INFECTION PREVALANCE IN PATIENTS OF PESHAWAR, KP, PAKISTAN: A CROSS-SECTIONAL STUDY

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Abstract. This cross-sectional study aimed to assess the prevalence of HIV infection among intravenous drug users (IDUs) in Peshawar, KP, Pakistan, shedding light on the socio-demographic factors associated with the spread of the virus. A total of 280 patients were purposively selected from Dost Welfare Foundation Hospital and its affiliated branches between April and July 2017. The research employed a comprehensive approach, gathering data on patients' detailed medical history, signs, and symptoms, incorporating age and weight parameters to ascertain HIV presence. Blood samples were meticulously collected and subjected to analysis using both Immune Chromatography Technique (ICT) and Enzyme-linked Immuno-sorbent Assay (ELISA) for HIV detection. Results revealed a substantial 23.5% prevalence of HIV infection among drug users, with a notable higher prevalence observed among IDUs. Gender-wise disparities were evident, with higher prevalence in males, along with unmarried individuals and those grappling with poor socioeconomic status. This study underscores the urgent need for community-oriented awareness and educational initiatives targeting IDUs to mitigate the further spread of HIV infection. Additionally, the implementation of stringent protocols for the safe disposal of contaminated needles and the prevention of unscreened blood transfusions is imperative. The research advocates for a multifaceted approach, combining medical interventions with social and educational strategies to address the complex socio-economic factors contributing to the prevalence of HIV in this vulnerable population.

Keywords: *gender-wise prevalence, age-wise prevalence, marital status-wise prevalence, literacy-wise prevalence, the economic status-wise prevalence*

Introduction

The Human Immunodeficiency Virus (HIV) is an RNA virus that belongs to the Retroviridae family and is the primary causal agent of the fatal disease, Acquired Immunodeficiency Syndrome (AIDS) (Tahmina et al., 2000). HIV is considered one of the top ten most harmful infectious diseases (Peterlin and Luciw, 1988) and has infected approximately 40 million people globally (Fonkwo, 2008). Sub-Saharan Africa is home to more than 68% of the world's HIV-infected population, with only 12% of the infected individuals residing outside this region (Denniston et al., 2014). The National AIDS Control Program reports that roughly 100,000 people in Pakistan are living with AIDS (Khan et al., 2023). The majority of HIV patients are not knowledgeable about the infection and its associated social issues, and it is highly probable that the number of HIV infections is underreported (Khan et al., 2023). HIV targets the host immune system, specifically lymphocytes and monocytes (Khan et al., 2023). Upon entering the host cell, the viral genome is converted into double-stranded DNA by reverse transcriptase enzyme. The integrase enzyme then transports the DNA into the nucleus and integrates it into the cellular DNA (Pari et al., 2022). HIV infection progresses

through three stages: acute, latency, and AIDS. The acute stage lasts for several weeks and causes symptoms such as mild fever, lymphadenopathy, swollen lymph nodes, muscle pain, malaise, and mouth and esophageal sores. The latency stage can last from two weeks to twenty years with minimal or no symptoms. The final stage is determined by the individual's immune system, and if the CD4 count drops below 200, it is classified as AIDS (Manga, 2015). HIV is a perilous and lethal illness that has significant social consequences (McCune, 1995). Each day, roughly 13,000 new cases of HIV are reported worldwide (McCune, 1995), and in 2008, more than 16,000 people died from AIDS. African American populations are particularly vulnerable to HIV infection. Earlier research in the general population of Pakistan indicates a 0.23% seroprevalence of HIV (McCune, 1995). The present study aims to investigate the prevalence of HIV in the drug addict's population in Peshawar, KPK. The primary objective is to collect the socio-demographic characteristics of the study population and estimate the frequency of HIV in drug addicts. Additionally, the study intends to draw recommendations based on its findings.

The significance of this study lies in its potential to identify the main causes of HIV among drug addicts, providing factual data based on direct experiences. By sensitizing people about the consequences of HIV, this study may aid in the development of more effective prevention and treatment strategies. The findings of this study may also contribute to a better understanding of the spread of HIV among drug addicts and help in designing targeted interventions to reduce its prevalence.

Materials and Methods

Data was gathered by examining the detailed medical history, signs, and symptoms of patients for a specific duration, while also recording the age and weight of participants to identify the presence of HIV. This study was conducted over a period of four months, from April to July 2017, and the selected individuals were screened for HIV in laboratories and hospitals located in the Peshawar district. A total of 280 patients were randomly selected from the Dost Welfare Foundation and its associated branches during the survey of HIV infection in intravenous drug users in Peshawar. The process involved collecting blood from each patient using a syringe, transferring it to gel tubes, and then centrifuging it to separate the serum from the blood. Subsequently, one drop of serum and one drop of solution were added to the HIV test device. The resulting window displayed two color bands indicating a positive test, while a single band indicated a negative result. The screening process for HIV infection utilized the immunochromatography technique, which involved the use of specific test devices to detect the presence of HIV in patient blood samples (*Figure 1*). The patients' specimens were subject to the third-generation Elisa technique, followed by Ict, in order to test for antibodies. Elisa combines the specificity of antibodies with the sensitivity of simple enzyme assays. This involves the use of antibodies or antigens coupled to an enzyme that is easily assayed and has a high turnover rate. Elisas are useful in measuring the concentration of specific molecules in a sample and are typically highly sensitive and easy to perform. This solid-phase assay is made possible by the positive attachment of proteins (antibodies) to plastic (96-well microtiter plate) (*Figure 2*).

Figure 1. *Immune Chromatography Technique (ICT).*

Figure 2. *Enzyme linked Immuno-Sorbent Assay (Elisa).*

Results and Discussion

The prevalence rates remain stubbornly high in study cohort

A random selection of 280 patients was made from Dost Welfare Foundation and its related branches, and each person's age, gender, education, and location were recorded through questionnaires. Of the total samples examined, 276 were male and 4 were female. Among the male population, 66 (23.5%) were infected with HIV, while all females were non-infected. Overall, 66 individuals (both male and female) out of 280 patients were diagnosed with HIV infection, and the remaining 214 (76.4%) patients were non-infected. *Table 1* presents the prevalence of HIV infection among drug addicts. It indicates that out of the 280 patient samples examined, only 66 individuals (23.5%) were diagnosed with HIV infection, while 214 (76.4%) patients were non-infected.

Table 1. *Prevalence of infection in drug addicts.*

Infection	Frequency (N)	Percentage (%)
HIV positive	66	23.6
HIV negative	214	76.4
Total	280	100

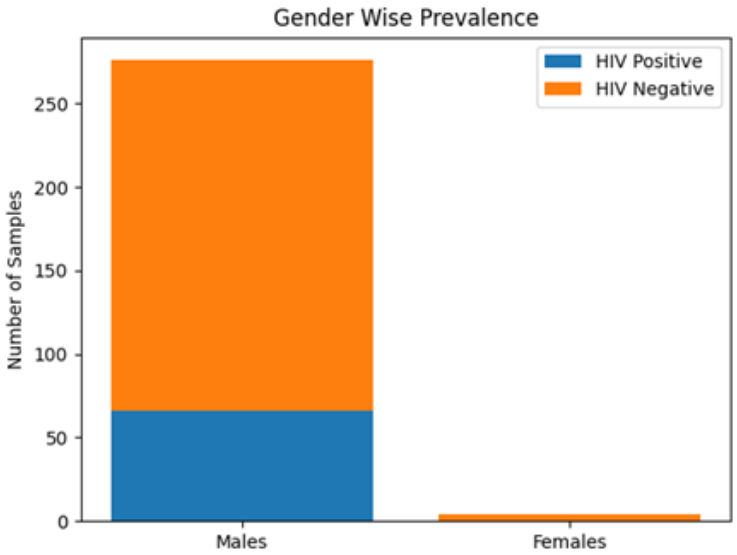

Figure 3. *Prevalence of HIV infection among drug user in KP.*

As the access to female drug users was restricted, we could only examine two female patients along with 276 male drug users (*Figure 4* to *Figure 9*). Analysis of the collected blood samples revealed that both female patients were free of HIV infection, while a high proportion of male drug users were found to be infected with HIV (*Table 2*). In *Table 2*, the analysis of the gender-wise prevalence of HIV revealed that among the 276 male subjects, 66 (23.5%) was found to be infected with HIV, while 210 (76%) were not infected. On the other hand, among the 4 female subjects, both were found to be non-infected. These results indicate that the prevalence of HIV infection was higher in males as compared to females. All drug users were adults, and no HIV-positive drug users were found in the age group up to 15 years. The second age group, which includes individuals between 16 and 30 years old, had the highest prevalence of HIV infection, accounting for approximately 70% of the total infections. The third age group accounted for about 24% of the total infected individuals, while the older age group of drug users also had infections (*Table 2*). During the study, the marital status of both male and female drug users was recorded. *Table 2* revealed that the proportion of HIV-infected patients was higher among unmarried drug users, accounting for 57.57% of the overall infected patients. In contrast, the prevalence of HIV infection was found to be lower among married drug users, possibly due to social norms that discourage extramarital activities. Education has been a significant concern in Pakistan, particularly in the KPK region, where the literacy rate is lower compared to other provinces such as Punjab and Sindh. Consequently, the lack of education has resulted in a lack of awareness among the people in KP regarding the nature and spread of diseases such as viruses. According to *Table 2*, the literacy rate of those who contracted the virus was only 39.39%, while the majority of infected patients, accounting for approximately 61%, were illiterate. It is apparent that due to numerous social and economic pressures, individuals are turning

towards drug use, leading to a higher prevalence of HIV infection in those living in poverty. As a result, there is an increased likelihood for these drug users to contract HIV through unsafe practices. This study similarly reveals that a significant proportion of drug users who contracted HIV belong to the lower economic class with 91% of patients falling into this category; only 9% of patients belonged to the middle class and no instances were found in the higher economic class. An investigation was conducted to determine the prevalence of HIV infection among drug users (DUs) and individuals who engage in injecting drug use (IDUs). The results revealed that HIV infection is highly prevalent among IDUs, accounting for 64% of the total cases. The prevalence is also considered among DUs, with 36.3% of the total samples being infected, albeit lower than that of IDUs. The high HIV prevalence among IDUs is likely attributed to the practice of sharing the same injection for drug administration (*Table 2*).

***Table 2**. Prevelance of infection by demography.*

Category	Frequency (N)	Percentage (%)
Gender		
Male with positive	66	23.5
Male with negative	210	76.5
Female with postivie	-	-
Female with negative	4	100
Age (with positive HIV)		
1-15	-	-
16-30	46	70
31-45	16	24.24
46-60	4	5.76
Marital status (with positive HIV)		
Married	28	42.42
Unmarried	38	57.58
Literacy status (with positive HIV)		
Literate	26	39.39
Illiterate	40	60.61
Economic condition (with positive HIV)		
Poor	60	91
Medium	6	9
Drug user status (with positive HIV)		
Injecting drug user (IDU)	42	64
Drug user (DU)	24	36

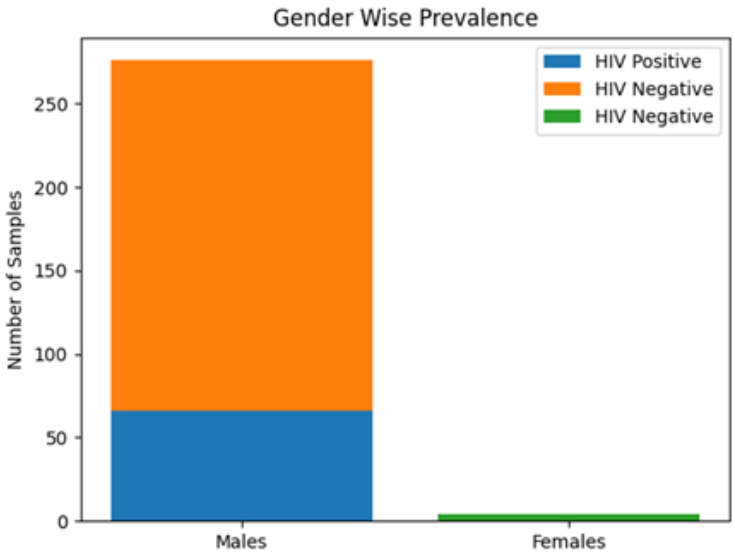

Figure 4. *Gender wise prevalence.*

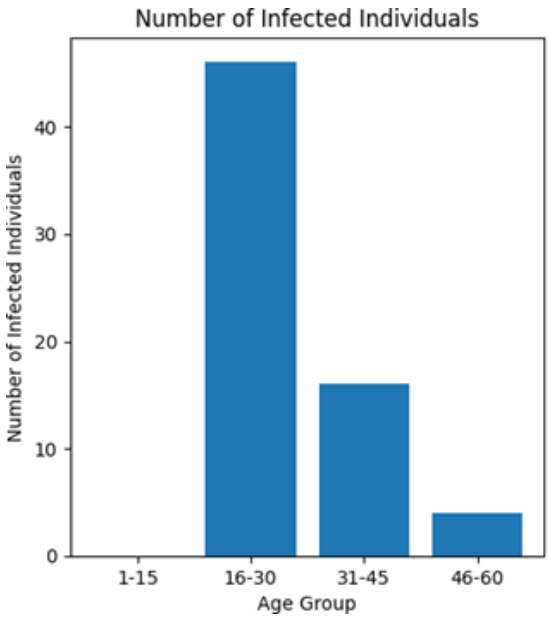

Figure 5. *Demonstrating the age-wise prevalence of HIV infection in drug addicts.*

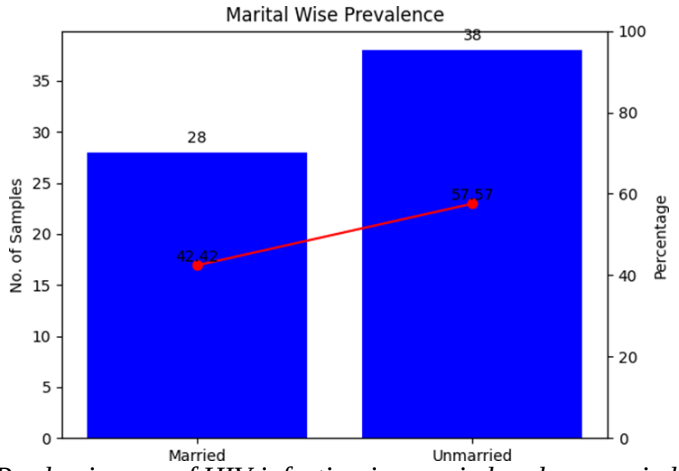

Figure 6. *Predominance of HIV infection in married and unmarried drug user.*

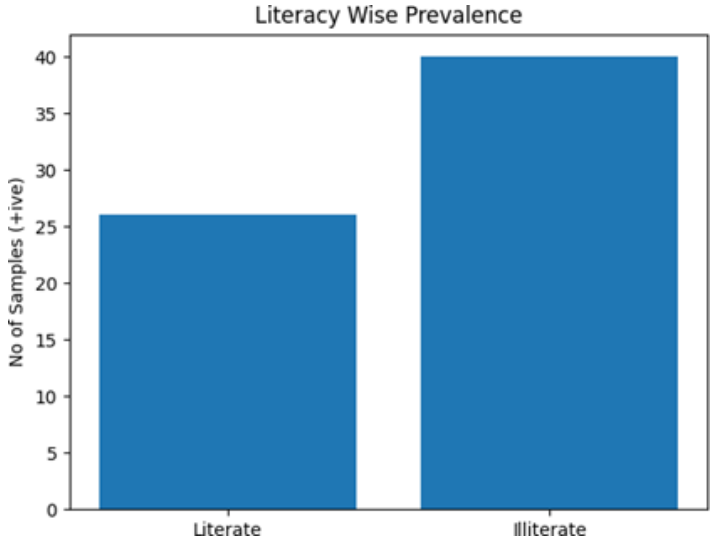

Figure 7. *Predominance of HIV infection literacy wise prevalence.*

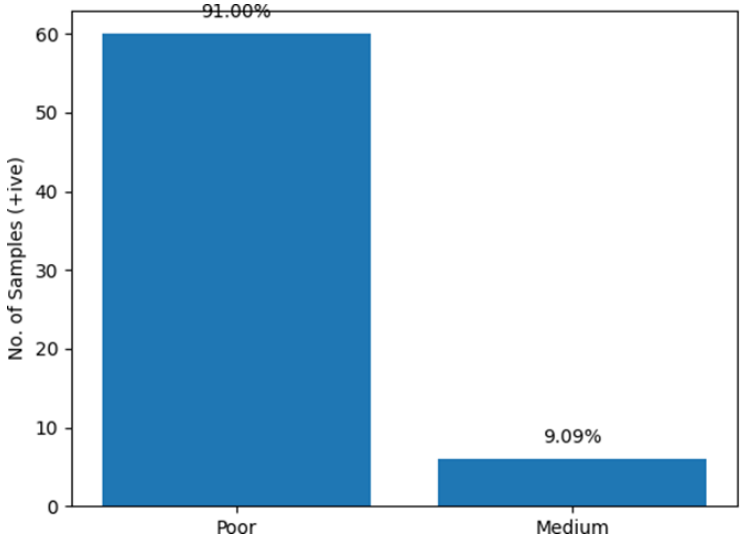

Figure 8. *Prevalence of economic condition.*

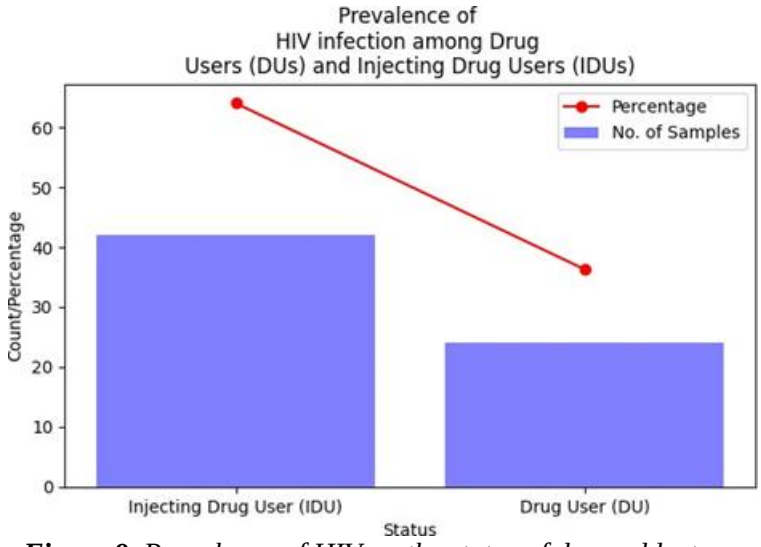

Figure 9. *Prevalence of HIV on the status of drug adductors.*

HIV is a fatal illness that impacts individuals across all risk categories, but drug users are particularly susceptible to contracting the virus. In Pakistan, it is believed that there are more than 5 million drug users, with over 15% of them being regular IDUs (St Lawrence, 1993). In our research, we gathered 280 samples from drug users and discovered that 23.5% of them had contracted HIV. The remaining 76.4% were free of the virus. This indicates a significantly higher prevalence of HIV infection among drug users than in previous studies on the topic. In recent times, there has been a noticeable trend among drug addicts of moving away from inhalable drugs and towards injectable drugs. This is thought to be linked to a reduction in the quality and accessibility of heroin. The impact of injecting drugs is typically stronger and more gratifying, causing young drug users who switch to injectables to often make it their primary method of drug consumption (Khan and Pari, 2023) same was the case in the present study. Around half of the IDUs reported by Crimi (1999). Roughly 50% of the IDUs were enrolled in a treatment program, and many of them expressed a desire to overcome their addiction but were unable to do so due to the limited availability and high cost of rehabilitation centers. The economic status of the individuals affected is also a significant factor, as many addicts cannot afford to attend rehabilitation centers due to financial difficulties. Our study found a notable number of HIV cases among drug users, consistent with four separate studies that reported a high prevalence of HIV (57% ± 17.7%) among IDUs. Low literacy rates have been a significant challenge, particularly in the Khyber Pakhtunkhwa region. Compared to Punjab and Sindh, KPK has lower literacy rates. Consequently, people in KPK have a limited understanding of the nature of viruses and how diseases spread. Among the infected samples, only 39.3% were found to be literate, while the remaining 61% were illiterate. Previously, it was reported that there was a significant lack of awareness among the population regarding the various risk factors associated with HCV (Conner et al., 2008; Kuo et al., 2006; Pollini et al., 2006). According to a survey conducted in Karachi city, it was found that even educated individuals had a poor understanding of the risk factors and transmission of HCV. The survey included participants of both genders and various educational backgrounds. The results revealed that a significant proportion of HIV-infected individuals were unmarried drug users, with 57.5% falling into this category. Interestingly, the prevalence of HIV infection among married individuals who were

drug users was found to be lower at 42.4%, potentially due to the positive influence of social activities and the discouragement of negative behaviors like drug use in the married population.

Conclusion

The analysis of 280 samples revealed that 66 (23.5%) were positive for HIV infection. Injecting drug users and males showed a higher prevalence of HIV, with 42 (64%) and 66 (23.5%) positive cases, respectively. Furthermore, the study observed significant differences in the age group, with a higher prevalence of HIV infection among individuals aged between 16 to 30; with 74 (70%) positive cases.

Acknowledgement

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Conflict of interest

The authors confirm that there is no conflict of interest involve with any parties in this research study.

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