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PREVALENCE OF AIDS IN FAMILY MEMBERS OF HIV POSITIVE PATIENTS IN DISTRICT BANNU

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Abstract

Background: The Human Immunodeficiency Virus (HIV) undermines the immune system and may advance to Acquired Immunodeficiency Syndrome (AIDS) without prompt treatment. Timely diagnosis and antiretroviral treatment are essential for illness management and enhancing patient outcomes.

Aim and Objective: This study aimed to determine the frequency of AIDS among family members of HIV-positive patients at Khalifa Gul Nawaz Hospital MTI District Bannu, using ICT and PCR protocols for diagnosis and assessing the correlation between HIV-infected individuals and their family members.

Methodology: Blood samples from 131 individuals were analyzed using the ICT method, all of which indicated HIV positivity.

Results: Among the 131 individuals, 64.9% were male, and 35.1% were female. Age-wise prevalence was highest in individuals aged 21–40 years (54.2%). Most HIV-positive females (33.6%) were homemakers, while males were predominantly drivers (26.7%), laborers (10.7%), and students (9.9%). Foreign travel history revealed 44.3% of patients had traveled abroad, mainly to UAE (22.1%) and Saudi Arabia (16.8%). Among family members, 48% of infected cases were wives of HIV-positive husbands, followed by 32.8% of infected husbands. Families with one child showed the highest infection rate (29.8%).

Conclusion: The study found a strong link between HIV prevalence and family connections, particularly among spouses of infected men and households with children. To reduce intra-family HIV transmission, targeted public health initiatives, early diagnosis, and education are needed.

Keywords: Family transmission of HIV, HIV diagnosis, ICT method

INTRODUCTION

The HIV virus attacks immune cells that have the CD4+ glycoprotein and inserts a double-stranded DNA copy of its RNA genome into the chromosome of the target cell, resulting in a long-lasting infection (1). HIV is a retrovirus that causes AIDS. HIV belongs to the Retroviridae family as Lentivirus. Using genetics and viral antigens, HIV is split into types 1 and 2. Non-human primate immunodeficiency viruses like SIV exist in Lentivirus. HIV-1 and HIV-2 evolved in SIVcpz and SIVsm Central African chimpanzees and West African sooty mangabeys. Sooty mangabeys contracted HIV-2 via more than eight SIV transmissions in an Old-World monkey (2). HIV-1 has four classifications: M, O, N, and P. Most HIV-1 infections are group M (5). Complex protein-protein interactions occur early in cell infection. Host cell CD4 receptors bind to mature HIV particle glycoprotein gp120. HIV infects T cells, macrophages, and dendritic cells that express CD4+, causing a persistent infection by inserting its RNA genome's double-stranded DNA copy (vDNA) into the target cell chromosome (3). The host cell's chromosomal-integrated vDNA (called "provirus") promotes progeny viruses throughout its lifecycle. Chronic progressors (CPs), who are most HIV-positive, make progeny viruses from proviruses. This leads to new infections and target cell death if the infection is not managed. As a result, the immune system slowly breaks down, which leads to acquired immunodeficiency syndrome (AIDS) and, finally, death (4, 5).

Three confirmed modes of HIV transmission include heterosexual and gay sexual contact, blood, and maternofetal (6). Sexual contact spreads HIV. Immunological (dendritic) cells carry the virus through the mucosa like a Trojan horse when sexually transmitted (7). Early on following infection, blood and donated organs—including bone—may spread HIV day 5–6. Before, during, and following delivery, HIV-1 can be passed from mother to child (8). Transmission is rare early in pregnancy but prevalent late and during delivery. Mother-to-child transmission has been shown as early as the 12th week, although it is most common (>90%) in the final trimester, particularly before or during birth (9).

In Pakistan, HIV/AIDS transmission is primarily heterosexual, with infected blood or blood products being the most often reported routes of transmission (10). Lack of prevalence measures and causative factors is driving HIV incidence in Pakistan up alarmingly. In 2019, 36,902 people were HIV positive, up from 4,500 in 2013 (11). The annual Pakistan National AIDS Control Program (NACP) report indicates growing HIV cases. National AIDS Control Program: 97400 HIV/AIDS cases detected. The Pakistani HIV/AIDS epidemic is well-known and growing among high-risk communities (12).

According to WHO, Pakistan has 94,000 HIV-positive people (58,000-180,000 total). There are 2,100 HIV-positive women aged 15 and up, as well as children under 14. (1,300-3,700). 2,800 people die from AIDS. Pakistan has seen an 11% increase in HIV/AIDS mortality. Pakistan had a death rate of 1.5 per 100,000, higher than Afghanistan and Iran (1 per 100,000) (13). According to WHO standards HIV testing procedures must have a sensitivity of at least 95% and a specificity of minimum 95%, (14). Increased use of antiretroviral therapy (ART) and public health efforts to reduce HIV transmission, such as needle-exchange programs and 100% condom use per sex (CUPS), have reduced new HIV cases worldwide (15).

HIV infection risks and rates may be reduced by education. Increased parental education can help to prevent children from HIV/AIDS (16). The significant rise in HIV prevalence might be attributed to a lack of knowledge and insufficient HIV protection (17). More broad and concentrated awareness programs on health education and safe injection practices are required across the country, particularly in Khyber Pakhtunkhwa (KP) (18). Exposure to improper therapeutic injections was one of the primary risk factors discovered during the 2019 epidemic in Pakistan (19). The objective of this study is to diagnose HIV patients using ICT and PCR methods.

MATERIALS AND METHODS

This cross-sectional study was conducted at Khalifa Gul Nawaz Hospital MTI Bannu (Integrated HIV hepatitis thalassemia control program) KP, Pakistan. A total of 130 patients exhibiting signs and symptoms of HIV, as evaluated by clinicians, were included. The inclusion criteria comprised HIV-positive patients confirmed by the ICT method, regardless of age, gender, or occupation, as well as their affected family members, including children. Patients without affected family members or those with negative PCR results were excluded. Blood samples (5 mL) were collected aseptically from all participants after obtaining informed written consent.

The study involved two phases: initial diagnosis using the Immunochromatographic Technique (ICT) and confirmation via Polymerase Chain Reaction (PCR). For ICT, blood samples were centrifuged at 300 rpm for 3 minutes to isolate serum, which was then tested with a rapid diagnostic device using serum and buffer solution. Results were recorded within 10–15 minutes. PCR analysis involved DNA amplification using Taq polymerase, primers, and dNTPs in a thermal cycler. The process included initial denaturation at 95°C, cycling steps (denaturation at 95°C, annealing at 60°C, and extension at 72°C), and evaluation of amplified DNA via gel electrophoresis. The study ensured rigorous adherence to diagnostic protocols for accurate detection of HIV in patients and their families.

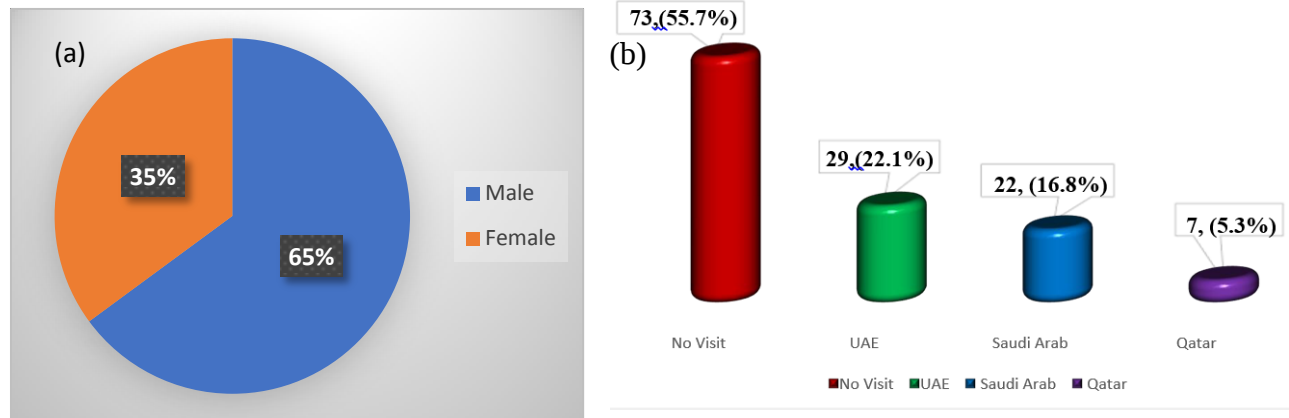
RESULTS

The age-wise distribution of HIV infection (Table. I) revealed that 8.3% of patients ranging from 1 to 20 years were found HIV positive. The prevalence of HIV was found 54.2% in the age group ranging from 21 to 40 and 37.4% in the age group ranging from 41 to 60 years.

Table I. Infection of HIV in different ages

S. no.	Frequency	Percent (%)	Valid percent (%)	Cumulative percent
1	01 to 20 Years	11	8.4	8.4%
2	21 to 40 Years	71	54.2	54.2%
3	41 to 60 Years	49	37.4	37.4%
	Total	131	100.0	100.0%

Of the 131 patients, 64.9% male patients and 35.1% female patients tested positive for HIV. (Fig. 1a). Table II revealed that 33.6% infected female were house wife, 26.7% men were driver, 10.7% were labor, 9.9% were students, 7. 6% were Shopkeepers.

**Fig. 1 (a).** Gender wise distribution of HIV infection. **(b).** Travelling history of HIV infected patients**Table II.** Occupation wise distribution of HIV infection

S. No	Occupation	Frequency	Percent (%)
1	Driver	35	26.7
2	Govt/FC	10	7.6
3	Shop keeper	10	7.6
4	Labour	14	10.7
5	House wife	44	33.6
6	student	13	9.9
7	Child	5	3.8

In this study, 55.7% patients had not visited any foreign country, 22.1% were patients who had spent time in UAE, 16.8% had spent time in Saudi Arabia and 5.3% had spent time in Qatar (Fig. 1b). A significant increase was observed in the wives (48%) of HIV infected husbands, (32.8%) in husbands only, 1.5% mothers were infected in family and 3.8% infection was observed in mother and fathers both (Table III).

Table III. Infected family member of HIV Patient

S. No	Infected member	Frequency	Percent (%)	Cumulative percent (%)
1	Husband	43	32.8	32.8
2	Wife	64	48.9	81.7
3	Mother	2	1.5	83.2
4	Mother & Father	5	3.8	87.0
5	No	17	13.0	100.0
6	Total	131	100.0	

A significant increase was observed in HIV infection in those families who had 1 (29.8%) child (Table IV). 18.3% infected patients had 2 children, 9.2% infected patients had 3 children in family and 8% had four children in the family. In this study, blood was drawn from 131 patients for the ICT method and all

tested positive (Fig. 3a). In this study, blood was drawn from 131 patients for the PCR method and 110 (87%) patients were tested positive and 16% were negative for HIV infection (Fig. 3b).

Table IV. Frequency and Percentage of Families with infected child

S. No	Families having infected children	Frequency	Percent (%)	Cumulative percent (%)
1	1 child	39	29.8	29.8
2	2 children	24	18.3	48.1
3	3 children	12	9.2	57.3
4	4 children	1	.8	58.0
5	No child	55	42.0	100.0

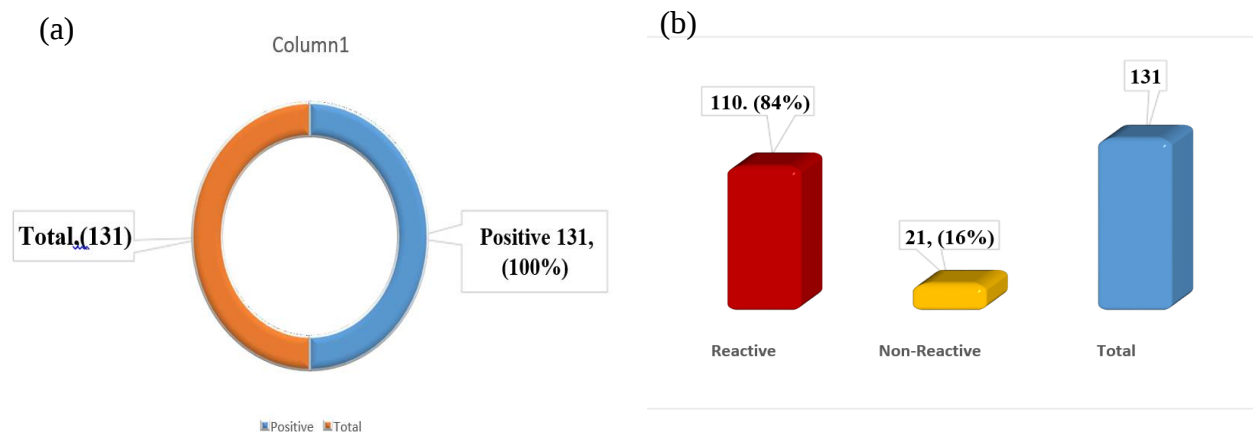


Fig. 3 (a). ICT (Immunochromatographic) individual Positive of HIV. **(b).** PCR (Polymerase chain reaction) individual Positive of HIV

Occupation, sick family members, and infected children were shown statistically significantly correlated by the chi-square. Occupation and infected family members ($\chi^2 = 79.77$, $p < 0.001$) showed a substantial correlation wherein some occupations, like drivers and housewives, had a greater frequency of HIV infection among family members. Comparably, occupation was strongly linked with infected children ($\chi^2 = 36.65$, $p < 0.001$), suggesting that parental work exposure might affect the probability of child infection. Moreover, a noteworthy correlation between affected children and family members ($\phi^2 = 48.24$, $p = 0.001$) underlines the home transmission risk.

DISCUSSION

HIV (human immunodeficiency virus) impairs human immunity, resulting in AIDS. CD4 T cells regulate both cellular and humoral immunity. HIV lowers immunity by targeting these cells. The majority of HIV infections are generated by drug injection using non-sterile needles and risky sexual contact. A lack of information on HIV/AIDS contributes to its prevalence. HIV/AIDS suppresses the immune system and causes a variety of health issues. The immune system weakens when it destroys its own cells. Other illnesses include influenza, tuberculosis, herpes, and attacks. As a result, the patient is unable to battle infections and eventually dies (20, 21).

In the December 1, 2021–March 31, 2022 research, 64.9% of men and 35.1% of women tested positive for HIV. HIV was found in 8.3% of 1–20-year-olds. The 21–40 age group had 54.2% HIV prevalence and the 41–60 age group had 37.4%. A 2014 research examined rural and urban Sawabi, Khyber Pakhtunkhwa. Approximately 200 vulnerable male and female blood samples were obtained. Starting at 18, respondents were divided into 5 age groups. 19.04% of 21 18–30-year-old samples were HIV-positive. Infection was 14.28% greater in men than women (4.76%). From 58 samples aged 31–40, 6.89% were HIV positive, with 3.44% gender equality. Only one male responder in age group 41–50 (1.69%) was HIV positive, whereas no case was recorded among respondents above 50 years (22).

Among infected women, 33.6% were housekeepers, 26.7% were drivers, 10.7% were workers, 9.9% were students, and 7.6% were merchants. 1993–2006 Ankara Numune Education and Research Hospital clinic Turkey. From 1993 to 2006, 97 HIV/AIDS patients underwent monitoring. At diagnosis, the mean age was 36 years (range, 13-71). There were seventy-two per cent of men among the patients. There was only one graduate of a university here. For 63 (72%), without social insurance, the state's basic coverage certificate reimbursed full hospital fees. The most prevalent jobs were truckers and laborers (23). Another research found that 48% of HIV-positive husbands' spouses were infected, 32.8% of husbands solely, 1.5% of moms, and 3.8% of both mothers and fathers. At Ratodero, Sindh Pakistan, 726 index consumers were found between September 2019 and February 2020. Of these 726, 106 were adults and 621 youngsters. The index contacts 463 mothers, 404 dads, and 1392 siblings who had never been HIV-tested. Seven moms (1.7%) and 22 siblings (2.0%) of 1766 clients were HIV positive. Of the siblings, 11 were male and 11 female. None of the dads had HIV. HIV positive was 1.6% (29/1766) (24).

Another study looked at 420 HIV-positive moms who gave birth in health facilities in the Musanze area between January 2019 and December 2020, along with their babies. Most of the moms who had HIV (52.1%) were between the ages of 30 and 39. Over 420 moms with HIV had children between the ages of 18 and 24 months, and 55.2% of them were girls. Eighty-two per cent of the women in the study who had HIV were married, 85.5% had only finished elementary school, and 86.5% had part-time jobs (25).

CONCLUSION

The research revealed an elevated occurrence of *HIV* diagnoses in males, with notably heightened rates in persons between the ages of 21 and 40. A notable proportion of *HIV* infections were detected among homemakers, and a considerable number of the infected persons had previously resided in the UAE. Among family members, the incidence of *HIV* infection was particularly high among wives of men who were infected. In addition, the research found a significant prevalence of *HIV* infection in households with at least one infected child.

Limitations:

Due to its limited sample size, this study may not be generalizable to the general population. The study used self-reported travel and job histories, which might skew remembering. Cross-sectional designs prohibit causal linkages between job, family transmission, and HIV infection. Long-term study with larger samples is needed to corroborate these findings.

Conflict of Interest:

The authors have no conflict of interest.

Funding:

This study did not receive funding from any individual or organization.

Ethical Approval:

All examinations were preceded as a piece of routine clinical consideration with no requirement for independent educated assent.

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