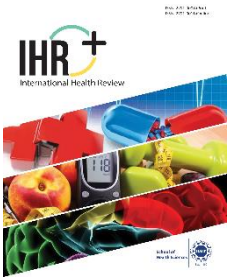
International Health Review (IHR)
Volume 4 Issue 1, 2024
ISSN$_{(P)}$: 2791-0008, ISSN$_{(E)}$: 2791-0016
Homepage: https://journals.umt.edu.pk/index.php/ihr

Article QR



Title:	**HIV Epidemic among Pakistani Inhabitants in District Faisalabad, Pakistan**
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DOI:	http://doi.org/10.32350/ihr.41.06
History:	Received: November 03, 2023, Revised: April 10, 2024, Accepted: April, 10, 2024, Published: June 30, 2024
Citation:	Yasmin R, Raza M, Asif R, et al. HIV epidemic among Pakistani inhabitants in district Faisalabad, Pakistan. *Int Health Rev.* 2024;4(1):90–105. http://doi.org/10.32350/ihr.41.06
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Conflict of Interest:	Author(s) declared no conflict of interest

A publication of
The School of Health Science
University of Management and Technology, Lahore, Pakistan

HIV Epidemic among Pakistani Inhabitants in District Faisalabad, Pakistan

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ABSTRACT

The pandemic of HIV/AIDS has severely impacted the most vulnerable sections of society in Pakistan. The results of the current study on the HIV epidemiology in Faisalabad, Pakistan, highlighted the importance of preventive measures. The current study attempted to assess the prevalence of HIV in Faisalabad. Moreover, it also identified potential risk factors for the spread of this pandemic in the region. A total of 1540 test results were gathered between March 2020 and July 2022 from 3 hospitals, that is, Allied Hospital, Aziz Fatima, and DHQ Hospital Faisalabad. Immuno-chromatographic Technique (ICT) was used to detect the presence of the infection. The researchers in District Faisalabad, Pakistan, surveyed 1540 locals to determine the HIV prevalence in that area. About 33 cases of HIV infection were confirmed through ICT, with a prevalence rate of 2.14%. Roughly, 25 males, however, only 8 females tested positive for HIV. Since more than half of HIV diagnoses occur in people between the ages of 15 and 30, it is essential that HIV prevention efforts focus on this demographic. The increased exposure to unsanitary needles and blood may explain why city dwellers appear more vulnerable than rural residents. The findings confirm that HIV is a serious threat to public health in Faisalabad, Pakistan. Community health professionals must work together to educate the public and come up with other solutions to this problem.

Keywords: epidemic, HIV, prevalence, risk factors, sexually transmitted infections

1. INTRODUCTION

The Human Immunodeficiency Virus (HIV) emerged as a global health crisis in 1981, marking a watershed moment in contemporary medical

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history. The ensuing pandemic, characterized by the development of Acquired Immunodeficiency Syndrome (AIDS), has brought about profoundhumanitarian, developmental, and demographic consequences [1]. By the end of 2002, HIV had claimed the lives of 25 million people out of 42 million individuals infected worldwide. While, approximately 13 million children in Sub-Saharan Africa were orphaned due to AIDS- related deaths. Notably, HIV/AIDS has also led to a reduction in life expectancy, weakened social fabric, and eroded economic safety nets in the hardest-hit nations [2].

HIV primarily targets the immune system, leading to the onset of AIDS. Contrary to commonmisconception, AIDS does not typically manifest upon initial HIV infection, rather represents the late stage in the virus's life cycle [3]. The progression from HIV to AIDS typically unfolds over an approximate three-year span in untreated individuals. HIV specifically impactsCD4 cells, also known as T cells, which are crucial components of the immune system. The loss of a significant number of these cells renders the body incapable of effectively combating subsequent infections or illnesses, ultimately leading to AIDS [4].

While no cure for HIV/AIDS currently exists, timely medical attention and appropriate care may effectively manage the infection, allowing individuals to lead relatively normal lives. Antiretroviral therapy (ART) is the primary treatment modality for HIV, bolstering the body's defenses against the infection [5]. HIV gains entry into the body through various biological fluidsincluding blood, sexual fluids, and other fluid transfusions [6].

There are presently two forms of HIV, that is, HIV-1, which is prevalent globally, and HIV-2, a rarer variant primarily found outside North America. Both forms ultimately culminate in AIDS despite differing routes of progression. HIV-1 and HIV-2 share clinical symptoms and complications, however, HIV-2 is notably more infectious. It spreads more rapidly and with greater infectivity over time as compared to HIV-1 which is characterized by slower transmission and amore challenging detection profile [7]. Modes of HIV transmission include unprotected sexual contact with an HIV-positive partner, blood transfusions, sharing needles or other sharp objects with an infected individual, and mother-to-child transmission during pregnancy, childbirth, or breastfeeding [8].

Early detection of HIV is pivotal in enabling the individuals to

commence ART, which helps mitigate CD4 cell decline and facilitates immune system recovery, ultimately allowing for longer and healthier lives. Patients initiating ART must maintain lifelong treatment to suppress virus reactivation and protect the immune system [9]. Several preventive measures can significantly reduce the risk of contracting HIV. These measures include engaging in safe sexual practices, using condoms to prevent transmission, administering ART to HIV-positive pregnant and breastfeeding women to protect their infants [10] refraining from sharing needles or other sharp objects, implementing voluntary male medical circumcision, and screening blood for HIV before transfusion [11].

Despite relatively low HIV incidence rates among general population in Pakistan, the viral infection is on the rise among high-risk groups, such as intravenous drug users (IDUs), female sex workers (FSWs), men who have sex with men (MSM), and transsexuals (0.1%) [12]. These groups have been described as both the "disease vector" and the "central transmitter". The prevalence of HIV infection in Faisalabad aligns with Pakistan's national average of 0.1% [13].

As of December 2014, an estimated 91,340 individuals in Pakistan tested positive for HIV, with 15,606 new cases reported that year [14]. The overall HIV prevalence rate in the country remained steady at approximately 1% among those aged 15 to 49 in 2014. Specific factors contributed to higher incidence rates among certain groups including IDUs and MSM.

The current study endeavored to assess the prevalence of HIV among the population of District Faisalabad in Pakistan. Moreover, it also aimed to identify the risk factors associated with HIV transmission, emphasize the importance of prevention strategies, ensure safe blood transfusion practices, and reduce the transmission of sexually transmitted diseases [15, 16].

The HIV/AIDS crisis in Faisalabad calls for a multipronged response. Healthcare, education,and community engagement should all be prioritized by these plans [17]. Counseling and testingfor HIV should be more easily accessible to those at highest risk. Effective HIV awareness campaigns must do three things at once: inform the public, reduce the stigma, and inspire action [18].

More collaboration is needed among healthcare providers, government agencies, and non- governmental organizations [19]. Plans must take into

account Faisalabad's specific difficulties and advantages. New cases must be monitored and efforts must be made to stem the tide of HIV epidemic in Faisalabad, as evidenced by this study. All people, regardless of their ability to pay, should have access to necessary social services, such as healthcare [20].

1.1. Objective

The major objective of the current study was to assess the prevalence of HIV among people in District Faisalabad.

2. MATERIALS AND METHOD

HIV positivity was confirmed in the current study using the Immuno-chromatographic Technique (ICT). This technique leverages modern technology to quickly identify HIV-specific antibodies in plasma or serum, making it a reliable and efficient tool for HIV diagnosis. Between March 2020 and July 2022, blood samples were collected from three 3 hospitals in Faisalabad and were analyzed afterwards. The current study utilized HIV ICT test kits specifically from AccuQuik Test Kits, catalogued under number AQ-99421.

The ICT process works by detecting the presence of HIV-specific antibodies that, if present, bind to HIV antigens on the test strip. This binding reaction is visually confirmed by the appearance of a line on the strip. Additionally, the reliability of each test is ensured through a control line, which must appear to validate the results. The presence of control line indicates that the test functioned correctly, while the test line indicates a positive result for HIV antibodies.

The findings were statistically analyzed to calculate the HIV prevalence rate among the surveyed population, providing crucial insights into the extent of the HIV pandemic in District Faisalabad. The data revealed a prevalence rate of 2.14%, highlighting a significant public health concern. This rapid and accurate method not only facilitates prompt diagnosis, however, also plays a vital role in the ongoing monitoring and treatment of HIV. By providing timely and reliable results, ICT enables healthcare providers to implement immediate interventions and tailor prevention strategies effectively, thereby contributing to better management and control of HIV in the region.

Overall, the use of ICT in the current research underscored its utility in

large-scale epidemiological studies and public health initiatives, offering a potent tool for combating the HIV epidemic through enhanced diagnostic capability and efficient disease surveillance.

3. RESULTS

Between March 2020 and July 2022, 1540 people were surveyed in District Faisalabad, Pakistan to establish HIV prevalence there.

Data was collected from three separate medical facilities over the course of three years. In 2020, 11 out of 550 samples tested positive for HIV at District Headquarters Hospital. The Aziz Fatima Hospital had 9 positive samples out of 450 in 2021. Roughly, 13 samples out of 540 tested that year at Allied Hospital were positive for the HIV.

Thirty-three (33) cases of HIV were confirmed using ICT, for the prevalence rate of 2.14%. Twenty-five (25) males and eight females were tested positive for HIV as shown in Table 1. The average annual rate of new HIV infections was 22 per 100,000 people between the ages of 15 and 30 as shown in Table 2. The findings underscored the importance of targeting people of this age with preventive measures. The current study determined that the prevalence of HIV infection was higher in urban areas (22 cases) as compared to rural areas (11 cases). This is likely due to higher rates of injection, drug use, and exposure to unclean needles and blood products as shown in Table 3. According to the data on marital status, the prevalence of HIV was also found to be higher among the unmarried (23 cases) than the married (10 cases) as shown in Table 4. Four times as many people diagnosed with HIV were found to be illiterate as compared to those with college degrees (9 vs. 24) as shown in Table 5.

Table 1. HIV Prevalence by Gender and Testing Period

Testing Period	Total Samples	HIV-Positive (Male)	HIV-Positive (Female)	Total HIV-Positive
2020	550	8	3	11
2021	450	8	1	9
2022	540	9	4	13
Total	1540	25	8	33

Table 2. HIV Prevalence by Age Group and Testing Period

Testing Period	15-30 Years	31-45 Years	46-60 Years	Above 60 Years	Total Samples	Total HIV-Positive
2020	7	2	0	2	550	11
2021	6	2	1	0	450	9
2022	9	4	0	0	540	13
Total	22	8	1	2	1540	33

Table 3. HIV Prevalence by Area and Testing Period

Testing Period	Total Samples	HIV-Positive (Urban)	HIV-Positive (Rural)	Total HIV-Positive
2020	550	7	4	11
2021	450	6	3	9
2022	540	9	4	13
Total	1540	22	11	33

Table 4. HIV Prevalence by Literacy and Testing Period

Testing Period	Total Samples	Total HIV-Positive (Illiterate)	Total HIV-Positive (Literate)	Total HIV-Positive
2020	550	9	2	11
2021	450	7	2	9
2022	540	8	5	13
Total	1540	24	9	33

Table 5. HIV Prevalence by Marital Status and Testing Period

Testing Period	Total Samples	Total HIV-Positive (Unmarried)	Total HIV-Positive (Married)	Total HIV-Positive
2020	550	8	3	11
2021	450	6	3	9
2022	540	9	4	13
Total	1540	23	10	33

Figure 1 shows that the overall prevalence of HIV in Faisalabad is 2.14%.

Table 1 shows the number of people in District Faisalabad who had HIV over three years (2020-2022)based on their gender. It shows the number of men, women, and the total number of positive cases each year. Figure 2

graphically represents this data.

Table 2 shows the number of people in District Faisalabad who had HIV in different age groups during the years 2020, 2021, and 2022. It shows the number of positive cases in each age group, each year, and the total cases. Most HIV cases have been shown to be in 15-30 age group. Figure 3 illustrates this data.

Table 3 shows the number of people in District Faisalabad with HIV infection in urban and rural areas during the years 2020, 2021, and 2022. Moreover, it also shows the number of positive cases along with the total cases at both places each year. The prevalence of HIV cases was higher in cities as compared to urban areas. Figure 4 visually represents this data.

Table 4 shows the number of people with HIV in District Faisalabad between literate and illiterate during the years 2020, 2021, and 2022. It also shows the number of people in each group who had HIV eachyear along with the total number of HIV cases as well. HIV cases were more prevalent in illiterate people than in literate people. Figure 5 depicts this information.

Table 5 shows the number of people with HIV in District Faisalabad who were either married or unmarried during the years 2020, 2021, and 2022. It represents how many people in each group had HIV each year and the total number of HIV cases. More HIV cases were prevalent in unmarried people than in married people. Figure 6 provides a graphical representation of this data.

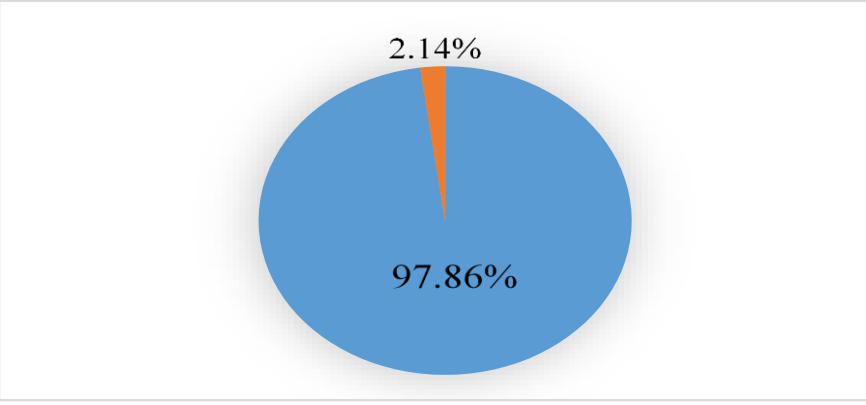

Figure 1. Prevalence of HIV in District Faisalabad

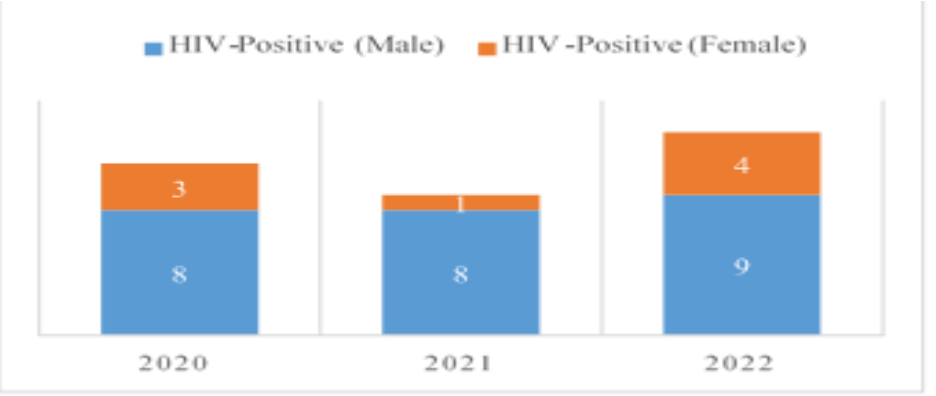

Figure 2. HIV Positive Cases in Various Years Among Male and Female

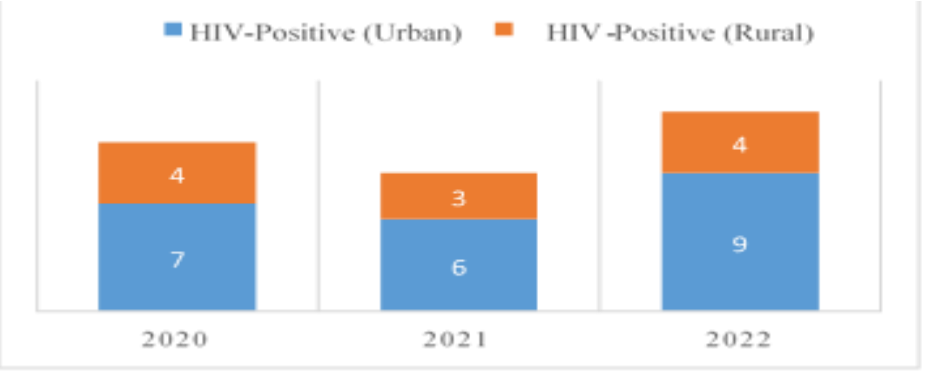

Figure 3. Geographical Representation of HIV Positive Cases

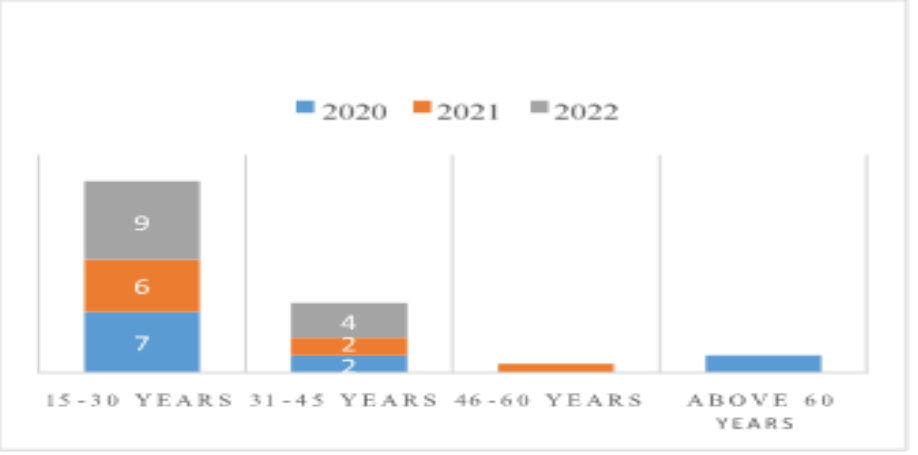

Figure 4. Age Wise Representation of HIV Positive Cases in Various Years

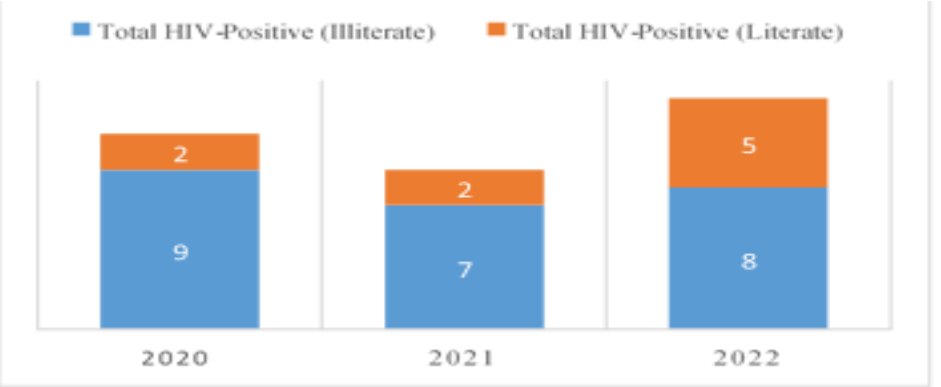

Figure 5. HIV Positive Cases in Various Years According to Literacy

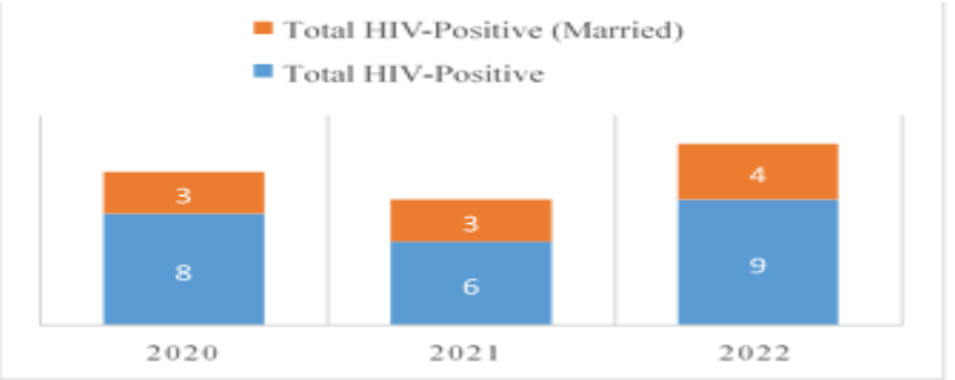

Figure 6. Martial Status of HIV Positive Cases in Various Years

4. DISCUSSION

In the early years, HIV cases in Pakistan were relatively low, and the infection was primarily associated with high-risk groups, such as IDUs and commercial sexworkers. These groups were identified as key populations at greater risk due to practices that exposed them to the infection. The first case of HIV in Pakistan was reported by IDUs in Karachi in the mid-1980s [21].

Nevertheless, the infection quickly spread outside those areas. By the 1990s [22], effects of the infection started to spread. To combat the spread of HIV, Pakistan launched education and advocacy campaigns and built clinics to diagnose and treat those individuals with the infection [23]. Factors, such as pervasive stigma, a broken healthcare system, and a lack of finance impeded the country's capacity to handle the issue.

There was a sharp rise in the number of people who injected drugs and were HIV positive in Pakistan throughout the first decade of this century. There were attempts by the government and non-profit organizations to quell the epidemic [24]. The importance of HIV testing, counseling on safe sex behaviors, and treatment is now becoming more widely known as a result of these efforts.

The fight against HIV/AIDS is an ongoing fight in Pakistan. Although, this is a major issue in many parts of the world, it is not nearly as pervasive in Pakistan as in the United States. Additionally, it is also crucial to continue spreading accurate information about HIV prevention and treatment and to keep a steady focus on caring for those living with HIV/AIDS [25]. In the continuous and difficult fight against AIDS in Pakistan, it is essential that public education, awareness, and cooperation be maintained at higher levels.

The current study enhanced the understanding pertaining to the demographics and potential risk factors that fuel HIV transmission in Pakistan's District Faisalabad. To address the implications of these findings and the HIV landscape in Pakistan generally, vulnerable populations need to be focused. Targeted preventive methods, educational campaigns, and greater access to healthcare are the essential weapons in the fight against HIV/AIDS.

The results shed critical light on the state of HIV/AIDS in District Faisalabad. Moreover, it also highlighted the need for better treatment options and targeted prevention strategies for at-risk populations, such as young adults, city dwellers, the illiterate, and the unmarried.

It is imperative that the government, medical professionals, and community leaders work together to effectively combat HIV/AIDS. These plans should focus to diagnose cases early, provide treatment on time, and provide ongoing help to those suffering from HIV. By taking care of special issues that people at risk face and encouraging everyone to practice safety, people can work together to lessen the impact of HIV in District Faisalabad. The goal is to achieve a future where no one has to worry about this preventable virus.

4.1. HIV Prevalence and Demographics

After testing 1540 residents, the researchers in District Faisalabad, Pakistan, determined that the HIV prevalence rate was 0.69%. Although, this is a relatively low rate when compared with other countries, it does

show that HIV is a problem in the area. There were 25 HIV-positivemales as compared to 8 positive females, a significant disparity. This lends credence to the widespread belief that males have a greater risk of contracting HIV than females due to factors, such as sexual behavior and lack of access to healthcare.

The largest age group of HIV-positive individuals comprised young adults (15-30). This agedistribution is worrisome since it reveals the higher risk of HIV infection among young adults in Faisalabad. Due to high rates of sexual activity and other risky behaviors displayed by this specific age group, it is crucial to focus prevention efforts on them. Two examples of early interventions that could help reduce the spread of HIV among young adults include comprehensive sexual education and easy access to testing and counseling services.

4.2. Geographic Disparities and Risk Factors

It was also discovered that the risk of HIV transmission is higher in urban areas than in ruralareas. There have been 22 confirmed cases, with a higher risk of transmission in urban areas due to increased exposure to dirty needles and blood. These results emphasize the need for urban-specific HIV prevention education and intervention programs. Even in outlying areas, people who use IDUs should have an easy access to sterile needles and syringes.

The importance of education and preventive measures is emphasized by the higher prevalence of HIV among those who are unmarried and by the correlation between illiteracyand increased risk of HIV infection. Among the illiterate population, there may be a reason for the lower number of HIV cases (only 24). Campaigns aimed at educating the public about HIV must prioritize this population due to an urgent need to improve their knowledge and reduce their risky behavior.

Unmarried people have a higher prevalence (23 positive cases) as compared to married people which suggests that people who engage in sexual activities outside of their marriage are more at risk. Safe sexual practices, such as the consistent use of condoms, should be emphasized alongside the promotion of testing and counseling services for the unmarried.

4.3. Conclusion

The study reveals a significant public health concern with an HIV prevalence rate of 2.14% in Faisalabad, highlighting the urgent need for targeted preventive measures and increased awareness. The higher prevalence among young adults, males, and urban residents underscores the importance of focused interventions in these demographics to effectively combat the HIV epidemic in the region.

4.4. Implications and Recommendations

The results highlight the importance of a comprehensive strategy for HIV prevention and treatment in District Faisalabad. The difficulties associated with HIV infection can only be overcome if healthcare, education, and community involvement are all part of the plan.

Accessible Testing and Counseling Services

It is important to increase access to HIV testing and counseling for high-risk groups, such as young adults, city dwellers, and those who have never been married. Providing services that are both private and nondiscriminatory is crucial if more people are to take the test.

Education Campaigns

Public health campaigns are essential for the prevention, recognition, and promotion of safe behavior surrounding AIDS. The young adult and uneducated populations are particularly important to be targeted with campaigns, promoting safe sexual practices and routine testing.

Collaboration and Community Involvement

It is essential that healthcare workers, government and community organizations must all work together. Due to the unique challenges and opportunities presented by Faisalabad, tailored approaches are required.To successfully include high-risk communities in HIV prevention efforts, the stigma that theyare "disease vectors" must be eradicated.

Early Detection and Timely Treatment

Collaboration between healthcare providers, policymakers, and community organizations is crucial for advancing population health. Faisalabad calls for specialized strategies due to its specific challenges and opportunities. Dispelling the myth that high-risk communities are inherently

dangerous "disease vectors" is crucial for enlisting them in HIV prevention efforts. The current results are both a wake-up call and a crucial contextualization of the HIV epidemicin Faisalabad. HIV can be eliminated in the area if everyone pitches in. The availability of HIV testing, treatment, and care is a community concern that must be addressed collectively.

CONFLICT OF INTEREST

The author of the manuscript has no financial or non-financial conflict of interest in the subject matter or materials discussed in this manuscript.

DATA AVAILABILITY STATEMENT

The data associated with this study will be provided by the corresponding author upon request.

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