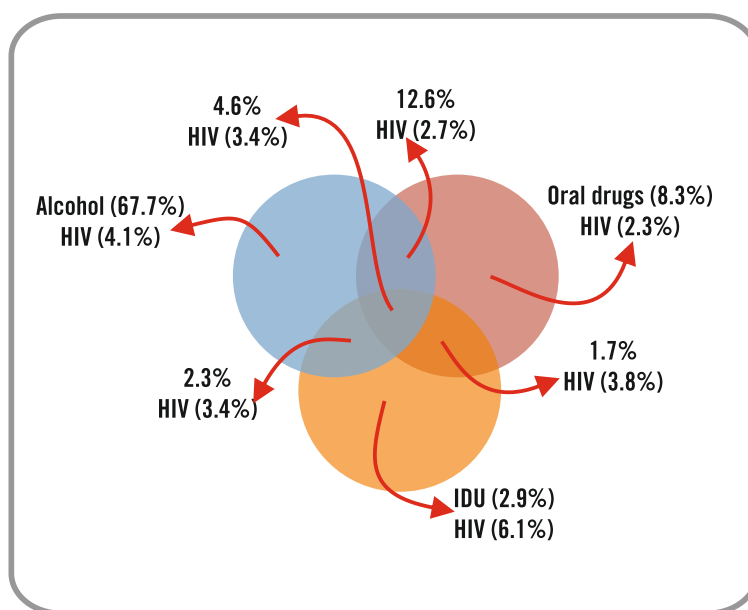
In India, TGW/H people are significantly affected by HIV as its prevalence among this population is the second-highest after people who inject drugs. The NACO report[3] states that HIV prevalence among Hijra/Transgender people, MSM and female sex workers is nearly 6 to 13 times higher than the adult prevalence.

In another study conducted by J. Michael Wilkerson, Angela Di Paola et al[11]. among 433 MSM in Maharashtra, India, it was observed that the prevalence rates of hazardous drinking were far higher and found that Unmarried MSM with high income were more likely to report hazardous drinking contrary to previous studies done on same topics. Studies conducted in Belgium[12] and China[13] reported that the risk of contracting HIV can increase to around 30 times when psychoactive substances are used before sexual intercourse.

A study conducted in San Francisco (United States)[14] to identify the relationship between unprotected sexual behaviour and HIV risk among Transgender Women, found that overall, 35% of TGW with HIV-discordant primary partnerships had unprotected sex with the male primary partner during the last 3 months. They concluded that factors that were associated with unprotected sex included living with partner, drug use, education level, low self-efficacy to use condoms and perceived discrimination.

Alliance India's Samarth clinics, located in 6 cities across 6 states in India, focused on ensuring the well-being of community members by creating enabling environments, generating demand for services as well as providing treatment literacy. They found that overall, 23.5% of the clients used drugs orally, sniffed, and injected drugs, approx. 59% consumed alcohol daily, weekly or occasionally, and Tobacco (smoked or chewed) was used by 28.2% clients (unpublished data). The intersectionality between substance use, gender identity and Sexual behaviour on the outcome of HIV is of particular interest to us, through this study Alliance India hope to address the challenge of accurately predicting the association of different/combinations of substance in risk practices among MSM and TGW + H and also provide recommendations to program leaders in designing interventions to reduce the harmful/negative aspects related to substance use that would lead to reduction in HIV.

METHODOLOGY

Aim & Objective

A Case-Control study was conducted with the aim to assess the associations between psychoactive substance use and HIV risk among MSM and TGW + H populations in India. Using the findings, the study team will provide recommendations in the form of a policy brief, to further improve the National HIV prevention and care & support programs

The objectives of our study can be broadly categorised as follows:

1. To understand the multilevel (individual, group, community, environmental) associations between psychoactive substance use and HIV risk among MSM and TGW + H populations in India.

2. To develop a policy brief that focuses on the intersectionality of psychoactive substance use, gender identity and sexual behaviour on HIV risk which would contribute to the National HIV prevention program of India.

Areas of inquiry

Table 1 – Areas of inquiry

	Objective: To understand the multilevel associations between psychoactive substance use and HIV risks among (MSM) and (TGW/H) in India.
1	**Sub Objective:** To characterise and assess the differences in the use of psychoactive substances between HIV positive and HIV negative MSM and TGW/H.

1.1.1: Areas of Enquiry

Outcome –	Variable of interest –	Other variables (mediator/modifier) –
• HIV (positive or not)	• Type of psychoactive substance • Common combinations • Substance use according to identity • Behaviour changes in last 6 months • Use of substance in groups (Non-injecting and Injecting)	• Reasons for starting • Reasons for multi-use • Role in life now • Occupation/education • Violence faced/stigma/reasons for/type • Covid19 effect on use • Age when started • Time taken to shift from alcohol to "higher substance"

2	**Sub Objective:** TTo assess and examine differences in sexual risk patterns among HIV positive and HIV negative MSM and TGW/H.

1.2.1: Areas of Enquiry

Outcome –	Variables of interest –	Other variables (mediator/modifier) –
• HIV (positive or not)	• Number of partners • Number of sexual encounters • Sexual history • Number of encounters last 7 days/7 days before screening test	• Demographic profiles and use • Types of encounter – Vaginal, oral, anal receptive and penetrative) • Violence faced/stigma/reasons for/type • Age of first encounter/sex work • STI and Sexual encounters • Reason for using substance before / during intercourse • Type of encounter – Vaginal, oral, anal receptive and penetrative) • Violence faced/stigma faced • Condom uses before sex/prEP use • Use of psychoactive substances and risky sexual behaviours in tandem

3	**Sub Objective:** To assess the health/care-seeking behaviour and needs of HIV positive and HIV negative MSM and TGW/H

1.3.1: Areas of Enquiry

Outcome –	Variable of interest –	Other variables (mediator/modifier) –
• HIV (positive or not)	• Under any service/HR/TI/ART/prEP etc • Knowledge about De-addiction/HIV/ART/STD interventions	• ART services • Prophylaxis services (prEP)/Specific intervention • Harm reduction • Support networks/groups • Combinations of services (TI with OST/OAT, prEP etc.) • Covid19 pandemic • Understanding HIV • Risky behaviour • Access to interventions • Able to afford interventions • Healthcare seeking behaviour and (perceived/experienced) stigma.

Study Design

A case-control study was conducted from July to December 2021 among MSM and TGW populations.

Study Setting

Our two main study settings are:

- **Samarth clinics** – Samarth project provides community-led HIV screening and treatment linkages for men who have sex with men (MSM) and transgender and hijra (TGH) population by ensuring confidential and sensitive dealing of various sexual health-related issues. Samarth community clinics are implemented through a consortium of three partners; Lakshya Trust, Amitie Trust and Shaan Foundation in five cities: Noida (Delhi NCR), Jalandhar (Punjab), Vadodara (Gujarat), Hyderabad (Telangana) and Hooghly (West Bengal). Samarth is the first community-based testing intervention implemented in India with the support of the National AIDS Control Organisation (NACO) for MSM and TGH population.

- **Vihaan TG-CSC** – The programme is implemented nationwide in a diverse partnership with the government, civil society, and the networks of people living with HIV and serves nearly 1.6 million PLHIV through its 319 Care and Support Centres (CSCs) spread across 28 states and 4 union territories in India. The community-led model (TG-CSC) of the Vihaan Care and Support programme has been recognised as an integral part of the national programme as a care and support component. The programme is focusing on strengthening differentiated care and support services and expanding reach to the most vulnerable, and hard to reach population to provide holistic care and support services.

Table 2 – Domains/areas from where population was recruited

Area/Domain of recruitment	Location	Area/Domain of recruitment	Location
Samarth Clinics	• Delhi • Hyderabad (Telangana) • Jalandhar (Punjab) • Vadodara (Gujarat) • Hooghly (West Bengal)	**Vihaan Care and Support Centres**	• Delhi • Telangana • Punjab • Gujarat • West Bengal

From these sites, managers/program officers were contacted to prepare a line list of clients who would be willing to participate (with consent) in our study. The sample was proportionately distributed among these locations taking into consideration the language spoken (Hindi speaking Delhi and Jalandhar, Gujarati speaking Vadodara, Bengali speaking Hooghly & Howrah and Kannada speaking Hyderabad).

The individuals who agreed were included in our final sample consideration based on the Inclusion and Exclusion Criteria.

Study Respondents:

Our target population were divided into cases and controls defined below;

Cases – HIV seropositive MSM and TGW + H individuals (tested 6 months before the interview)
Controls – HIV seronegative MSM and TGW + H individuals (tested 6 months before the interview)

The cases and controls were matched on the following criteria: Age ± 5 years, Location, Gender Identity

Based on our objectives the following Inclusion/Exclusion criteria were set, which can be found below in table 3.

Table 3 - Inclusion/exclusion criteria

Cases	Controls
INCLUSION CRITERIA – • HIV seropositive population (MSM and TGW) – screened 6 months before the interview • Recruited from Samarth clinics/CSC • Above the age of 18 • Consent to take part in the study (informed via phone)	**INCLUSION CRITERIA –** • HIV seronegative population (MSM and TGW) – screened 6 months before the interview • Recruited from Samarth clinics/CSC • Above the age of 18 • Consent to take part in the study (informed via phone)
EXCLUSION CRITERIA – • Clients who are already involved/participating in HIV prevention trials/programs • Other Transgender populations (TGM, genderqueer/binary)	**EXCLUSION CRITERIA –** • Clients who are already involved/participating in HIV prevention trials/programs • Other Transgender populations (TGM, genderqueer/binary)

Sample Size and Sampling Methodology

To obtain a valid sample size the following criteria were used:

- Minimum Odds Ratio to detect (based on previous literature the odds of substance users developing HIV were between 2 – 7) – 2.5

- Statistical power of 85%, 0.85

- 95% Confidence Interval

- Baseline exposure of drug (Higher drugs including all except Alcohol and tobacco) use in controls of 25% - presumed to be exposed with the smallest prevalence, so will provide sufficient power to assess the potential significance of other exposure variables.

- Alpha of 0.05 will be considered statistically significant.

- The correlation between case and control exposures for matched pairs (rho) of 0.1. The value of 0.1 is used here because it is recommended to use a small arbitrary value when rho is not known from the previous studies.

- Ratio between cases and controls of 1.

The EpiR package in RStudio was used to calculate sample size by using the following code in R: epi. sscc (OR = 2.5, p0 = 0.25, n=NA, power = 0.85, r = 1, rho = 0.1, conf. level = 0.95, method = "matched").

- OR = the expected study odds ratio

- p0 = prevalence of exposure in the control group

- n = total number of subjects in the study

- r= ratio between cases and controls

- power = the required study power

Inputting all values and a 20% attrition rate an effective sample of 264 was derived - which was able to make (132 cases and 132 controls).

Study Tools

The primary variable of interest in our study was substance use among MSM and TGW + H individuals. For the same, the study team created a questionnaire (Quantitative and Qualitative) covering a number of different sections pertaining to the respondents. (Appendix 1)

a) Socio-demographic profile
b) Substance use history
c) Sexual behaviour
d) Stigma/violence faced
e) Health service utilization

PRIMARY INFORMATION – The questionnaire was adapted from the following pre-existing standardised tools: -

- **WHO, Family Health International (Behavioural Surveillance Survey –** The WHO, Family Health International tool or the Behavioural surveillance Survey is a tested valid tool that was developed in 2000 and serves as a baseline questionnaire builder for all similar surveillance tools. The original tool has three separate questionnaires for three different population characteristics i.e. – General Adults (15 – 49), Unmarried youth groups, Female Sex workers, MSM groups and Injecting Drug Users (IDU). However, each covers some general sections like demographics, sexual history, Knowledge/ attitudes and services availed. Apart from this, each different questionnaire has a set of specific questions for each target group. On average each questionnaire had between 57-78 questions.

- **NACO IBBS (Integrated Biological and Behavioural survey –** The survey was implemented in a number of districts in India and sampling of high-risk groups was done. While the tool was built using the WHO tool as a framework, since the WHO tool was developed nearly 20 years ago, this version used by NACO was more updated and also relevant for the Indian population. The behavioural indicators used for the survey were; Knowledge indicators (HIV prevention, STI, condom, services), Risk profile of

clients, Sexual behaviours, risk perception and HIV testing, Stigma and Discrimination, injecting practices for IDU. It also consisted of separate questionnaires built for different target groups, with both common questions and group specific questions), the categories being FSW (131 questions), MSM (165 questions) and IDU (132 questions).

- **United Nation Office on Drug use and Crime (UNODC) –** In a publication by Dr Atul Ambekar in partner with the south Asia branch of UNIDC, on drug use, pattern and service intake, the categories used for injecting drug/substances were incorporated into our own list.

SECONDARY INFORMATION – The secondary information was taken from Client Registration Forms (CRF). This CRF was developed by Alliance India to record client information from the day they first register with Samarth clinics/Vihaan care and support centres. The information relevant to us was the HIV screening test dates, which were used to record the time difference between the same and the interview date. This was used in further analysis.

PROGRAM QUESTIONNAIRE – A short qualitative questionnaire was developed to understand service accessibility, affordability, gaps/hurdles in accessing services and strategies on how to bridge this gap. This information was incorporated into the health service utilization section and the Policy brief to get a holistic picture of current health services for MSM and TGW. (Appendix 2)

PRE-TESTING OF STUDY TOOLS

Pre-testing was done on 5 MSM and 5 TGW to understand and identify problems in language, tone, structure and design of the questionnaire. This evaluated the reliability, validity and appropriateness of our questionnaire in gathering information relevant to our hypothesis. After adjustments were made based on the findings of the pre-testing, the tools were sent for translations into the 4 local languages (Hindi, Kannada, Gujarati & Bengali).

RESEARCH ASSISTANTS AND CAPACITY BUILDING

Investigators were selected based on their prior experience in regards to working with the community (MSM and TG). In total 4 Research Assistants (Investigators) each being able to speak and understand the 4 languages (Hindi – Delhi & Punjab, Bengali – West Bengal, Kannada – Telangana, Gujarati – Gujarat) were

selected. Training of the assistants in study design, methodology and the investigative procedure was done at the Alliance India Delhi office over a period of 3 days. The agenda of the training session can be found in Appendix 4. Over 3 days, all topics in relation to the study were covered and all team members were introduced. Mock interviews and pilot testing done were conducted using the mobile-based collection tool.

Data collection & Data Management

Mobile Data Collection Software

In house mobile data collection tools were used for the survey. Complete digitization of the study questionnaire was done. An application was downloaded onto tablets provided to the 4 research assistants and instruction on how to use the app and questionnaire were given during training.

All interviews conducted using the tablet were securely stored on device memory. The RAs were asked to upload conducted interviews daily using the upload data function. All uploaded data was stored securely in Alliance India's internal server. A respondent code (generated by the software) was entered in the mobile for further data collection to maintain the confidentiality of details of the respondent and deceased person. The audio recording was done only for the interviews done with the individual at the program level after consent for the same was taken.

Only the PI and co-PIs were allowed to access and download the data from Alliance India's internal sever. The downloaded raw and processed data were otherwise kept locked and/or password protected. This was shared only with those who are part of the study team (investigators) and who have received research ethics training. Further analysis was conducted on the data only after removing the identifiers of the clients. Once all data was received, it was downloaded as an excel work sheet and made ready for analysis.
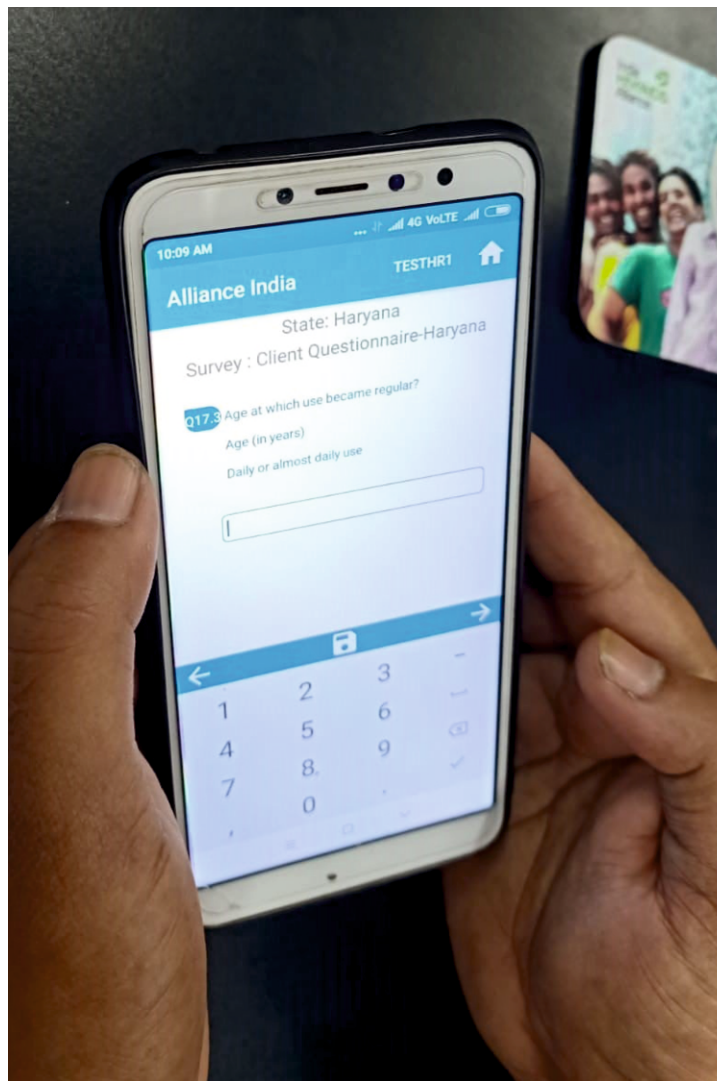
DATA PREPARATION AND DATA ANALYSIS

All analysis was conducted using RStudio software. Before analysis data was cleaned to remove duplicates, making sure no incomplete data was present, handling missing data and filtering any unwanted outliers.

Initially cross-tabulations and frequency tables were generated. Proper use of inferential statistic test was used to verify the results. Cross tabulations were made with cases and controls as the two distinct categories, p-values were calculated using chi-square test for categorical variables and t-test for continuous variables wherever necessary. Only p values less than 0.05 were considered statistically significant for all the tests.

Since the design of our study is a matched case-control and we have more than one independent variable, multivariable conditional logistic regression was used to build a model to determine the significant predictors

for the outcome of interest i.e., HIV status. Adjusted odds ratio along with its 95% CI was presented. Variables selection for the final model was done based on p-value in univariate analysis. Those variables whose p-value was <0.250 in the univariate analysis were taken for the final model of multivariable analysis. Ever forced into sexual act, age at the start of sex work, received condoms from peer educator or outreach worker, received lubricants from peer educator or outreach worker, seen demonstration on condom use, Visited Detox/deaddiction centre, cannabis, sedatives and other substances were included in the final model. (Table 20 in appendix 6)

To further understand patterns between substance use and HIV risk, a latent class analysis/cluster analysis was performed. Latent implies, measuring variables that are hidden or one that isn't directly measurable or observable. Classes are groups formed by uncovering hidden (latent) patterns in the data. Latent Class Analysis is a way to uncover these "hidden" patterns of association that can exist between observation and group subjects into "classes"/groups or subgroups with similar/unobservable/membership[16]. Cluster analysis is very similar to latent class analysis, a cluster is a group of similar objects (characteristics of each object in each cluster are similar to each other). Cluster analysis, like LCA, makes no distinction between independent and dependent variables the difference between the two being that LCA reduces the number of variables by grouping them into a smaller set of factors/classes, while cluster analysis reduces the number of observations by grouping them into a smaller set of clusters.

Our secondary data which mainly consisted of client details taken from Samarth and CSC databases will be used to cross-check respondent details with those details registered in our databases. We will also be taking relevant HIV information (date of diagnosis, status) of clients from these databases which will be used primarily in identifying sample lists. The HIV date of diagnosis will be used to get substance use history in the months leading up to diagnosis with HIV (0 - 1.5, 1.6 – 2.5, 2.6 – 3.5, 3.6 – 4.5, 4.6 – 5.5, 5.6 – 6.5).

ETHICAL APPROVAL AND INFORMED CONSENT

The study was initiated only after obtaining ethical approval from the Alliance India Institutional Review Board (AIIRB) located at India HIV/AIDS Alliance, New Delhi. The IRB reviewed the research protocol and all study-related materials before and during the study period. The study team ensured that the research complies with the IRB procedures or requirements.

A consent form was developed and used to obtain informed consent from all study participants. It mentioned all possible risks and benefits of taking part in the study and comprised of the following subheadings as per ICMR guidelines. (April 2020)[15]

- Statement mentioning that it is research
- Purpose of research
- Duration, frequency and methods
- Benefits to participants
- Foreseeable risks, discomfort/inconvenience
- Confidentiality of records
- Payment/ reimbursement for participation
- Treatment or compensation for injury (not relevant to our study)
- Freedom to participate/ withdraw
- Identify of research person and contact persons

STATISTICAL ANALYSIS

Respondents who were HIV seropositive were considered cases and those who were HIV seronegative were considered controls.

Descriptive analysis was carried out by frequency and proportion for categorical variables. Continuous variables were presented as mean (±standard deviation) or median (IQR). Chi-square test was used to test the statistical significance of cross-tabulation between categorical variables. An independent t-test was used to compare the mean (±standard deviation) of the continuous variable between the two groups. Mann-Whitney U test was used to compare the median (IQR) of the continuous variable between two groups. Since the design of our study matched case-control and we had more than one independent variable, multivariable conditional logistic regression was used to build a model to determine the significant predictors for the outcome of interest i.e. HIV status; adjusted odds ratio along with its 95% CI was presented. Latent class analysis and cluster analysis were used to categorize study participants based on their substance abuse history into n number of classes/clusters.

P value < 0.05 was considered statistically significant. A p-value from a t-test or statistical test is the probability that the results or relationship between two values of the sampled data occurred by random chance. A p-value of 0.05 or lower is considered statistically significant. Low p-values indicate the greater the statistical significance of the observed results/data that did not occur by chance.

RStudio Version 1.2.1093 was used for statistical analysis. (Reference: *RStudio Team (2020). RStudio: Integrated Development for R. RStudio, PBC, Boston, MA URL* http://www.rstudio.com/.)

STUDY RESULTS

Figure 2 depicts the distribution of cases and controls among the various programs from which they were mainly associated with.

Figure 1 – Distribution of cases and controls according to program

CASES

- Samarth
- CSC-Vihaan
- Referred

1%
27%
72%

CONTROLS

- CSC
- Samarth

3%
97%

Socio-Demographic Profiles

From the study, the team observed that the sex at birth for all respondents was male. The distribution of gender Identity i.e., MSM to TGW ratio was observed at 1.78.

Figure 2 – Distribution of cases and controls according to Identity

CASES

- MSM
- TGW

36%
64%

CONTROLS

- MSM
- TGW

36%
64%
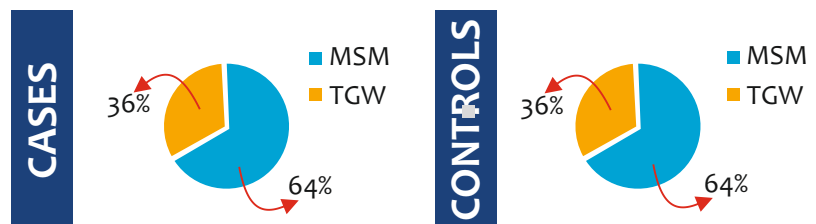
Respondents' education levels were categorised based on their level of completion as seen in the WHO FHI and NACO IBBS tools. In total 0.8% of cases and 2.3% controls couldn't read or write. For cases, those who had completed 12th class were in the majority (26%), whereas in controls those who had completed graduation were in majority (29%) ($p = 0.80$).

Figure 3 – Respondents' education levels (*Completed masters and completed graduation merged, ** can read, can read and write combined)

Case: 0.8, 2.3, 12.1, 15.9, 15.9, 25.9, 27.3, 1

Control: 2.3, 1.6, 9.8, 18.9, 16.7, 20.5, 30.3

Legend:
- Cannot read and write
- 10th Pass
- Can read/write
- 12th Pass
- 5th Pass
- 8th Pass
- Graduation/Masters
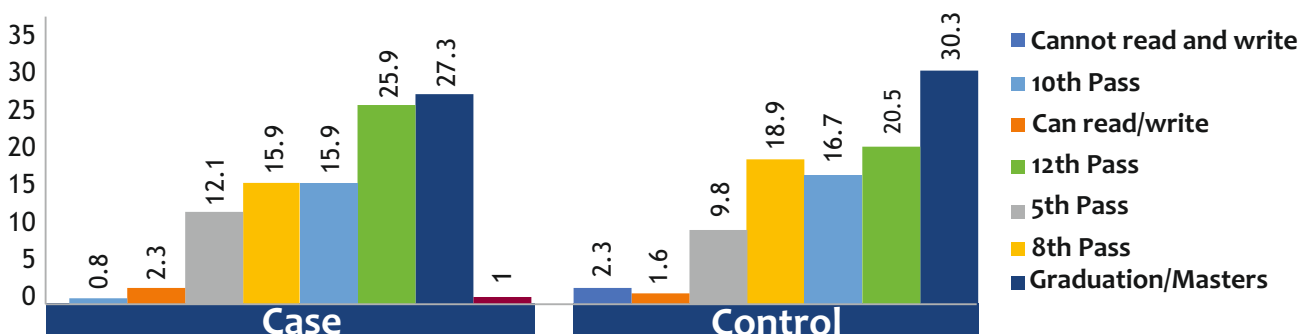
A majority of the study sample (49% cases, 48% controls) were observed to be employed in full-time jobs (> 30 hrs/day) p = 0.06.

Figure 4 – Employment status of respondents (EFT – Employed full time, **EPT – Employed part-time)*
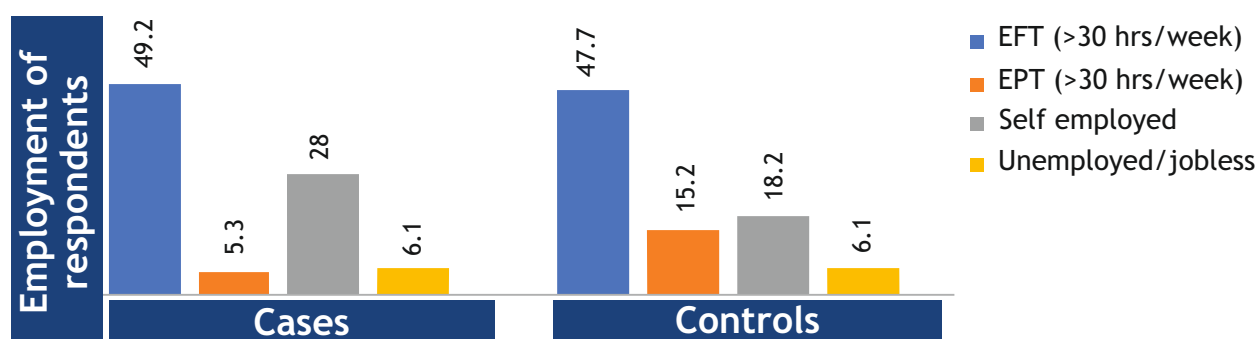
The majority of those employed full time worked in private companies (61% cases & 73% controls). Part-time workers, the majority were seen working as Daily wage labourers (43% cases & 80% controls). Among cases, the number of self-employed individuals mentioned that sex work was their main profession (46%), while among controls a majority of self-employed mentioned their main occupation as owning a private business. (p = 0.13).

Approximately 3(2.3%) respondents in each group (cases & controls) mentioned that they were physically disabled (p =1). It was observed that 75% of our cases and 76% of the controls have never gotten married (p = 0.52). A majority of cases (49%) and controls (46%) were living with parents or other family members in the last 6 months. (p = 0.40). Table 4 in Appendix 1 gives an overview of all socio-demographics of respondents.

Substance Use History

Overall use

Lifetime psychoactive substance use was observed among 86% (MSM – 92%, TGW – 74%) of cases and 82% of controls (79% MSM, 87% TGW) (p = 0.40). Alcohol was the most popular substance among both cases [80% (88% MSM, 66% TGW)] and controls [80% (76% MSM, 87% TGW)] (p = 1.00). This was followed by Cannabis use [cases 42% (45% MSM, 38% TGW)] [controls 49% (49% MSM, 48% TGW)] and, (p 0.133) and Injecting substance users (Heroin), [cases 10% (9% MSM, 10% controls)] & [controls 5% (6% MSM, 4% TGW)]. (p 0.121). Table 5 shows lifetime psychoactive substance use of MSM and TGW individuals.

However, substance use in the last 6 months was found to be significantly higher (p = 0.003) among MSM & TGW cases (54%) as compared to controls (44%). Furthermore, on adjustment, it was observed that consumption of psychoactive substances increases the risk of HIV by 2 times (aOR – 2.45 CI: 1.02 -3.56, p = 0.043).

Alcohol use started around 19 years for both cases (± 3.38) and controls (±2.86). Cannabis use started usually a year later at 20-21 for cases (±3.76) and controls (±4.01). Injecting Heroin use (23 years ±3.55 in cases and 24 years ± 6.45 in controls) (Table 6 Appendix 2) The time taken to shift from Alcohol (reference substance) to the higher level substance (Cannabis, ATS, Heroin etc.) was captured in table 6. On average the time taken to shift from Alcohol to Cannabis was recorded to be within 1 year, from Alcohol to cocaine and another substance the time taken to shift was observed to be 3-3.5 years.

Amongst HIV seropositive individuals, the average time difference between the age of first use of alcohol and HIV diagnosis was 9.27±6.6 years. HIV was diagnosed earlier in individuals as they progressed from alcohol to cannabis (9.01±6.1) and to other drugs like cocaine (8.00±3.1), heroine (6.46±6.2), amphetamine (6.25±4.4), cocaine (8.00±3.1) and opioids (5.00±1.9) (p= 0.001).

Table 6 – Frequency of shift from Alcohol to Cannabis and Other substances (* *Cocaine, Amphetamines, Sedatives, Inhalants, Hallucinogens, Heroin (Inj.), Codeine

Substance	Cases			Controls		
	Started earlier/same age	1 to 2 years	3 and above years	Started earlier/same age	1 to 2 years	3 and above years
Cannabis	26(76.5%)	18(78.3%)	10(35.7%)	37(92.5%)	14(66.7%)	14(46.7%)
Others subs*.	8(23.5%)	5(21.7%)	18(64.3%)	3(7.5%)	7(33.4%)	16(53.3%)
TOTALS	34	23	28	34	21	30

Table 7 - Time difference between substance start to HIV diagnosis

Substance	Time difference between HIV diagnosis, substance use initiation
Alcohol	9.27±6.60
Cannabis	9.01±6.10
Cocaine	8.00±3.08
Amphetamines	6.25±4.42
Inhalants	9.50±2.12
Sedatives	2.00±1.41
Opioids	5.00±1.87
Heroin (Injection)	6.46±6.16

The most popular reasons for using individual substances were found to be "to experiment/try" or "before/during sexual intercourse". Figure 5 shows the distribution among cases and controls for substances and the reason for use. Table 8 in appendix 2 gives percentage distribution along with P-values, however, reasons for using substances were not found to be significant predictors of HIV.

Figure 5a – Percentage of individuals among cases and controls who said that experimentation was the reason for using the substance for the first time
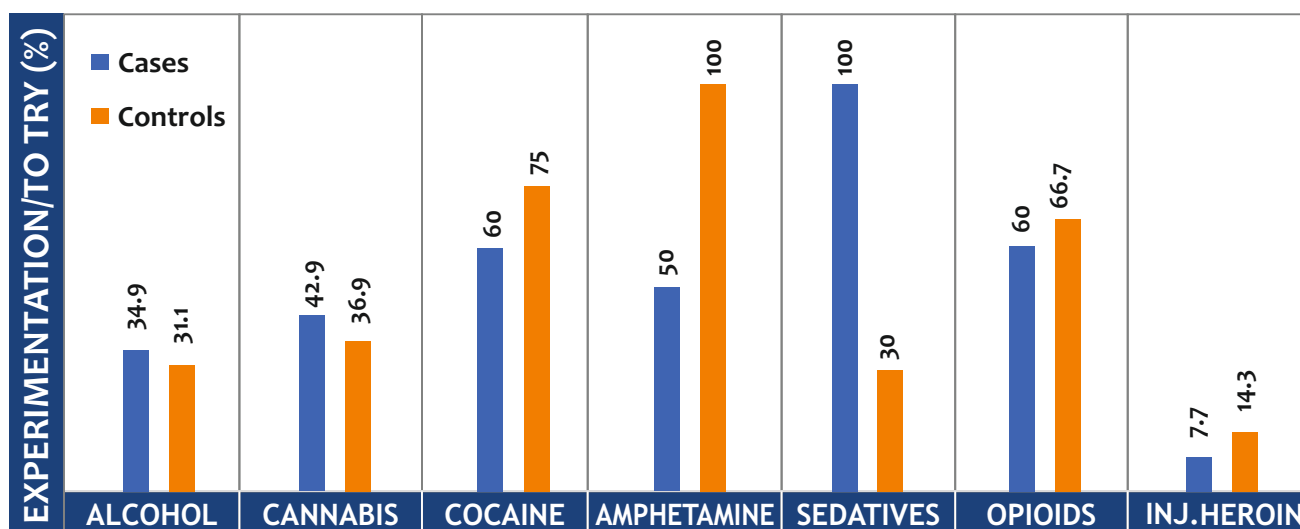
Figure 5b – Percentage of individuals among cases and controls who said that using before sex was the reason for using the substance for the first time
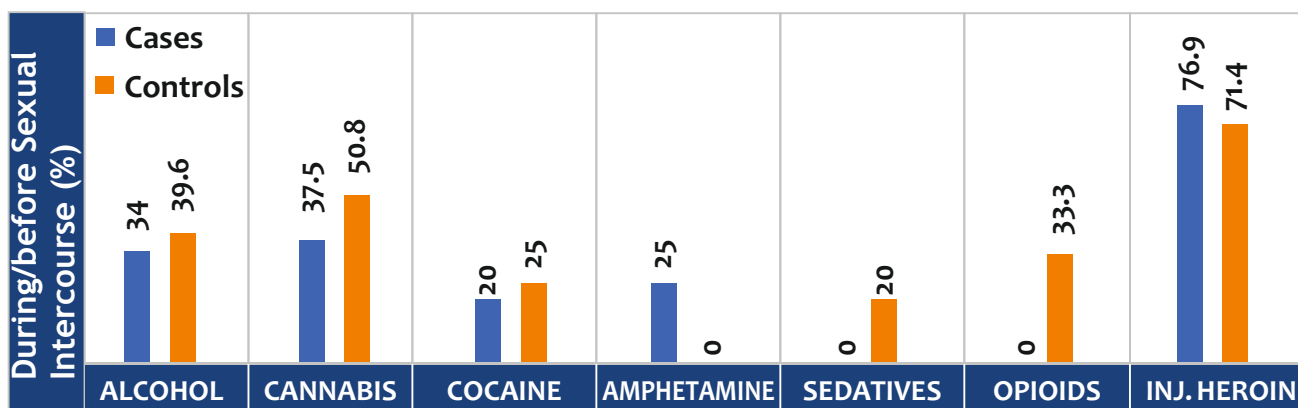
When considering the role of substances in the last 6 months, the study observed that increasing sexual pleasure was found to be what the majority of MSM and TGW individuals use the substance currently. (Figure 6)

Figure 7 – Percentage of individuals who mention that the role of substance currently is to increase sexual pleasure.
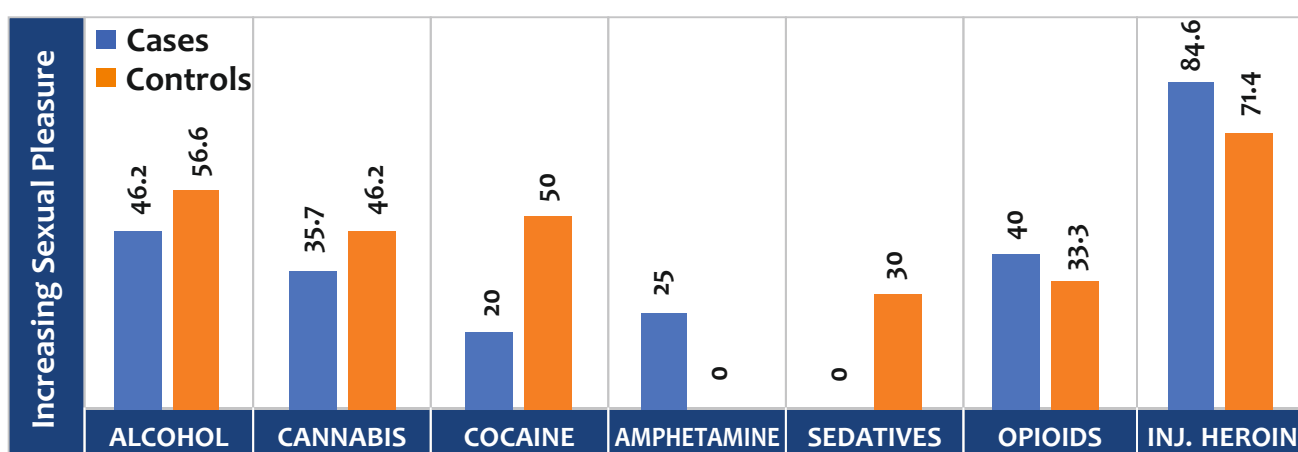
The study also observed that substance use behaviour in the last 6 months showed a significant difference between cases and controls as cases showed a decrease in use (39%) as compared to the 13% decrease in the control group. In exploring the reason for the same COVID-19 and HIV diagnoses were major reasons for the decrease.

USE OF SUBSTANCE IN COMBINATION

A combination of substances was used in 45.5% of cases and 43.9% of controls. The most popular combination of substances used was found to be similar among cases and controls (Alcohol + Cannabis – 19% cases and 27% controls) (P = 0.22).

Among the 60 cases who use combinations, the reason for using a combination of substances for the majority of the respondents was before/during sex (45%) followed by like to use/enjoy the feeling (31.7%) and to experiment (16.7%); similarly, among the 58 controls, the reason for using a combination of substances for the majority of the respondents was before/during sex (50%) followed by like to use/enjoy the feeling (20.7%) and to experiment (19%) (p = 0.23). The main reasons for using a combination of substances during/before sexual intercourse were observed to prolong sex (74% cases, 89% controls) (P = 0.04).

SUBSTANCE USE IN GROUPS

Around 26% of the cases had used non-injecting drugs in a group whereas 24% of the controls had used non-injecting drugs in a group. The reason for using non-injecting drugs in the group for the majority of the cases was due to drugs bought from pooled funds (64.7%) followed by finding similar sexual partners in the group (11.8%).

Similarly, the reason for using non-injecting drugs in the group for the majority of the controls was due to drugs bought from pooled funds (48.4%) followed by finding similar sexual partners in the group (25.8%).

Table 9 - Comparison of Non-injecting drugs in group between cases and controls

	Variables	Cases (n=132)	Controls(n=132)	P-value
Have you ever used any substances/drugs (non- injecting) in groups	Yes	34(25.8%)	31(23.5%)	0.905
	No	73(55.3%)	76(57.6%)	
	Variables	**Cases (n=34)**	**Controls (n=31)**	**P-value**
Reason for using in groups?	Not having personal stock of drugs	2(5.9%)	1(3.2%)	0.722
	Bought drugs from pooled funds	22(64.7%)	15(48.4%)	
	Scared of overdosing if used alone	1(2.9%)	2(6.5%)	
	To socialize	1(2.9%)	1(3.2%)	
	To find similar sexual partners in the group	4(11.8%)	8(25.8%)	
	To increase sexual pleasure	3(8.8%)	4(12.9%)	
	Others	1(2.9%)	0(0.0%)	

Table 10 - Comparison of injecting drugs in group between cases and controls

	Variables	Cases (n=132)	Controls(n=132)	P-value
Do you know any person or place from where you can get unused clean needles/syringes/ equipment?	Yes	13(9.8%)	8(6.1%)	0.255
	No response	119(90.2%)	124(93.9%)	
Have you injected drugs in groups in the last 6 months	Yes	8(6.1%)	5(3.8%)	0.385
	No	3(2.3%)	2(1.5%)	
	Others	2(1.5%)	1(0.8%)	
	Variables	**Cases (n=8)**	**Controls (n=5)**	**P-value**
What were the reasons for injecting in groups?	Not having personal stock of drugs	0(0.0%)	1(20.0%)	0.055
	Bought drugs from pooled funds	0(0.0%)	2(40.0%)	
	Getting injected by experienced injectors	5(62.5%)	1(20.0%)	
	To find similar sexual partners in the group	2(25.0%)	0(0.0%)	
	Others	1(12.5%)	1(20%)	
In the last 6 months before injecting did you draw up solution from the same container/shared with others?	Yes	8(6.1%)	5(3.8%)	0.532
	No	2(1.5%)	2(1.5%)	

Among 8 cases who injected drugs in groups in the last 6 months, 5 respondents injected due to the chance of getting injected by experienced injectors, 2 respondents injected to find similar sexual partners in the group and 1 respondent injected for other reasons. Among 5 controls who injected drugs in groups in the last 6 months, 2 respondents injected since they bought drugs from pooled funds, 1 respondent injected due to lack of personal stock of drugs, 1 respondent injected due to chance of getting injected by experienced injectors and 1 respondent injected due to scare of overdosing when injecting alone.

SAFE INJECTING PRACTICES

Approximately 10% of cases and 6.1% of controls knew of any person/place from where they could get unused clean needles/syringes/equipment.

LATENT CLASS ANALYSIS AND CLUSTER ANALYSIS

For the selection of a number of classes, AIC (Akaike's Information Criteria) and BIC (Bayesian Information Criteria) values were assessed[17]. These values are used to assess the goodness of fit of the model. Lower the AIC and BIC values, better the model.

Figure 8 – Number of classes in LCA depending on AIC, BIC values
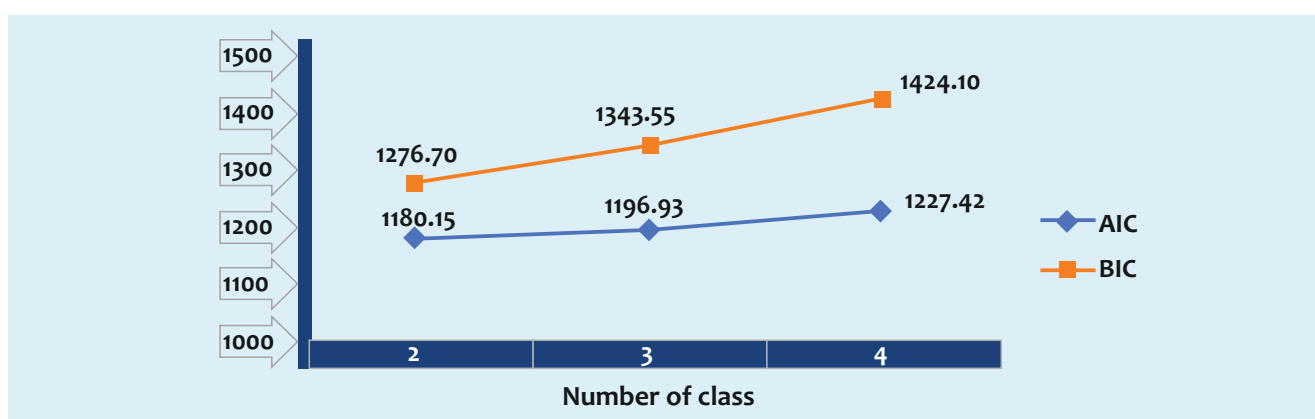
The model with the lowest AIC and BIC values was found when the number of classes was 2. So, the model with 2 latent classes was chosen.

92.05% of the study participants i.e., 243 were categorized in class 1 whereas 7.95% of the study participants i.e., 21 were categorized in class 2.

Based on study findings, 92.05% of the study participants i.e., 243 were categorized in class 1 whereas 7.95% of the study participants i.e., 21 were categorized in class 2. Class 1 while the majority were found to mainly consume Alcohol and Cannabis. Once the classes were derived based on their similar characteristics, an analysis was run to check the association between the classes and HIV risk. However, it was found to be non-significant.

Cluster analysis was also done to further understand the effect various grouping of substances have on HIV status. 2, 3, and 4 clusters were identified and results for each were analysed. The model with 4 clusters showed the best significance and was hence incorporated into the results. (p = 0.024)

62 were categorized in cluster 1, 13 were categorized in cluster 2, 177 were categorized in cluster 3 and 12 were categorized in cluster 4.

Table 11a – Study participant in each cluster of the cluster analysis

Cluster	1	2	3	4
Frequency	62	13	177	12

ANOVA table tells the contribution of each variable in cluster formation. Here, alcohol, cannabis, cocaine, amphetamine, opioids and other substances contributed statistically significant to the cluster formation (p<0.05). F value tells the amount of contribution of each variable to the cluster formation. Here, alcohol had the highest contribution.

Table 11b – ANOVA table for cluster analysis

Substance	Cluster Mean Square	df	Error Mean Square	df	F	P-value
Alcohol	10.595	3	.038	260	276.268	<0.001
Cannabis	6.189	3	.181	260	34.257	<0.001
Cocaine	.355	3	.029	260	12.102	<0.001
Amphetamine	.221	3	.020	260	11.028	<0.001
Sedatives	3.818	3	0.000	260		
Opioids	1.177	3	.016	260	72.459	<0.001
Other substances	2.891	3	.051	260	57.168	<0.001

The proportion of alcohol users was significantly higher in cluster 4, cluster, 3 and cluster 2 respectively as compared to cluster 1. The proportion of cannabis users, cocaine users, amphetamine users, opioids users and other substances users respectively were higher in cluster 2 as compared to other clusters. The proportion of cannabis users was significantly higher in cluster 4 as compared to cluster 1 and cluster 3. Similarly, the proportion of cannabis users was significantly higher in cluster 3 as compared to cluster 1. Sedative users were only present in Cluster 4.

Among cases, 25% were in cluster 1, 7.6% were in cluster 2, 65.9% were in cluster 3 and 1.5% were in cluster 4 whereas among controls, 22% were in cluster 1, 2.3% were in cluster 2, 68.2% were in cluster 3 and 7.6% were in cluster 4. (p = 0.024).

Table 11c – Cluster vs HIV percentages in each group

Cluster	Cases (n=132)	Controls (n=132)	P-value
1	33(25.0%)	29(22.0%)	0.024
2	10(7.6%)	3(2.3%)	
3	87(65.9%)	90(68.2%)	
4	2(1.5%)	10(7.6%)	

Alternatively, among cluster 1, 53.2% were HIV positive; among cluster 2, 76.9% were HIV positive; among cluster 3, 49.2% were HIV positive and among cluster 4, 16.7% were HIV positive. (p = 0.024).

Table 11d – Clusters vs HIV, percentage of HIV positive in each group

Cluster	Cases	Controls	P-value
1 (n=62)	33(53.2%)	29(46.8%)	0.024
2 (n=13)	10(76.9%)	3(23.1%)	
3 (n=177)	87(49.2%)	90(50.8%)	
4 (n=12)	2(16.7%)	10(83.3%)	

SEXUAL HISTORY

Among cases, the gender of primary/regular sexual partner was mostly male for both cases (74.2%) and controls (71.2%) (p = 0.762). No significance was found when considering the average age of first-time sex, regularly engaging in sex, first-time sex work, and regularly engaging in sex work.

Table 12 – Age at which individual participated in sexual intercourse

Age at	Cases	Controls	P-value
Sex for the first time	16.53±3.18	16.87±3.11	0.396
Regularly engaged in sex	17.65±3.52	17.62±3.16	0.945
First started sex work	18.38±2.67	18.73±3.5	0.744
Regularly engaged in sex work	18.57±2.59	19.2±3.79	0.579

Figure 9 compares sexual intercourse with a different type of partner in the last 7 days. The majority of respondents either had sex with a commercial client (62.9% cases, 59.1% controls) or with their Primary male partner 55.3 % cases, 53% controls) in last 7 days (p = 0.711)

Figure 9 – Sexual intercourse with different partners in the last 7 days
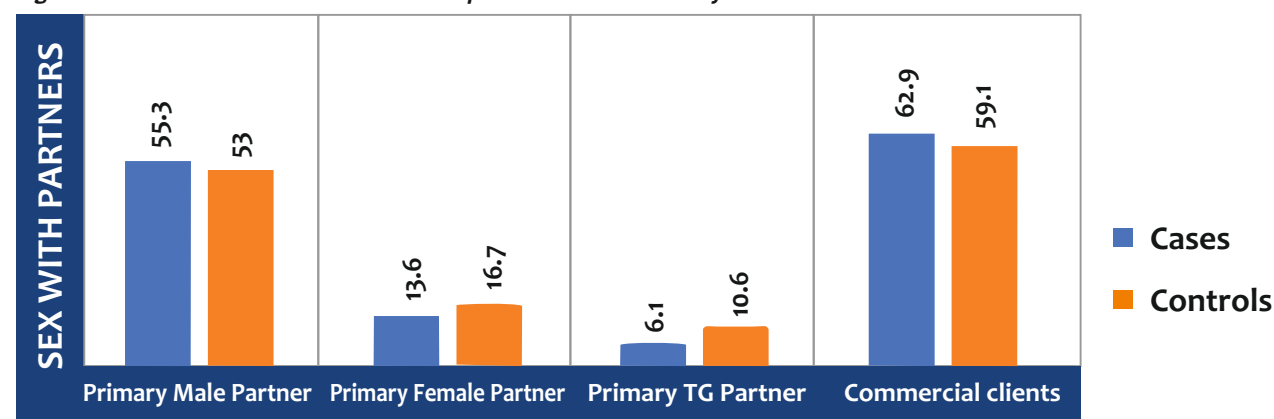
Another important finding in our study was, that those who were into sex work at some point in their life were 7 times more likely to get HIV infection as compared to those who never started sex work. (aOR: 6.68 CI:1.34 – 33.20 p = 0.020).

There was a statistically insignificant difference in the spread of sexual acts in the last 7 days with a male partner, female partner and clients respectively between cases and controls (p>0.05). However, the median (IQR) number of sexual acts in the last 7 days with a transgender partner was found higher in controls as compared to cases (p = 0.040)

Table 13 – Number of sexual acts in last 7 days with different partners

Sexual acts in the last 7 days	Cases {Median (IQR)}	Controls {Median (IQR)}	P-value
Male partner	15(7,54)	27.5(8,81)	0.067
Female partner	3(2,4)	3(3,4)	0.626
Transgender partner	33(27,56)	78(42,102)	**0.040**
Clients	24(10,45)	36(10,75)	0.104

Among primary male partners, the median number of sexual acts in the last 7 days through an anal penetrative medium without the use of a condom or prEP (2 times cases, 4.5 times controls), through an anal receptive medium without the use of a condom or prEP (2 times cases, 4 times controls) and the oral medium without the use of condom or prEP (3 times cases, 7 times controls) was found statistically significantly higher among controls as compared to cases (p<0.05). (Table 14 Appendix 3)

Among primary transgender partners, the median number of sexual acts in the last 7 days through an anal penetrative medium without the use of a condom or prEP (1time vs 20times) and through anal receptive medium without the use of a condom or prEP (1time vs 20times) was found statistically significantly higher among controls as compared to cases (p<0.05). (Table 14 appendix 3)

Among clients, the median number of sexual acts in the last 7 days through an anal penetrative medium without the use of a condom or prEP (1 time vs 4 times), through an anal receptive medium without the use of a condom (4 times vs 10 times) or prEP and an oral medium without the use of condom or prEP (6 times vs 12 times) was found statistically significantly higher among controls as compared to cases (p<0.05). (Table 14 Appendix 3)

85.6% of cases and 76.5% of controls had multiple sexual partners in the last 6 months. (p > 0.05). The difference in the median number of multiple partners is depicted in figure 10.

Figure 10 – Average number of multiple partners in last 6 months

Variable	Cases {Median (IQR)}	Controls {Median (IQR)}	P-value
Sexual Partners in last 6 months	12(5,20)	14(5,27)	0.408

A statistically significant difference in reasons for not using prEP in last 7 days between cases and controls was observed. (p = 0.007)

Figure 11 – Reasons for not using prEP among cases and controls
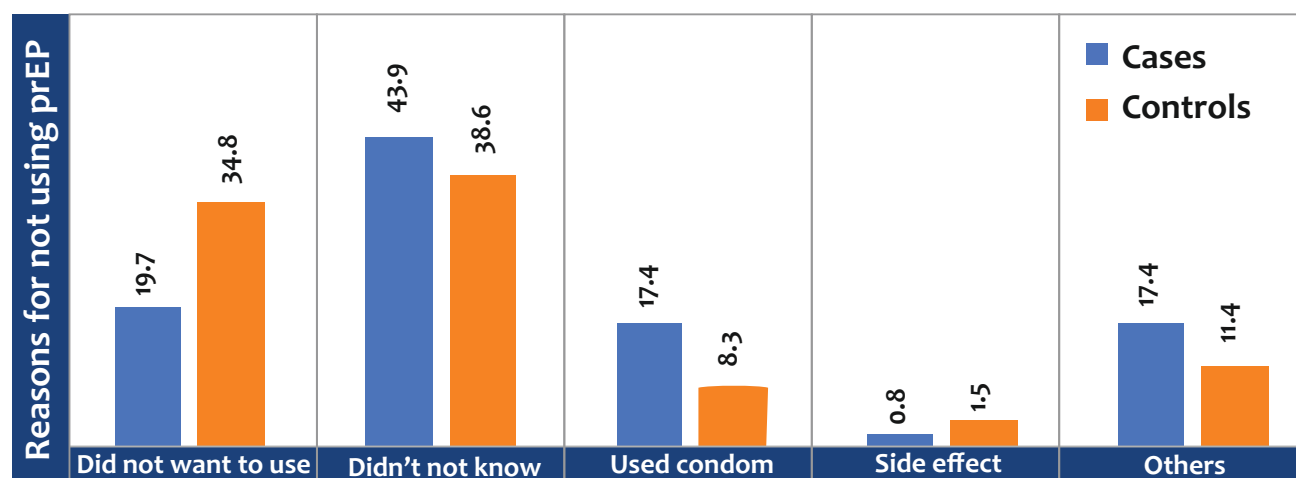
The reasons for not using a condom in the last 7 days for the majority of the cases was decrement in pleasure (28%) followed by a trusted partner (22%); similarly, it was decrement of pleasure (26.5%) followed by trusted partner (17.4%) for controls.

Observing the number of sexual acts in the week before undertaking a screening test for HIV, findings showed that the respondent did not use protection the team found that our controls had more incidence of unprotected sex as compared to our cases. (Table 15 in appendix 3),

On asking in the last 6 months on average how many times one forgot to use Condom the following responses (given in the graph below) were observed.

Figure 12 – Not using condoms in the last 6 months (*Not used sometime – 2-3 times/week, **Not used most of the time - >3 times/week)
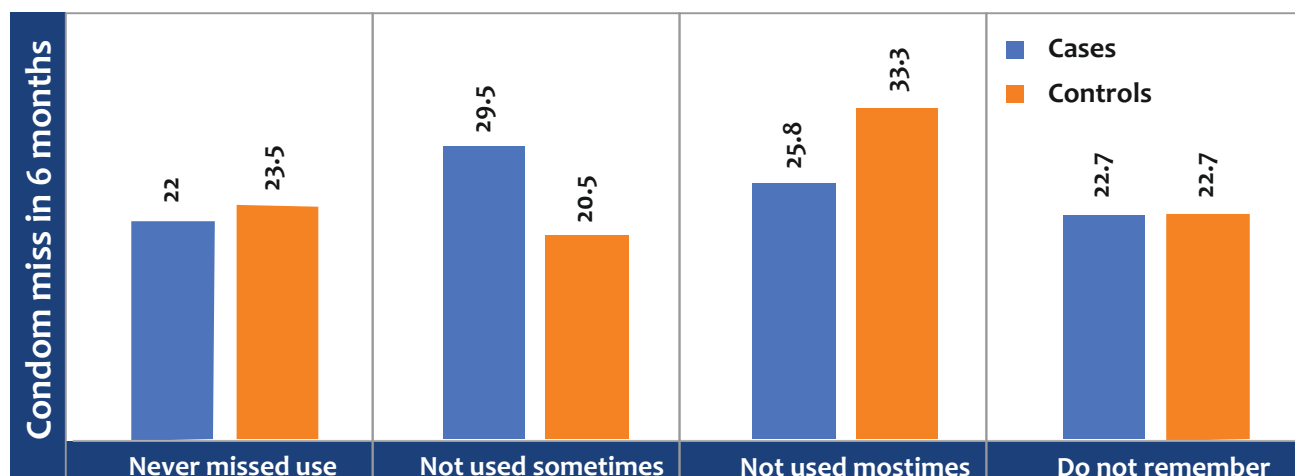
35.6% of the cases knew the HIV status of a regular partner whereas 52.2% of the controls knew the HIV status of a regular partner (p < 0.05). 53% of the cases were engaged in sexual intercourse with primary male partner in the week before they were diagnosed with HIV. Meanwhile, 14.4% of the cases were engaged in sexual intercourse with primary female partner in the week before they were diagnosed with HIV.

Only 6.8% of the cases were engaged in sexual intercourse with primary transgender partner in the week before they were diagnosed with HIV. Meanwhile, 57.6% of the cases were engaged in sexual intercourse with clients/other partners in the week before they were diagnosed with HIV.

STIGMA & VIOLENCE

Stigma

Approx. 41.7% of cases and 44.7% of controls felt they are treated differently due to their identity as MSM/TG. 14.4% of cases 5.9% of controls had experienced stigma/discrimination in health care facilities. Only 12.1% of cases and 16.7% of controls had told anyone about the stigma/discrimination faced.

Violence

In the past 12 months, 14.4% of cases and 15.9% of controls had been physically or verbally assaulted because of their identity had ever been physically or verbally assaulted because of their identity.

In the last 6 months, among cases, 6.8% had been physically hurt by anyone, 4.5% were threatened with harm and 9.8% were forced to have sex by physical force or verbal threats. While among controls, 1.5% had been physically hurt by anyone, 3% were threatened with harm and 9.1% were forced to have sex by physical force or verbal threats. Approx. 39.3% of the cases and 55.6% of the controls were physically/mentally harassed by clients. 25% of the cases and 27.8% of the controls were physically/mentally harassed by their peers.

However, there was a statistically significant difference in forced sexual history between cases and controls since 48.5% of the cases were forced into sexual acts compared to 33.3% of controls (p < 0.05). Individuals who were forced to have sex without a condom (aOR: 1.96; 95% CI: 1.05 – 3.67) had higher odds of being HIV positive.

HEALTH SERVICE UTILIZATION

Client perspective

The majority did not have any signs/symptoms of STI in the last 6 months (56.7% cases & 66.7% Controls).

Itching in the genital area is the most common symptom (13% cases & 14% controls)(table 19 appendix 5). 7.6% of cases and 6.1 controls did not know of any of the public health practices/interventions that are provided by the government in regard to Harm Reduction.

Table 17 – Knowledge about harm reduction/PHC/TI among the respondents

Knowledge about the common Harm reduction practices/de-addiction interventions available	Cases (n=132)	Controls (n=132)	Crude OR (95% CI)	P-value
Needle/syringe program	21(15.9%)	11(8.3%)	1.52(0.28-8.32)	0.629
Primary health care services	64(48.5%)	85(64.4%)	0.36(0.10-1.32)	0.121
Drug rehabilitation/de-addiction clinics	34(25.8%)	26(19.7%)	1.86(0.48-7.15)	0.369
Targeted Intervention	3(2.3%)	2(1.5%)	1.36(0.12-15.15)	0.803
No Knowledge *(Reference)*	10(7.6%)	8(6.1%)	1.00	-

Univariate logistic regression showed that public health services/interventions such as receiving condoms from peer educators or outreach workers and seeing a demonstration of condom use were found as significant predictors of HIV infection. Those who received condoms from peer educators/outreach workers were 61% less likely to get HIV infection as compared to those who didn't receive condoms from peer educators. Those who had seen a demonstration on condom use were 74% less likely to get HIV infection as compared to those who hadn't seen a demonstration on condom use.

Multivariable analysis showed that those who received condoms from peer educators/outreach workers were 76% (aOR: 0.24; 95% CI: 0.07 – 0.88 p = 0.032) less likely to get HIV infection as compared to those who didn't receive condoms from peer educators. Those who had seen demonstration on condom use were 83% (aOR: 0.17; 95% CI: 0.04 – 0.63 p = 0.009).

The study participants expressed their need for more awareness campaigns (45% cases & 53% controls) and provision of materials like condoms (32% cases & 36% controls), safe needles (11% case & 1%controls) etc. More than 2/3rd of the HIV positive individuals expressed their need for counselling services.

Figure 13 – Service needs as mentioned by respondents
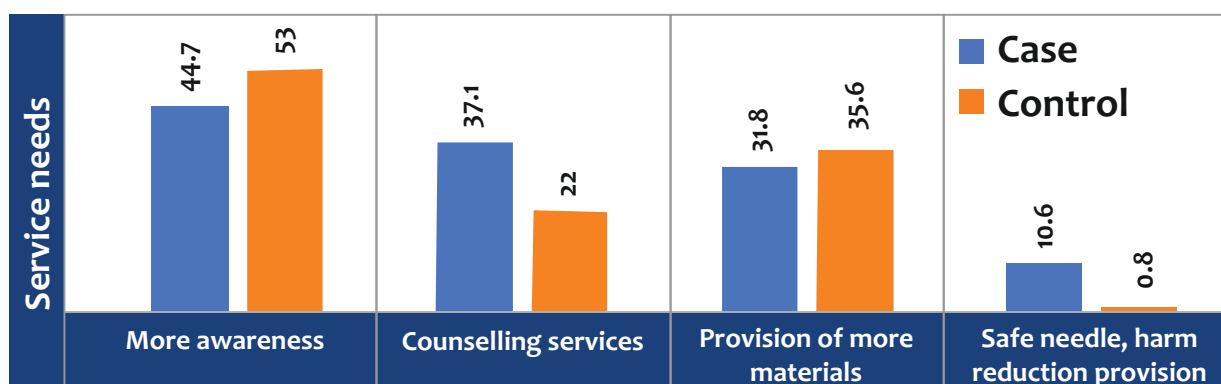
1.5% of cases and 7.6% of controls had spent money for any of the above services.(p = 0.003). Approximate 86.4% of cases could access all the services whereas 96.2% of the controls could access all the services, service accessibility was found statistically significantly lower among cases as compared to controls (p = 0.009).

Around 44.7% of cases and 60.6% of controls never faced barrier while accessing those services while (p = 0.72). Economic hurdle was faced by 26.5% case and 9.8% controls, 7.6% cases and 3% controls faced stigma/discrimination and COVID-19 reduced access to services in 59.8% cases and 71.2% controls (p = 0.006).

The figure below depicts the impact of COVID-19 on substance use, sexual behaviour and service access/utilization (p > 0.05)

Figure 14 – COVID-19 impact on substance use, sexual behaviour and service access
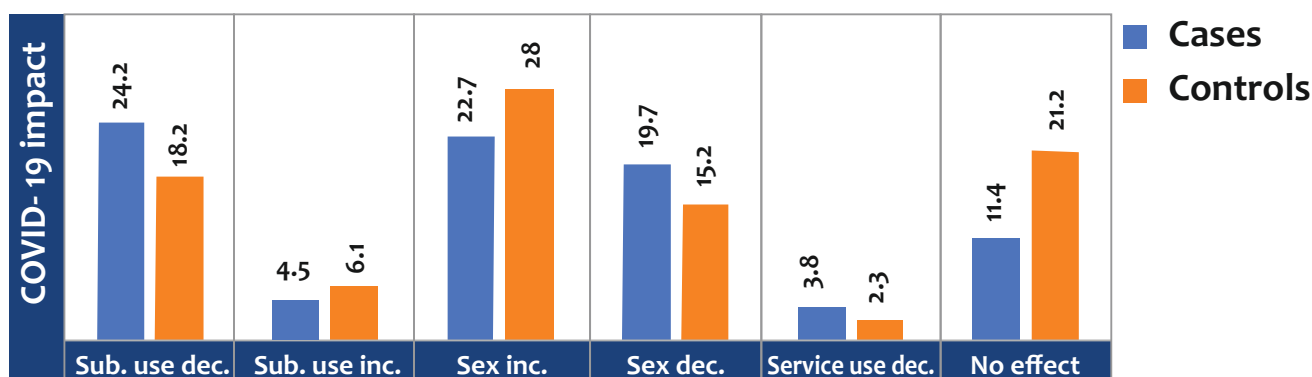
The study found a significantly higher number of HIV seropositive individuals used deaddiction services (48%) however, the high cost of private de-addiction clinics and inadequate services provided at government centres is a potential barrier to the management of psychoactive substance use amongst them.

Table 16 – Knowledge about harm reduction/PHC/TI among the respondents

Knowledge about the common Harm reduction practices/de-addiction interventions available	Cases (n=132)	Controls (n=132)	Crude OR (95% CI)	P-value
Needle/syringe program	21(15.9%)	11(8.3%)	1.52(0.28-8.32)	0.629
Primary health care services	64(48.5%)	85(64.4%)	0.36(0.10-1.32)	0.121
Drug rehabilitation/de-addiction clinics	34(25.8%)	26(19.7%)	1.86(0.48-7.15)	0.369
Targeted Intervention	3(2.3%)	2(1.5%)	1.36(0.12-15.15)	0.803
No Knowledge *(Reference)*	10(7.6%)	8(6.1%)	1.00	-

Programme perspective

This tool was administered by various program officers/managers involved with Samarth and Vihaan -care & support centre. All interviews were audio-recorded (after taking consent) and key findings based on transcription are summarized as below:

- **Availability of current services (HR, ART) –** Based on the interviews the study found that focusing more on intersectionality is a common theme among all program leaders. Programs tend to work in silos, focusing on one aspect of the issue at hand (substance use) however it is important to understand that sexual behaviour and gender identity are important factors. Apart from these, other opinions consisted of;
  - Sensitization of caregivers to needs and issues of community members
  - Lack of programs, mainly in the context of de-addiction clinics
  - Lack of information provided to the community about harm reduction/HIV services

- **Affordability of current services –** The responses in the context of affordability come mainly in the form of the high cost of private de-addiction clinics. The program leaders mentioned that though the government centre is available for de-addiction they do not cater to all substances. Private centres while catering to all types of substances are very expensive. Another issue faced is that many members of the community face stigma and discrimination at the centres and hence avoid availing services.

- **Accessibility of services –** Many of them do not have a clear understanding that the services exist. A segment of the population, has a mixed understanding and incorrect information. For example, they may want to have access to de-addiction services from the private health sector and might get referred to some hospital, but don't really know the cost or whether the service is authenticated by the government or not. This seems to be the common theme that all program leaders talked about. Lack of information creates a barrier to accessing services by the community.

- **Gap in service –** Gaps come generally due to the lack of communication between the service provider and the client as they are unwilling to share correct information about their substance use with the service providers due to fear of stigma, even though they are aware of the harmful/negative impacts of substance use and risky sexual practices.

- **COVID-19 impact –** COVID-19 decreased service utilization in many parts of the country due to the constant lockdowns and travel restrictions. Another problem that resulted from the pandemic was the difficulty in tracking registered clients. To counter this many have started many got ration support and relief support from the program side, however, a consequence seen is that the population has now become dependent on compensation packages. Their entire understanding/ willingness to understand their own health has now become linked to how much incentive they are receiving for the same.

DISCUSSION

The proportion of HIV seropositive (54%) MSM and TGW/H individuals who consumed psychoactive substances was significantly higher than HIV seronegative individuals (44.4%) in the last 6 months (p=0.003). The consumption of psychoactive substances increased the risk of HIV by 2 times amongst HIV seropositive individuals (After adjustment p = 0.043). It was observed that Alcohol was the most popular substance followed by Cannabis use in both cases and controls. Approximately 10% HIV positive and 5% HIV negative individuals were injecting substance users The popular combination of substances among cases was found to be similar for both MSM and TG, Alcohol + Cannabis combination (19%) used for/before sexual intercourse. This is similar in other studies conducted in India by Pradeep K et al.[4], Wilkerson, J, et al[11] and many others[8,9] show Alcohol and Cannabis to be popular substances used among MSM and TGW.

Also observed was that substance use behaviour in the last 6 months showed a significant difference between cases and controls as cases showed a decrease in use (39%) as compared to the 13% decrease in the control group. In exploring the reason for the same COVID-19 and HIV diagnosis were major reasons for the decrease. Many studies that measured the impact of COVID-19 on substance use among the population show that use tends to increase (Nicole M, Julia Simkus et al.)[18] during the pandemic, this is in contrast to what was found through our study, that individuals observed decreased use.

Amongst HIV seropositive individuals, the average time difference between the age of first use of alcohol and HIV diagnosis was 9.27±6.6 years. HIV was diagnosed earlier in individuals as they progressed from alcohol to cannabis (9.01±6.1) and other drugs like cocaine (8.00±3.1), the heroine (6.46±6.2), amphetamine (6.25±4.4), cocaine (8.00±3.1) and opioids (5.00±1.9) (p= 0.001).

Individuals who were forced to have sex without a condom (AOR: 1.96; 95% CI: 1.05 – 3.67) had higher odds of being HIV positive. A higher proportion of HIV negative individuals received condoms (37%) from the peer educators through the existing government programs as compared to the HIV positive individuals (24%) (p = 0.009). This resulted in lower odds of contracting HIV amongst them (AOR: 0.38; 95% CI: 0.14 – 0.97). This matches with some

previous studies, like the one done in Haiti by Nicole Y. Frascino and Lauren Y. Zalla[19] that show how those who had forced sex history were nearly 4 times at risk of HIV (after adjustment).

Another important finding in our study was that those who started sex work at the age between 19 to 28 years were 7 times more likely to get HIV infection as compared to those who never started sex work. This matches with a number of studies conducted in India that show that individuals (MSM and TGW) who are active Sex workers are at higher risk of contracting HIV. In the context of intersectionality, Individuals who were forced to have sex without the condom (AOR: 1.96; 95% CI: 1.05 – 3.67) had higher odds of being HIV positive. A higher proportion of HIV negative individuals received condoms (37%) by the peer educators through the existing government programs as compared to the HIV positive individuals (24%) (p = 0.009). This resulted in lower odds of contracting HIV amongst them (AOR: 0.38; 95% CI: 0.14 – 0.97). A systematic review conducted by Operario, Don et al[20] shows that Transgender Females who do sex work show a relative risk of 1.46 compared to all other groups. Similar is also seen among MSM groups in another study conducted by William M. Miller et al[21] who observed that Male sex workers who had sex with men were twice as likely to use illicit substances and hence are at higher risk of contracting HIV.

The study also observed a significantly higher number of HIV seropositive individuals used

deaddiction services (48%) however, the high cost of private de-addiction clinics and inadequate services provided at government centres is a potential barrier to the management of psychoactive substance use amongst them. The study participants expressed their need for more awareness campaigns (48% cases & 53% controls) and provision of materials like condoms (32% cases & 36% controls), safe needles (11% case & 1%controls) etc. More than 2/3rd of the HIV positive individuals expressed their need for counselling services. These two points on access to de-addiction clinics and HIV related services are incredibly important in preventing HIV infection as other studies conducted by G. Armstrong et al[22], have shown.

CONCLUSION

In conclusion, through the findings of this study a policy brief has been developed that focuses on the future potential for improvement in HIV prevention programs. Investing in community-led and driven harm reduction services for MSM and TGW is a must, this will ensure meaningful involvement of the communities at all stages and levels of intervention. Furthermore, implementation research is a must to develop future program designs. As the majority (73%) of the individuals graduate from alcohol to cannabis within 1 – 2 years and harder drugs within 2 - 8 years, new strategies and programs should be developed to intervene during this period of transition to reduce the risk of contracting HIV. The findings of this study in the form of a policy brief will be shared with all relevant stakeholders (Government, Private, NGOs, Community members and researchers).

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APPENDIX

Appendix 1 – Socio demographic characteristics

Table 4 - Socio-demographic profiles of respondents

Background characteristics		Group		P-value
		Cases (n=132)	Controls (n=132)	
Program	Samarth clinic	94(72%)	128(97.0%)	**<0.001**
	Wajood Project	0(0.0%)	0(0.0%)	
	CSC	36(27.3%)	4(3.0%)	
	Referred by other respondents	1(0.8%)	0(0.0%)	
Sex assigned at birth	Male	132(100%)	132(100%)	—
Age (Mean ± SD)		28.60±6.07	27.91±5.41	0.331
Gender considered now by yourself	MSM	85(64.4%)	85(64.4%)	1.000
	TG	47(35.6%)	47(35.6%)	
Education	Cannot read and write	1(0.8%)	3(2.3%)	0.802
	Can read	0(0%)	1(0.8%)	
	Can read and write	3(2.3%)	1(0.8%)	
	Completed primary (5th grade)	16(12.1%)	13(9.8%)	
	Completed higher secondary (8th grade)	21(15.9%)	25(18.9%)	
	Completed higher secondary (10th grade)	21(15.9%)	22(16.7%)	
	Completed 12th pass	34(25.8%)	27(20.5%)	
	Completed Graduation/diploma	33(25%)	38(28.8%)	
	Completed masters	3(2.3%)	2(1.5%)	
Occupation	Employed Full time (>30 hours per week)	65(49.2%)	63(47.7%)	0.057
	Employed part time (<30 hours per week)	7(5.3%)	20(15.2%)	
	Self-employed	37(28%)	24(18.2%)	
	Unemployed/jobless	8(6.1%)	8(6.1%)	
	No response	15(11.4%)	17(12.9%)	
Physically disabled	Yes	3(2.3%)	3(2.3%)	1.000
	No	128(97%)	129(97.7%)	
	No response	1(0.8%)	0(0%)	

Background characteristics		Group		P-value
		Cases (n=132)	Controls (n=132)	
Marital status	Never married	99(75.0%)	100(75.8%)	0.523
	Married with female partner	20(15.2%)	24(18.2%)	
	Married with male partner	8(6.1%)	5(3.8%)	
	Married with transgender	0(0.0%)	1(0.8%)	
	Widowed/Divorced/Separated	5(3.8%)	2(1.5%)	
Currently living with	Living alone	22(16.7%)	24(18.2%)	0.398
	Parents/other family	64(48.5%)	61(46.2%)	
	Wife/girlfriend/female partner	20(15.2%)	24(18.2%)	
	Husband/boyfriend/male partner	12(9.1%)	5(3.8%)	
	Guru at dera	7(5.3%)	5(3.8%)	
	Transgender partner	2(1.5%)	3(2.3%)	
	Roommate	4(3%)	10(7.6%)	
	Don't have regular place	1(0.8%)	0(0%)	

Appendix 2 – Substance use history

Table 5 – lifetime substance use of MSM/TGW cases and controls

Substance Abuse Ever	Gender	Cases (n=132)	Controls (n=132)
Psychoactive substances	MSM	78(59.1%)	67(50.8%)
	TG	35(26.5%)	41(31.1%)
Alcohol	MSM	75(56.8%)	65(49.2%)
	TG	31(23.5%)	41(31.1%)
Cannabis	MSM	38(28.8%)	42(31.8%)
	TG	18(13.6%)	23(17.4%)
Cocaine	MSM	3(2.3%)	4(3%)
	TG	2(1.5%)	0(0%)
Amphetamine	MSM	3(2.3%)	2(1.5%)
	TG	1(0.8%)	0(0%)
Inhalants	MSM	1(0.8%)	0(0%)
	TG	1(0.8%)	0(0%)
Sedatives or sleeping pills	MSM	2(1.5%)	8(6.1%)
	TG	0(0%)	2(1.5%)
Hallucinogens	MSM	85(64.4%)	85(64.4%)
	TG	47(35.6%)	47(35.6%)
Opioids	MSM	3(2.3%)	3(2.3%)
	TG	2(1.5%)	0(0%)
Codeine/Over counter cough syrup	MSM	1(0.8%)	0(0%)
	TG	0(0.0%)	0(0.0%)
Injecting Heroin	MS	8(6.1%)	5(3.8%)
	MTG	5(3.8%)	2(1.5%)

Table 6 – Mean age at which individuals started using substance

Variables	Cases	Controls	P-value
Alcohol	19.38±3.38	19.86±2.86	0.265
Cannabis	20.30±3.76	21.17±4.01	0.225
Cocaine	24.00±4.06	21.25±2.87	0.292
Amphetamine	21.00±9.02	22.50±2.12	0.837
Sedatives or sleeping pills	31.00±4.24	21.80±3.46	**0.007**
Opioids	20.80±3.42	24±2.65	0.218
Heroin	22.62±3.55	24.29±6.45	0.460

Table 8 – Reasons for using individual psychoactive substances

	Reason of using	Cases (n=106)	Controls (n=106)	P-value
Alcohol	To experiment/try	37(34.9%)	33(31.1%)	0.131
	Peer pressure	22(20.8%)	16(15.1%)	
	Before/during sex/Improves sex work	36(34%)	42(39.6%)	
	Others*	11(10.3%)	10(9.4%)	

	Reason of using	Cases (n=56)	Controls (n=65)	P-value
Cannabis	To experiment/try	24(42.9%)	24(36.9%)	0.140
	Peer pressure	8(14.3%)	2(3.1%)	
	Before/during sex/Improves sex work	21(37.5%)	33(50.8%)	
	Others*	3(5.3%)	6(9.2%)	

	Reason of using	Cases (n=5)	Controls (n=4)	P-value
Cocaine	To experiment/try	3(60%)	3(75%)	1.000
	Peer pressure	1(20%)	0(0%)	
	Before/during sex/Improves sex work	1(20%)	1(25%)	
	Others*	0	0	

	Reason of using	Cases (n=4)	Controls (n=2)	P-value
Amphetamine	To experiment/try	2(50%)	2(100%)	1.000
	Before/during sex/Improves sex work	1(25%)	0(0%)	
	Forced to use by partner	1(25%)	0(0%)	
	Others*	3(5.3%)	6(9.2%)	

	Reason of using	Cases (n=2)	Controls (n=10)	P-value
Sedatives/ Sleeping pills	To experiment/try	2(100%)	3(30%)	
	Before/during sex/Improves sex work	0(0%)	2(20%)	0.541
	Others*	36(34%)	5(50%)	

	Reason of using	Cases (n=5)	Controls (n=3)	P-value
Opioids	To experiment/try	3(60%)	2(66.7%)	
	Peer pressure	2(40%)	0(0%)	0.140
	Before/during sex/Improves sex work	0(0%)	1(33.3%)	

	Reason of using	Cases (n=13)	Controls (n=7)	P-value
Heroin	To experiment/try	1(7.7%)	1(14.3%)	
	Peer pressure	1(7.7%)	0(0%)	0.883
	Before/during sex/Improves sex work	10(76.9%)	5(71.4%)	

Appendix 3 – Sexual history

Table 14 – Comparison of sexual acts in the last 7 days before the interview

Sexual partner	Sexual acts in last 7 days	Cases {Median (IQR)}	Controls {Median (IQR)}	P-value
PRIMARY MALE PARTNER	Vaginal - Did not use condom or prEP	0(0,0)	0(0,0)	0.373
	Vaginal - Used condom	0(0,0)	0(0,0)	0.799
	Vaginal - Consumed prEP tablet	0(0,0)	0(0,0)	0.327
	Anal penetrative - Did not use condom or prEP	2(0,5)	4.5(0,20)	**0.001**
	Anal penetrative - Used condom	1(0,8)	1.5(0,4)	0.446
	Anal penetrative - Consumed prEP tablet	0(0,0)	0(0,0)	0.075
	Anal receptive- Did not use condom or prEP	2(0,4)	4(1,20)	**<0.001**
	Anal receptive- Used condom	2(0,10)	1(0,4)	**0.007**
	Anal receptive- Consumed prEP tablet	0(0,0)	0(0,0)	0.758
	Oral- Did not use condom or prEP	3(0,13)	7(0,25)	**0.010**
	Oral- Used condom	0(0,0)	0(0,0)	0.098
	Oral - Consumed prEP tablet	0(0,0)	0(0,0)	0.307

Sexual partner	Sexual acts in last 7 days	Cases {Median (IQR)}	Controls {Median (IQR)}	P-value
PRIMARY FEMALE PARTNER	Vaginal - Did not use condom or prEP	2(2,3)	3(2,3)	0.500
	Vaginal - Used condom	0(0,1)	0(0,1)	0.638
	Vaginal - Consumed prEP tablet	0(0,0)	0(0,0)	1.000
	Anal penetrative - Did not use condom or prEP	0(0,0)	0(0,0)	0.405
	Anal penetrative - Used condom	0(0,0)	0(0,0)	0.857
	Anal penetrative - Consumed prEP tablet	0(0,0)	0(0,0)	1.000
	Anal receptive- Did not use condom or prEP	0(0,0)	0(0,0)	0.835
	Anal receptive- Used condom	0(0,0)	0(0,0)	0.269
	Anal receptive- Consumed prEP tablet	0(0,0)	0(0,0)	1.000
	Oral- Did not use condom or prEP	0(0,0)	0(0,0)	0.405
	Oral- Used condom	0(0,0)	0(0,0)	0.269
	Oral - Consumed prEP tablet	0(0,0)	0(0,0)	1.000
PRIMARY TRANSGENDER PARTNER	Vaginal - Did not use condom or prEP	0(0,0)	0(0,0)	0.819
	Vaginal - Used condom	0(0,4)	0(0,0)	0.417
	Vaginal - Consumed prEP tablet	0(0,0)	0(0,0)	1.000
	Anal penetrative - Did not use condom or prEP	1(0,8.5)	20.5(14,28)	**0.004**
	Anal penetrative - Used condom	5(0,10)	1(0,2)	0.265
	Anal penetrative - Consumed prEP tablet	0(0,0)	0(0,0)	1.000
	Anal receptive- Did not use condom or prEP	1(0,8.5)	20.5(14,28)	**0.008**
	Anal receptive- Used condom	5(0,10)	1(0,2)	0.220
	Anal receptive- Consumed prEP tablet	0(0,0)1	0(0,0)	1.000
	Oral- Did not use condom or prEP	1(1,22.5)	23(14,30)	0.087
	Oral- Used condom	0(0,0)	0(0,0)	1.000
	Oral - Consumed prEP tablet	0(0,0)	0(0,0)	1.000
CLIENTS	Vaginal - Did not use condom or prEP	0(0,0)	0(0,0)	0.446
	Vaginal - Used condom	0(0,0)	0(0,0)	0.575
	Vaginal - Consumed prEP tablet	0(0,0)	0(0,0)	0.332
	Anal penetrative - Did not use condom or prEP	1(0,4)	4(0,20)	**<0.001**
	Anal penetrative - Used condom	1(0,5)	1(0,2)	0.500
	Anal penetrative - Consumed prEP tablet	0(0,0)	0(0,0)	0.302
	Anal receptive- Did not use condom or prEP	4(0,9)	10(0,20)	**0.001**
	Anal receptive- Used condom	2(0,8)	2(0,4)	0.215
	Anal receptive- Consumed prEP tablet	0(0,0)	0(0,0)	0.525
	Oral- Did not use condom or prEP	6(2,15)	12(4,24)	**0.010**
	Oral- Used condom	0(0,0)	0(0,0)	0.241
	Oral - Consumed prEP tablet	0(0,0)	0(0,0)	0.302

Table 15 – Comparison of sexual acts in the last 7 days before screening test for HIV

Sexual partner	Mode of sexual acts in the week before diagnosed with HIV	Cases {Median (IQR)}	Controls {Median (IQR)}	P-value
PRIMARY MALE PARTNER	Vaginal - Did not use condom or prEP	0(0,0)	0(0,0)	0.125
	Vaginal - Used condom	0(0,0)	0(0,0)	0.782
	Vaginal - Consumed prEP tablet	0(0,0)	0(0,0)	0.439
	Anal penetrative - Did not use condom or prEP	0.5(0,2)	9(0,20)	**<0.001**
	Anal penetrative - Used condom	1(0,5)	0(0,4)	0.228
	Anal penetrative - Consumed prEP tablet	0(0,0)	0(0,0)	0.581
	Anal receptive- Did not use condom or prEP	1(0,2)	9(0,20)	**<0.001**
	Anal receptive- Used condom	2(0,5)	0(0,3)	**0.009**
	Anal receptive- Consumed prEP tablet	0(0,0)	0(0,0)	0.430
	Oral- Did not use condom or prEP	2(0,6)	13(3,25)	**<0.001**
	Oral- Used condom	0(0,0)	0(0,0)	0.758
	Oral - Consumed prEP tablet	0(0,0)	0(0,0)	0.197
PRIMARY FEMALE PARTNER	Vaginal - Did not use condom or prEP	2(1,2)	2(1,3)	0.196
	Vaginal - Used condom	0(0,1)	0(0,0)	0.723
	Vaginal - Consumed prEP tablet	0(0,0)	0(0,0)	1.000
	Anal penetrative - Did not use condom or prEP	0(0,0)	0(0,0)	0.344
	Anal penetrative - Used condom	0(0,0)	0(0,0)	0.344
	Anal penetrative - Consumed prEP tablet	0(0,0)	0(0,0)	1.000
	Anal receptive- Did not use condom or prEP	0(0,0)	0(0,0)	0.344
	Anal receptive- Used condom	0(0,0)	0(0,0)	0.344
	Anal receptive- Consumed prEP tablet	0(0,0)	0(0,0)	1.000
	Oral- Did not use condom or prEP	0(0,0)	0(0,0)	0.175
	Oral- Used condom	0(0,0)	0(0,0)	1.000
	Oral - Consumed prEP tablet	0(0,0)	0(0,0)	1.000
PRIMARY TRANSGENDER PARTNER	Vaginal - Did not use condom or prEP	0(0,0)	0(0,3)	0.351
	Vaginal - Used condom	0(0,0)	0(0,0)	0.815
	Vaginal - Consumed prEP tablet	0(0,0)	0(0,0)	1.000
	Anal penetrative - Did not use condom or prEP	0(0,2)	8.5(3,25.5)	**0.007**
	Anal penetrative - Used condom	4(0,12)	0.5(0,2)	0.128
	Anal penetrative - Consumed prEP tablet	0(0,0)	0(0,0)	1.000
	Anal receptive- Did not use condom or prEP	0(0,2)	17(6.5,27)	**0.001**
	Anal receptive- Used condom	4(1,12)	0.5(0,2)	0.072
	Anal receptive- Consumed prEP tablet	0(0,0)	0(0,0)	1.000
	Oral- Did not use condom or prEP	2(0,3)	17(6.5,28)	**0.034**
	Oral- Used condom	0(0,0)	0(0,0.5)	0.887
	Oral - Consumed prEP tablet	0(0,0)	0(0,0)	1.000

Sexual partner	Mode of sexual acts in the week before diagnosed with HIV	Cases {Median (IQR)}	Controls {Median (IQR)}	P-value
CLIENTS	Vaginal - Did not use condom or prEP	0(0,0)	0(0,0)	0.265
	Vaginal - Used condom	0(0,0)	0(0,0)	0.729
	Vaginal - Consumed prEP tablet	0(0,0)	0(0,0)	1.000
	Anal penetrative - Did not use condom or prEP	1(0,2)	7(2,20)	**<0.001**
	Anal penetrative - Used condom	1(0,5)	1(0,2)	0.325
	Anal penetrative - Consumed prEP tablet	0(0,0)	0(0,0)	0.459
	Anal receptive- Did not use condom or prEP	2(0,5)	12(2,20)	**<0.001**
	Anal receptive- Used condom	3(0,9.5)	2(0,4)	0.091
	Anal receptive- Consumed prEP tablet	0(0,0)	0(0,0)	0.197
	Oral- Did not use condom or prEP	3(0,8)	11(3,21)	**<0.001**
	Oral- Used condom	0(0,0)	0(0,0)	0.242
	Oral - Consumed prEP tablet	-	-	-

Appendix 4 – Stigma/Violence history

Table 17: Comparison of stigma/discrimination between cases and controls

Variables		Cases (n=132)	Controls (n=132)	P-value
Do you feel you are treated differently by your family/ friends/neighbours because you	Identify as MSM/TG	55(41.7%)	59(44.7%)	0.627
	Are a substance user	1(0.8%)	2(1.5%)	
	Are an Injecting user	1(0.8%)	0(0%)	
	Sex worker	4(3%)	2(1.5%)	
	Not treated differently	57(43.2%)	61(46.2%)	
	No response	14(10.6%)	8(6.1%)	
Have you ever experienced stigma/discrimination in/by health care facilities/health care workers/clinics/ de-addiction centres etc.?	Yes	19(14.4%)	21(15.9%)	0.731
	No	113(85.6%)	111(84.1%)	
In the past 12 months has someone ever physically or verbally assaulted you because of your identity?	Never	82(62.1%)	84(63.6%)	0.757
	Once	19(14.4%)	21(15.9%)	
	2 - 5 times	15(11.4%)	9(6.8%)	
	6 - 11 times	0(0%)	1(0.8%)	
	Once a Month	2(1.5%)	1(0.8%)	
	Once in 15 Days	0(0%)	1(0.8%)	
	Everyday	0(0%)	1(0.8%)	
	No response	14(10.6%)	14(10.6%)	

Variables		Cases (n=132)	Controls (n=132)	P-value
Have you ever told anyone about this stigma/discrimination faced?	Yes	16(12.1%)	22(16.7%)	
	No	23(17.4%)	14(10.6%)	0.204
	No response	93(70.5%)	96(72.7%)	
Variables		Cases (n=23)	Controls (n=14)	P-value
If not told to anyone, the reason:	Fear of being judged	7(30.4%)	0(0.0%)	
	No one would listen	11(47.8%)	10(71.4%)	
	Counselling services far away	1(4.3%)	0(0.0%)	0.119
	Others	1(4.3%)	0(0.0%)	
	No response	3(13.0%)	4(28.6%)	

Table 18 - Comparison of physical/mental harassment between cases and controls

Variables		Cases (n=132)	Controls (n=132)	P-value
In the past 6 months has anyone ever:	Physically hurt you	9(6.8%)	2(1.5%)	
	Threatened you with harm	6(4.5%)	4(3.0%)	
	Used physical force or verbal threats to force you to have sex	13(9.8%)	12(9.1%)	0.139
	No never	87(65.9%)	102(77.3%)	
	No response	17(12.9%)	12(9.1%)	
Variables		Cases (n=28)	Controls (n=18)	P-value
Who did so?	Partner	3(10.7%)	1(5.6%)	
	Client/commercial	11(39.3%)	10(55.6%)	
	Peers/friend	7(25.0%)	5(27.8%)	0.931
	Other substance users	1(3.6%)	0(0.0%)	
	Clinic staff	1(3.6%)	0(0.0%)	
	Relative	5(17.9%)	2(11.1%)	

Appendix 5 – Health service history

Table 19 – Signs/symptoms associated with STI among respondents

Symptoms	Cases (n=132)	Controls (n=132)	P-value
Abdominal pain (first felt after unprotected sexual intercourse)	2(1.5%)	1(0.8%)	
Foul smelling discharge	3(2.3%)	2(1.5%)	
Burning pain on urination	8(6.1%)	3(2.3%)	0.070
Genital sores/ulcers	0(0.0%)	2(1.5%)	
Anal ulcer/sores	6(4.5%)	2(1.5%)	

Swellings around genital area	1(0.8%)	2(1.5%)
Anal warts	9(6.8%)	1(0.8%)
Itching	17(12.9%)	18(13.6%)
No issue	75(56.8%)	88(66.7%)
No response	11(8.3%)	13(9.8%)

Appendix 6 – Multivariable analysis table

Table 20 – Multivariable analysis table

Variables	Adjusted OR (95% CI)	P-value
Education: below 12	0.67(0.30-1.50)	0.329
Occupation: Unemployed/jobless	0.89(0.29-2.72)	0.840
Marital status: Married currently/before	1.78(0.51-6.20)	0.364
Currently living with parents/family	1.75(0.65-4.69)	0.267
Currently living with others	1.44(0.44-4.69)	0.541
Female sexual partner	0.78(0.14-4.31)	0.774
Male sexual partner	0.92(0.24-3.56)	0.902
TG sexual partner	0.45(0.04-4.90)	0.512
Ever forced into sexual act	1.64(0.75-3.59)	0.215
First sex at >18	1.03(0.38-2.78)	0.956
Into sex work at any point of life	6.68(1.34-33.20)	**0.020**
Received information about HIV/STI from a peer educator or outreach worker	0.48(0.14-1.62)	0.237
Received condoms from peer educator or outreach worker	0.24(0.07-0.88)	**0.032**
Received lubricants from peer educator or outreach worker	1.32(0.37-4.63)	0.668
Seen demonstration on condom use	0.17(0.04-0.63)	**0.009**
Received check-up/counseling services	0.79(0.39-1.59)	0.504
Visited Drop Centre	1.81(0.67-4.94)	0.244
Received help and support when faced with physical/sexual violence	2.39(0.52-10.93)	0.260
Received help or support when faced with trouble from police	1.25(0.14-10.95)	0.839
Received counseling on OST/prophylaxis services	2.95(0.49-17.76)	0.236
Substance abuse	2.45(1.10-5.45)	**0.029**

Appendix 7 – Study tools

Study tools are available in the e-version of the report at https://allianceindia.org/publications/