

Understanding Demographic & Behavioral Characteristics of Seropositive Clients Tested At ICTC: A Hospital-Based Study in Central India

Dr. Prabha Desikan, MD
Dr. Aseem Rangnekar, MD
Dr. Nikita Panwalkar, PhD
Mr. Manoj Pateriya, MSW
Mr. Virendra Singh Rajput, DMLT

Abstract

HIV, a global threat, has affected more than a hundred million people in 2024. The efforts of Integrated Counselling and Testing Centers (ICTCs) and other stakeholders have been instrumental in encouraging health care-seeking behavior, reducing HIV transmission rates, and reducing the stigma associated with it. The aim of this study was to understand the demographic and behavioral characteristics of clients visiting ICTC and evaluate the trends and patterns of seropositivity. This retrospective cross-sectional study included 38,074 clients who visited ICTC from 2016 to 2022. Client details, including gender, occupation, education, marital status, resident of rural/urban area, mode of transmission/risk, and seropositivity status, were recorded and analysed. A total of 218 (0.57%) seropositive clients were identified. Seropositivity was higher in married males ($p < .05$). The number of urban clients was higher than rural clients; however, no statistically significant difference was found between them ($p > .05$). A risk behavior pattern revealed that 70.2% heterosexual males and 100% heterosexual females were seropositive. Over the past seven years, intravenous drug abuse decreased from 54.3% to 21% ($p < .05$). An overall trend of decreasing seropositivity was not found to be statistically significant ($p > .05$). Despite the two-year COVID-19 pandemic period, the increase in ICTC clients during the seven-year study period is a positive sign. A multipronged approach addressing gender discrimination, illiteracy, unemployment, and sex education is needed to enhance efforts to achieve the 95-95-95 goal of the UNAIDS HIV/AIDS Programme by the year 2030.

Keywords: Sociodemographic & behavioral characteristics, HIV, ICTC, Seropositive, Central India

*Corresponding author may be reached at nikitapanwalkarnikita@gmail.com

Introduction

HIV remains a formidable threat worldwide. Globally, it is estimated that over a million people have been infected with HIV, and more than 0.6 million people have died from HIV related illnesses in 2024. An estimated 40.8 million people worldwide are living with HIV across the world (UNAIDS, 2025). Since 2010, the incidence of HIV and related morbidity and mortality appears to have been curtailed to a significant extent. However, there should be no room for complacency with such a

pathogen (Alliance India, 2023; World Health Organization, 2025).

In 2023, the adult HIV prevalence rate was 0.26% in India; however, the prevalence rates vary considerably across Indian geographies. For instance, Jammu-Kashmir and Ladakh regions reported the lowest prevalence at 0.06%, whereas the Northeast parts reported much higher rates—1.37% in Nagaland and 2.73% in Mizoram. The epidemiological diversity of India is also reflected in the estimated HIV incidence rates for high-risk populations. In 2023, the HIV incidence rate among men

who had sex with men (MSM) was highest in Himachal Pradesh, at 0.85%, and lowest in Telangana state, at 0.00005%. The HIV incidence rate among intravenous (IV) drug abusers was highest in Rajasthan, at 31%, and lowest in Goa state, at 0.00002%. Among female sex workers, HIV incidence rate was highest in Meghalaya, at 4%, and lowest in Nagaland, at 0.01% (National AIDS Control Organisation & ICMR—National Institute of Medical Statistics, 2022). These regional disparities in HIV burden in India underscore the need for region-specific responses.

Integrated Counselling and Testing Centers (ICTCs) act as nodal points for disease prevention and limiting the transmission of HIV. ICTCs enable prompt diagnosis with an emphasis on maintaining client privacy (National AIDS Control Organisation, 2022). ICTCs, along with other stakeholders, have been instrumental in reducing the stigma associated with HIV, encouraging health care-seeking behavior, and reducing HIV transmission rates, in addition to ensuring access to essential HIV preventive services, early diagnosis, counselling, and linkage of clients to care (National AIDS Control Organisation, 2021; National AIDS Control Organisation, 2022).

Sociodemographic factors influence the risk of exposure of clients to HIV infection, access to healthcare services, and overall health outcomes. These factors intersect and amplify each other. For example, women with lower literacy levels and socioeconomic status may face heightened vulnerability to HIV due to limited education about prevention, less negotiation power in sexual relationships, and restricted access to healthcare (Singh & Jindwani, 2012; Malhotra et al., 2016; National AIDS Control Organisation, 2021; National AIDS Control Organisation, 2022).

The objective of this study was to understand the demographic and behavioral characteristics of clients visiting the ICTC at a tertiary care hospital in Central India

and to evaluate the trends and patterns of seropositivity. It is expected that an analysis of demographic and behavioral characteristics of ICTC clients, and an examination of the seropositivity patterns over time, can provide an insight into the efficacy of HIV prevention and control measures, and contribute to evidence-based policy making.

Methods

This retrospective cross-sectional study was carried out at the ICTC, Department of Microbiology, in a tertiary care hospital from 2016 to 2022. A total of 38,074 clients visited during the seven-year study period.

Ethical approval was obtained from the Institutional Ethics Committee (IEC) of the institute. Written informed consent from the patients was waived due to the retrospective nature of this study. Patient samples were collected according to the National HIV Counselling and Testing Guidelines recommendations (National AIDS Control Organisation, 2024). Client data accessed for retrospective analysis was coded to maintain confidentiality. Client name and contact details were unknown to the study investigators. Unlinked and anonymous information was recorded from the laboratory registers. The client details included gender, occupation, education, marital status, resident of a rural/ urban area, and self-reported mode of transmission/risk. The HIV seropositivity status of the clients, as confirmed by enzyme-linked immunosorbent-assay (ELISA) for the detection of recombinant-antigens of HIV-1 and HIV-2 using various kits with different principles (dot-immunoassay and immunochromatographic tests), was recorded.

Data Analysis

Data were compiled and analysed for clients attending the ICTC during the study period. The total number of clients attending the ICTC was calculated for each

year. Sociodemographic characteristics and serostatus of male and female clients were calculated and stratified by gender. Risk behaviors among seropositive clients were analysed and summarized as proportions. Trends in HIV seropositivity from 2016 to 2022 were assessed to examine temporal changes over the study period. Key variables associated with HIV serostatus and reported routes of transmission were analysed. A comparative analysis was conducted between two study periods (January 2009 to January 2016 and January 2016 to December 2022). The total number of ICTC attendees and the proportion of seropositive clients were calculated and compared across these periods to demonstrate changes in ICTC attendees and seropositivity over time.

Statistical Methods

The data was entered into MS Excel to calculate the percentages and frequencies of variables. Continuous variables were represented as mean and standard deviation. A statistical tool, EpiTools Epidemiological Calculators (Ausvet, Australia), was used to perform the “Chi-squared test for linear trend” to examine the statistical significance of differences in proportions of seropositive cases identified over a period of seven years (2016-2022). A chi-square test was used to examine the statistical significance between categorical variables (age, gender, marital status, educational level, occupation, and routes of transmission). A Kolmogorov-Smirnov Test Calculator was used to check that the data distribution was normal. P-value <.05 was considered significant.

Results

In our ICTC, 38,074 clients visited from 2016 to 2022. Out of a total of 38,074 clients, 24,890 (65.37%) were male and 13,184 (34.63%) were female, 37,856 (99.43%) were seronegative, and 218 (0.57%) were seropositive. Of 38,074 clients, 5,715 (15.01%, 95% CI: 14.65% -

15.37%) visited in 2016, 5,916 (15.54%, 95% CI: 15.18% - 15.91%) in 2017, 6,405 (16.82%, 95% CI: 16.44% - 17.2%) clients in 2018, and 6,541 (17.18%, 95% CI: 16.8% - 17.56%) clients in 2019. Following this, 3,817 (10.03%, 95% CI: 9.73% - 10.33%) clients visited in 2020, 3,699 (9.72%, 95% CI: 9.42% - 10.02%) in 2021, and 5,979 (15.7%, 95% CI: 15.35% - 16.08%) clients in 2022. In terms of seropositivity, out of a total of 218 seropositive clients, 36 (16.51%, 95% CI: 11.84% - 22.12%) clients tested HIV positive in 2016, followed by 13 (5.96%, 95% CI: 3.21 - 9.98) in 2017, and 48 (22.02%, 95% CI: 16.70 - 28.11) in 2018. Additionally, 52 (23.85%, 95% CI: 18.36 - 30.07) clients were seropositive in 2019, 17 (7.8%, 95% CI: 4.61 - 12.19) in 2020, 27 (12.39%, 95% CI: 8.32 - 17.51) in 2021, and 25 (11.47%, 95% CI: 7.56 - 16.46) in 2022 (Table 1).

Of 218 seropositive clients, 185 (84.86%) were male, and 33 (15.14%) were female. The mean age of clients was 38.3 years (+/- standard deviation=18.64) with a minimum of 17 years and a maximum of 77 years. There were 4 (1.83%) clients who were below 18 years of age. The highest number of clients (38.53%) was in the age bracket of 19 to 30 years, followed by 67 (30.73%) clients in the age bracket of 31 to 40 years. No significant association between the age of the seropositive clients and gender was observed ($X^2=1.531$, $p=0.8211$). There were 17 (7.80%) clients from rural areas and 201 (92.2%) clients from urban areas. No significant association was found between the clients' residential areas and their gender ($X^2=1.011$, $p=0.3147$). A total of 173 (79.36%) clients were married, and 45 (20.64%) clients were unmarried. High HIV seropositivity was significantly associated with married male clients ($X^2=5.05$, $p=.02$). There were an equal number of illiterate clients and clients having primary level education (47, 21.56% each). A total of 102 (46.79%) clients had school-level education, and 22 (10.09%) clients had

Table 1
ICTC visits and seropositive clients from 2016 to 2022

Year	Total Clients (n=38074)		Seropositives (n=218)	
	No (%)	95% CI	No (%)	95% CI
2016	5715 (15.01%)	14.65 - 15.37	36 (16.51%)	11.84 - 22.12
2017	5916 (15.54%)	15.18 - 15.91	13 (5.96%)	3.21 - 9.98
2018	6403 (16.82%)	16.44 - 17.2	48 (22.02%)	16.70 - 28.11
2019	6541 (17.18%)	16.8 - 17.56	52 (23.85%)	18.36 - 30.07
2020	3817 (10.03%)	9.73 - 10.33	17 (7.8%)	4.61 - 12.19
2021	3700 (9.72%)	9.42 - 10.02	27 (12.39%)	8.32 - 17.51
2022	5982 (15.71%)	15.35 - 16.08	25 (11.47%)	7.56 - 16.46

Table 2
Sociodemographic characteristics and serostatus of male & female clients

Category	Seropositive Clients		Chi-square	p-value
	Male (n=185)	Female (n=33)		
Age Group				
≤18	3 (1.38%)	1 (0.46%)	1.531	0.8211
19-30	71 (32.57%)	13 (5.96%)		
31-40	55 (25.23%)	12 (5.5%)		
41-50	26 (11.93%)	3 (1.38%)		
> 50	30 (13.76%)	4 (1.83%)		
Residential Area				
Rural	13 (5.96%)	4 (1.83%)	1.011	0.3147
Urban	172 (78.9%)	29 (13.3%)		
Marital Status				
Married	142 (65.14%)	31 (14.22%)	5.05	0.02*
Un-married	43 (19.72%)	2 (0.92%)		
Education				
Illiterate	43 (19.72%)	4 (1.83%)	6.2575	0.0997
Primary	42 (19.27%)	5 (2.29%)		
High school	80 (36.7%)	22 (10.09%)		
Higher	20 (9.17%)	2 (0.92%)		
Occupation				
Daily wages	100 (45.87%)	0	114.6017	<0.0001*
Self employed	26 (11.93%)	0		
Service	39 (17.89%)	1 (0.46%)		
Home maker	20 (9.17%)	32 (14.68%)		

*Significant p-value.

Table 3
Risk behavior among seropositive clients

Transmission Route	Total (n=218)	Male (n=185)	Female (n=33)
Heterosexual	163 (74.7%)	130 (70.27%)	33 (100%)
Homosexual/Bisexual	10 (4.59%)	10 (5.41%)	0
Via blood and blood products	1 (0.46%)	1 (0.54%)	0
Via infected syringes and needles (IV drug abuse)	39 (17.89%)	39 (21.08%)	0
Unknown / Not specified	5 (2.29%)	5 (2.7%)	0

Figure 1
Seropositivity from 2016 to 2022 (n=218)

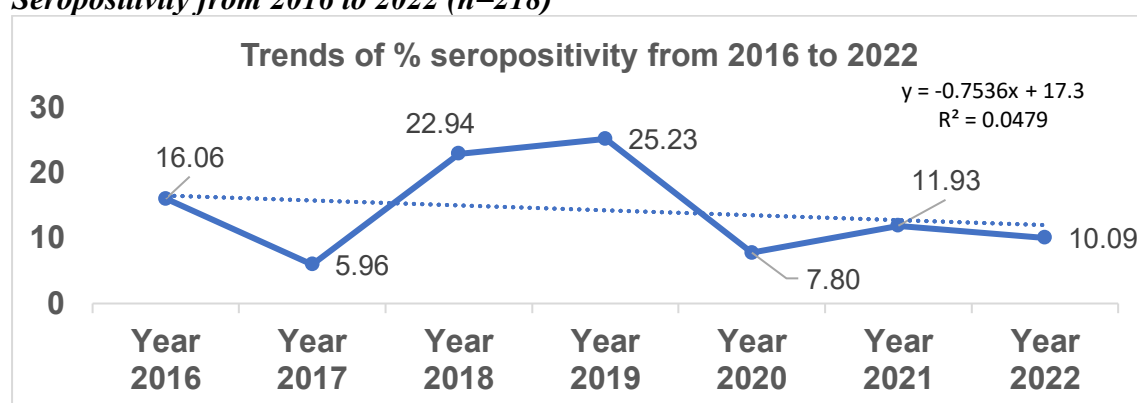
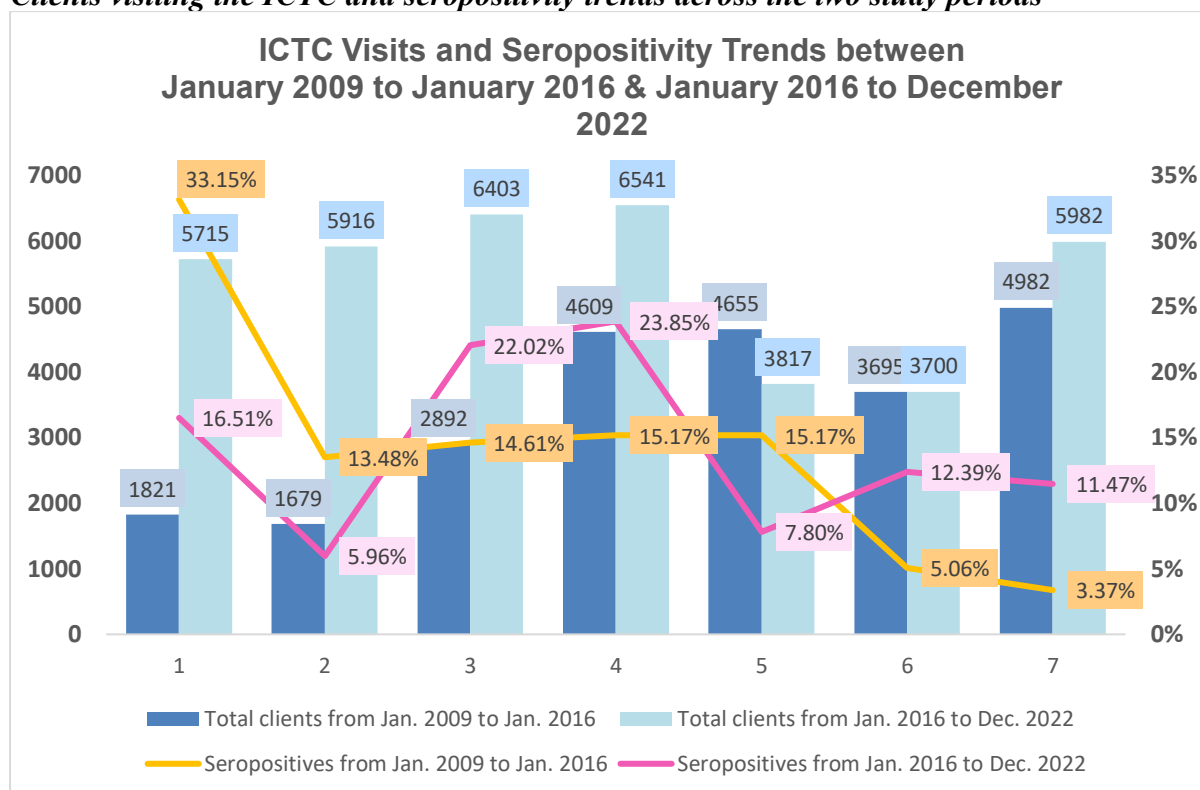


Table 4
Key variables associated with serostatus & transmission routes

Variables	Seropositive	Seronegative	Chi-square	p-value
Unmarried Male (2016 to 2022)	43	464	420.044	<.00001
Married male (2016 to 2022)	142	24241	7	*
Clients visited from Jan 2009 to Jan 2016	178	24155	5.9484	0.01473
Clients visited from 2016 to 2022	218	37856		
Rural female clients visited from Jan 2009 to Jan 2016	2	2183	2.852	0.0912
Rural female clients visited from 2016 to 2022	4	1123		
Illiterate clients visited from Jan 2009 to Jan 2016	16	4128	10.141	0.0015*
Illiterate clients visited from 2016 to 2022	47	4957		
Variables	IV drug abuse	Other transmission routes	Chi-square	p-value
Seropositive males from Jan 2009 to Jan 2016	82	69	39.825	<0.0001
Seropositive males from 2016 to 2022	39	146		

*Significant p-value.

Figure 2*Clients visiting the ICTC and seropositivity trends across the two study periods*

higher secondary-level education. Gender was not associated with the levels of education among the seropositive clients ($X^2=6.2575$, $p=.0997$). The maximum number of clients, 100 (45.87%), were daily-wage workers, 26 (11.93%) were self-employed, and 40 (18.35%) were employed in service. 52 (23.85%) clients were homemakers, of whom 61.54% were female. Male clients on daily wages were significantly associated with the HIV seropositivity ($X^2=114.60$, $p<0.0001$) (Table 2).

Our data on the route of transmission indicated that a majority of clients, 163 (74.77%), were infected by the heterosexual route. 10 (4.59%) were infected through the homosexual/bisexual route, one (0.46%) via blood and blood products, 39 (17.89%) via infected syringes and needles (IV drug abuse), and five (2.29%) through unknown/not specified

routes. None of the female clients had any transmission routes other than heterosexuality, making it 100% ($n=33$) in them. The risk behavior of seropositive clients is shown in Table 3.

The A Chi-squared test for linear trend indicated that the rate of seropositivity changed over the seven-year study period; however, it was not statistically significant ($X^2 = 0.123$, $p < 0.7258$). Annual trends in seropositivity are shown in Figure 1.

We observed a statistically significant difference between the serostatus of unmarried and married males in this study ($X^2=420.0447$, $p<.00001$). Furthermore, we examined the findings from the current study and a previous study conducted in the same geographical area (Desikan et al., 2020). These studies were then compared with clients' serostatus & transmission routes (Table 4).

We observed a significant difference between the serostatus and the number of clients ($X^2= 5.9484$, $p=.01473$), as well as the serostatus and the illiterate clients who visited the ICTC ($X^2=10.141$, $p=.0015$) during both study periods (January 2009–January 2016 and January 2016–December 2022.). IV drug abuse was a predominant route of transmission among seropositive males during the earlier study period. The chi-square test for this period ($\chi^2 = 39.825$, $p < 0.0001$) indicates a highly significant association. The number of rural female clients who visited across both study periods showed no statistical association ($X^2= 2.852$, $p< .0912$).

The total number of clients who visited the ICTC and the proportion of seropositivity between the two study periods are demonstrated in Figure 2.

Discussion

Our findings from the current study indicated an overall decrease in seropositivity among the clients who visited ICTC from 2016-2022. However, this decrease was not found to be statistically significant ($p > .05$). Remarkably, in the present study, we observed a steep decline in the seropositivity from 23.85% to 7.8% between 2019 and 2020. Such a steep fall in one year in seropositivity may be attributed to the intermittent lockdowns during the COVID-19 pandemic. The pandemic also affected the number of ICTC clients. During the years 2020 and 2021, only 3,817 and 3,700 clients visited ICTC, respectively, which was about 7% less than the number of clients who visited in 2019. Post pandemic, i.e., in 2022, the numbers rose again to 5,982. The overall increase in clients availing of ICTC services over seven years, despite two years of the pandemic period, is a positive sign and reflects the indispensable role of ICTC alongside various public health initiatives in creating public awareness. Moreover, the rising number of ICTC client visits, coupled

with the declining seropositivity rates, is an encouraging sign.

We observed that the HIV seropositivity among clients who visited the ICTC was 0.57% (95% CI: 0.50% to 0.65%), which is higher than the prevalence in the country (0.21%) (National AIDS Control Organisation & ICMR—National Institute of Medical Statistics, 2022). This could be due to the location of our ICTC at a tertiary care hospital, which caters mostly to the urban population and works in collaboration with several NGOs, targeting vulnerable populations with high-risk behavior (HRB). In a previous study, conducted in the same geographical area from January 2009 to January 2016, the seropositivity was found to be 0.73% (Desikan et al., 2020). Despite the higher number of clients testing positive during the previous study period, the proportion of seropositivity was lower in the current study period due to the larger client population. The seropositivity rate in several other studies conducted across the country was slightly higher than our findings (Correa & Gisselquist., 2006; Kiran et al., 2015). However, these studies had a much smaller sample size, and the data examined were of shorter duration. The current study extends our earlier study by providing an additional seven years of data on seropositivity and sociodemographic trends in the same settings. In addition to confirming the previously reported increase in the total number of clients visiting the ICTC, the present study demonstrates a continued decline in the proportion of seropositive cases over time. Furthermore, the findings of the current study were statistically validated, thereby strengthening the evidence for temporal trends in sociodemographic characteristics and risk profiles within the client population in this region.

Our findings showed that most of the clients, including those who were seropositive, were young adults and middle-aged. This was similar to the pattern

documented in other geographical areas (Kumar et al., 2008; Sharma, 2009; Kawichai et al., 2007; Kiran et al., 2015).

Access to ICTCs is better for urban clients. Most seropositive clients were from urban areas (92.2%) in this study. Rural female clients in this study were 12.2%, contrary to a previous study conducted in this region, wherein 6.2% of the seropositive female clients were residents of rural areas. Although statistically insignificant ($X^2 = 2.85$, $p = .0912$), occurrence of 12.2% seropositivity in female clients from rural areas seems to be alarming. These trends may be attributed to the ease of travel, the expansion of urban areas into the countryside, and widespread social media access even in rural areas.

We found that, although the proportion of married males (65.14%) was higher than that of unmarried males (19.72%) among the seropositive clients, the proportion of seropositivity among unmarried males was much higher when compared to the total number of clients who visited our ICTC. The high proportion of married seropositive females (14.22%) compared to unmarried females (0.92%) probably indicates that transmission of the virus has occurred from their infected partners. Similar observations were recorded from other study sites (Kawichai et al., 2007; Kumar et al., 2008; Sharma, 2009; Bhattacharya et al., 2011; Kiran et al., 2015).

We observed that 36.7% of males and 10.09% of females with education up to high school level, and 9.17% of males and 0.92% of females with education above high school level were seropositive. These findings among educated clients indicated a limited awareness regarding HIV transmission and preventive measures, implying that higher education level may not sufficiently equip individuals to adopt safe sexual practices. In this study, there were 21.56% illiterate seropositive clients. Compared to the previous study, we found that there was an increase of 12.8% in illiterate clients. The increment of illiterate clients may have resulted from the outreach

programmes undertaken by the ICTC, which include routine jail visits and camps in areas with a population suspected of high-risk behavior (HRB), like the red-light areas, interstate bus stands, and railway stations.

A considerable number of the HIV-positive males (45.87%) were daily-wage workers (labourers, truckers, etc.), and females (14.68%) were housewives. This cohort is least aware of the routes of HIV transmission. Married women, in particular, remain vulnerable to getting infections mostly from their spouses, especially in a patriarchal society. Such tendencies illustrate the significance of awareness programmes for the prevention of HIV transmission in this cohort.

A previous study from this area reported 54.3% of seropositivity in males with a history of IV drug abuse (Desikan et al., 2020). In the current study, reassuring results were observed in seropositive male clients with a history of IV drug abuse, as the proportion of seropositivity among this group significantly reduced from 54.3% to 21% over the past seven years. This fall could be explained by the various outreach programmes with a focus on addressing the issues of HIV transmission through IV drug abuse among targeted populations (i.e., prison inmates and drug peddlers; daily wage earners or unemployed individuals; and slum populations/red-light areas) and encouraging them to come forward for testing and counselling at the ICTC. The majority of HIV transmissions occur due to unsafe heterosexual intercourse (Kumar et al., 2025). IV drug usage and banned substances contribute to about 2.4% of cases, while about 2% of all cases are attributed to blood transfusions, 3.6% to perinatal transmission, and 6% to other/not specified reasons (Correa & Gisselquist, 2006). A study had stated that sex with a non-regular partner acts as a bridge between the high-risk and low-risk populations (Kiran et al., 2015). The bigger the bridge population, the larger the chances of HIV transmission into the general population.

The risk-behavior patterns and serostatus of the clients in our study indicated that a substantial proportion of male (70.27%) and female clients (100%) acquired HIV infection through the sexual route. Our findings showed that 5.41% of male clients had a history of homosexual contacts (men who had sex with men). Over the last two decades, similar observations were recorded from other parts of the country (Kumar et al., 2008; Sharma, 2009). Implementing robust strategies to foster risk awareness among the bridge population, which links high-risk groups (such as individuals with a history of IV drug abuse or sex workers) to the general, low-risk population, is critical to disrupt the chain of HIV transmission.

Conclusion

We found that there was a gradual and steady decline in the seropositivity rates over a period of seven years, which may be attributed to the efforts of ICTCs alongside other contributing public health initiatives towards creating public awareness and reducing HIV transmission. However, targeted interventions for high-risk and bridge populations may be required to further reduce HIV transmission and achieve UNAIDS targets. The current UNAIDS target includes reducing new HIV infections and AIDS-related deaths by 90% by 2030 (relative to 2010 levels), alongside achieving the 95–95–95 cascade—where 95% of people living with HIV know their status, 95% of those are on treatment, and 95% of those on treatment achieve viral suppression. Furthermore, a multipronged approach addressing prevention of gender discrimination, illiteracy, unemployment, and sex education would prove to be the final push required for achieving the 95-95-95 goal of the UNAIDS HIV/AIDS Programme, which aims at halting the HIV/AIDS epidemic by the year 2030.

Implications for Health Behavior Research

Our findings suggest that fostering systematic public awareness strategies and promoting overall inclusivity in diverse healthcare settings can lead to positive behavioral changes among clients. Our findings also suggest that any disruption in continuity of HIV services, including regular counseling, as observed during the COVID-19 pandemic, can severely impact the overall well-being of individuals living with HIV. Our research emphasizes the importance of social and demographic factors that affect treatment outcomes in HIV patients. Moreover, these same factors play a crucial role in determining the risk of HIV infection. Since this study captures the trends of new infections, explicitly linking the observed sociodemographic variables to both risk and outcomes, this would broaden its relevance and strengthen the argument for behaviorally informed interventions. Understanding these complex factors can help reshape policies that take firm, preventive measures. Our research findings are relevant, not only to HIV, but also to other infectious diseases that are prevalent worldwide or confined to certain geographic areas, since formulating the policies for prevention and controlling the infectious diseases is strongly influenced by the sociodemographic profile. Our study results underline the gap in HIV awareness, particularly among women and individuals with low literacy. Periodic and sustained awareness campaigns can transform the existing scenario.

Discussion Questions

This study indicates that the number of female clients who visited ICTCs was less than that of male clients. Are females more likely than males to face barriers in accessing HIV preventive services? Discuss gender specific psychological challenges among HIV positive patients.

A steep fall in seropositive clients was observed during the COVID-19 pandemic

in this study. How can HIV services be sustained without disruption during future crises such as the COVID-19 pandemic? How effective will intervention strategies, such as self-testing HIV kits and tele-concealing, be in meeting the individual's expectations?

Stigma reduction efforts are one of the focus areas of the HIV/AIDS program. To what extent can HIV awareness campaigns help reduce stigma among illiterate individuals with strong cultural beliefs and myths?

Conflicts of Interest: The authors have no conflicts of interest to declare.

Funding: No funding received for this study.

Author Contributions: PD conception and design of the study, finalized and approved the manuscript. AR & NP supervision, acquisition, analysis, and interpretation of data; wrote the manuscript. MP & VSR compilation, acquisition, analysis, and interpretation of data. All authors read and approved the final manuscript.

Ethical Approval: This study was reviewed and approved by the Institutional Ethics Committee (IEC) of Bhopal Memorial Hospital & Research Centre (BMHRC), Bhopal (project ID–IEC/57/Microbiology/23, dated 20.10.2023). Written informed consent from the patients was waived due to the retrospective nature of this study.

References

- Alliance India. (2023). *Annual Report 2022-2023*. New Delhi. <https://allianceindia.org/wp-content/uploads/2024/04/Annual-Report-Alliance-India-2022-23.pdf>
- Bhattacharya, S., Chakrabarty, B., Kundu, P. K., Maji, A., Ghosal, S. R., & Dey, K. K. (2011). Prevalence of HIV seropositivity among surgical patients in a tertiary care hospital. *Journal of the Indian Medical Association*, 109(12), 896-898. PMID: 23469570.
- Correa, M., & Gisselquist, D. (2006). Routes of HIV transmission in India: assessing the reliability of information from AIDS case surveillance. *International Journal of STD & AIDS*, 17(11), 731-735. <http://doi.org/10.1258/095646206778691194>.
- Desikan, P., Rangnekar, A., Tiwari, K., Panwalkar, N., Pateriya, M., & Rajput, V. S. (2020). Sociodemographic profile of patients attending the integrated counseling and testing center at a government super-specialty hospital in Central India. *Indian Journal of Sexually Transmitted Diseases and AIDS*. 41(1), 68-72. http://doi.org/10.4103/ijstd.IJSTD_52_17.
- Kawichai, S., Celentano, D. D., Chariyalertsak, S., Visrutaratna, S., Short, O., Ruangyuttikarn, C., Chariyalertsak, C., Genberg, B., & Beyrer, C. (2007). Community-based voluntary counseling and testing services in rural communities of Chiang Mai Province, Northern Thailand. *AIDS and Behavior*, 11(5), 770-777. <http://doi.org/10.1007/s10461-007-9242-7>.
- Kiran, A., Kujur, M., Kumar, M., Haider, S., Kashyap, V., & Sundaram, S. (2015). Profile of the Patients Attending in ICTC, RIMS, Ranchi. *Journal of Community Medicine and Health Education*, 5, 341. <http://doi.org/10.4172/2161-0711.1000341>.
- Kumar, A., Kumar, P., Gupta, M., Kamath, A., Maheshwari, A., & Singh, S. (2008). Profile of clients tested HIV positive in a voluntary counseling and testing center of a district hospital, Udupi, South Kannada. *Indian Journal of Community Medicine*, 33(3), 156-159. <http://doi.org/10.4103/0970-0218.169685>.

- Kumar, P., Aridoss, S., Mathiyazhakan, M., Dhanusu, S., Das, C., Rajan, S., Kumar, A., Biswas, S., & Arumugam, E. (2025). Integrated Behavioral and Biological Surveillance Among People Living with HIV Visiting the Antiretroviral Therapy Centers in India: Protocol for a Cross-Sectional Surveillance. *JMIR Research Protocols*, 14, e58252. <https://www.researchprotocols.org/2025/1/e58252>
- Malhotra, V., Balgir, R., & Kaura, S. (2016). Socio-demographic profile and risky behavior pattern of patients registered at ART centre, Patiala, Punjab. *National Journal of Community Medicine*, 7(2), 101-105.
- National AIDS Control Organisation & ICMR- National Institute of Medical Statistics. (2022). *India HIV Estimates 2021 Fact Sheet*. https://naco.gov.in/sites/default/files/India%20HIV%20Estimates%202021%20Fact%20Sheets_Final_Shared_24_08_2022_0.pdf
- National AIDS Control Organisation. (2021). *National Guidelines for HIV Care and Treatment*. Ministry of Health and Family Welfare, Government of India. https://naco.gov.in/sites/default/files/National_Guidelines_for_HIV_Care_and_Treatment_2021.pdf
- National AIDS Control Organisation. (2022). *Handbook on Prevention and Management of Stigma and Discrimination Associated with HIV & AIDS*. Ministry of Health and Family Welfare, Government of India. <https://naco.gov.in/sites/default/files/NACO%20Stigma%20Handbook.pdf>
- National AIDS Control Organisation. (2024). *National HIV Counselling and Testing Guidelines*. Ministry of Health and Family Welfare, Government of India. https://naco.gov.in/sites/default/files/HCTS%20Guideline%202024_High%20Resolution%20shared%20with%20SACS%20on%203rd%20Dec%202024%20by%20NC.pdf
- Sharma, R. (2009). Profile of attendee for voluntary counseling and testing in the ICTC, Ahmedabad. *Indian Journal of Sexually Transmitted Diseases and AIDS*, 30(1), 31-36. <http://doi.org/10.4103/0253-7184.55479>.
- Singh, K., & Jindwani, K. (2012). Clinical and demographic profile of newly detected HIV positive patients registered at anti retroviral therapy centre of a medical college. *Journal of Clinical and Diagnostic Research*, 6(7), 1167-1170.
- UNAIDS. (2025). *Global HIV and AIDS Statistics*. <https://www.unaids.org/en/resources/fact-sheet>
- World Health Organization. (2025). *HIV data and statistics*. <https://www.who.int/teams/global-hiv-hepatitis-and-stis-programmes/hiv/strategic-information/hiv-data-and-statistics>