

*Research Paper*

## **Incidence of HIV/AIDS in Healthy Blood Donors of Khyber Pakhtunkhwa, Pakistan**

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(Received: 20-3-14; Accepted: 15-5-14)

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**Abstract:** *Human immunodeficiency virus (HIV), among the top death causing infections, like elsewhere is a serious growing concern in Pakistan. HIV is spreading dramatically fast in areas with low awareness about the infection. The current study was conducted to determine the prevalence of HIV infection in apparently healthy blood donors of Khyber Pakhtunkhwa. A total of 6000 apparently healthy blood donors belonging to different regions of Khyber Pakhtunkhwa, were initially screened for anti-HIV antibodies which showed 0.13% (8/6000) prevalence. The infected samples were subjected to PCR analysis that confirmed HIV infection in all 8 anti-HIV positive blood donors. Out of positive samples 87.5% (7/8) were males while 12.5% (1/8) were females while the age group 20-40 years was found to have high HIV prevalence.*

**Keywords:** HIV, AIDS, Blood Donors, Prevalence, Khyber Pakhtunkhwa, Pakistan.

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### **1. Introduction:**

Human immunodeficiency virus (HIV), RNA virus of the family *Retroviridae* is the causative agent of the incurable diseases known as Acquired immunodeficiency syndrome (AIDS) (Gruters et al. 1987). It is one of the top ten lethal infectious diseases (Alter, 2006) with about 40 million infections worldwide (Alter, 2006). More than 68% of the HIV infected people belongs to sub-Saharan Africa,

housing only 12% of the world's population (UNAIDS, 2011). According to the National Aids Control Program, about 100,000 Pakistanis are living with AIDS (UNAIDS, 2008). Due to the fact that most HIV patients are not aware of being infected and other social problems, the number of HIV infectees is most likely an underestimate (Murphy and Nathanson, 1994).

HIV targets human immune system i.e. human lymphocytes and monocytes (Gruters, et al. 1987, Wei et al. 1995). The viral genome upon entry into the host cell is converted into double stranded DNA by the action of reverse transcriptase enzyme. The integrase enzyme then imports the DNA into the nucleus and integrates it into the cellular DNA (Coiras et al., 2009). The HIV infection has three stages namely acute, latency and AIDS. The time period of acute infection is several weeks and may include symptoms such as mild temperature, lymphadenopathy, swollen lymph nodes, muscle pain, malaise, mouth and esophageal sores. The time period of latency stage can last anywhere from two weeks to twenty years and have few or no symptoms. The last stage depends on the individual immune system if the CD4 count is lower than 200 then is called AIDS (UNAIDS, 2008).

In Khyber Pakhtunkhwa prevalence of HIV/AIDS in the common population is still below 0.1% and the probable load of syndrome is still not very noteworthy. However, recent surveillance studies in the province specify that the epidemic has started its progress in the High Risk Groups (HRGs). A rigorous pandemic has been observed in Injecting Drug Users (IDUs) with a prevalence of 13%, as in other parts of Pakistan (UNAIDS, 2008) with the potential to spread into other groups such as men having Sex with Men (MSM) and Commercial Sex Workers (CSW). The heterogeneity and interlacing of injecting drug use and sexual behaviour, combined with low levels of HIV knowledge and safe sexual practices and high levels of other sexually transmitted infections (STIs), indicate that there is a potential for a rapid spread of HIV into the general population through the interlinking population (Castro et al., 1993).

The weakness of the immune system does not usually cause death but instead leave the body unable of combating normally benign pathogens. Some opportunistic illness result from organisms across a wide range, including: protozoa, fungi, bacteria and other viruses, which make use of the body's devastated immune system (Holtgrave, 2007). Opportunistic infections have an effect on multiple regions of the body such as the pulmonary, gastro-intestinal and neurological systems. The types of opportunistic diseases that are most prevalent in a population depend on the region; for example, HBV has a high incidence rate among HIV positive individual in Khyber Pakhtunkhwa, Pakistan. Similarly tuberculosis has an extremely high incidence rate among HIV-positive individuals in many KPK areas whereas it is relatively rare in the US (Khan et al., 2010). The consideration of these secondary infections is vital in overall treatment, because these opportunistic diseases directly kill individuals with AIDS.

## **2. Materials and Methods / Definitions and Preliminaries:**

### **Approval from Ethical Committee:**

The study was approved by the ethical committee of Institute of Biotechnology and Genetic Engineering, Peshawar. All the volunteer participants were properly briefed prior to enrolment into the study, only willing blood donors were included in the study.

### **Sampling:**

A total of 7600 volunteer blood donors of 3 major government hospitals of Peshawar i.e. Lady reading hospital (LRH), Khyber teaching hospital (KTH) and Hayatabad Medical Complex (HMC) and blood donation camps, were offered to participate in the study, 78.94% (6000/7600) of the whom

agreed to voluntarily participate in the study. The volunteers belonged to different regions of Khyber Pakhtunkhwa.

### **Immuno-Chromatographic Tests (ICT):**

Blood sera of 6000 volunteer blood donors were screened for HIV sero-positivity using ACON HIV 1/2 Human Immuno deficiency Virus Ultra Rapid Test Device (ACON® Laboratories).

### **Enzyme Linked Immune-Sorbent Assay (ELISA):**

To confirm the seropositivity of the samples, the ICT positive samples were analyzed using HIV gp120 enzyme-linked immunosorbent assay (ELISA; Advanced BioScience Laboratories).

### **PCR Analysis:**

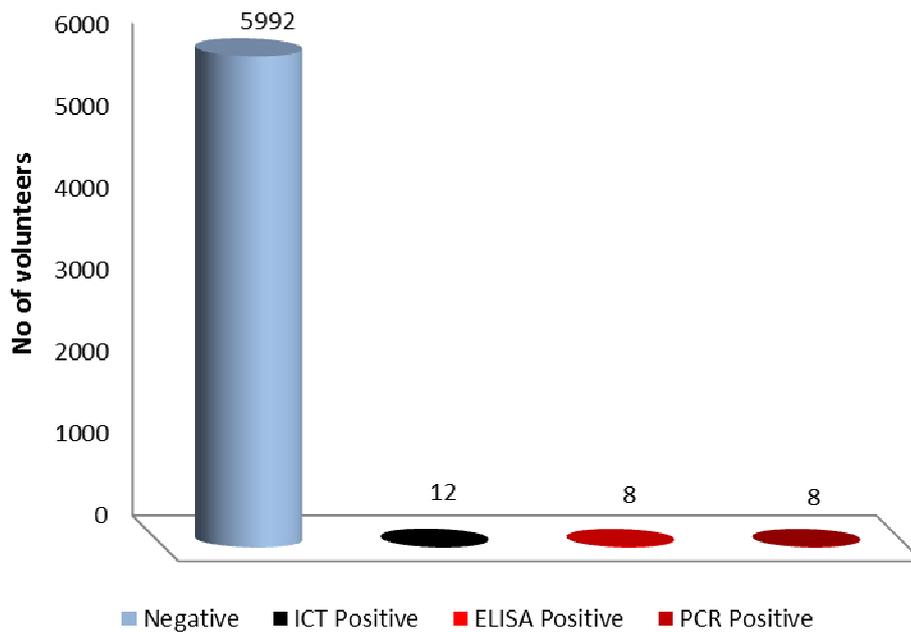
The confirmed serologically positive samples were then subjected to real time PCR analysis using Plasma/Serum HIV RT-PCR Detection Kit (Norgen Biotek Corp, Canada) according to the manufacturer's instructions. Positive and negative controls were incorporated in every step.

## **3. Results and Discussion:**

Since its recognition in 1981 (Greene, 2007), the incurable Acquired immune deficiency syndrome (AIDS) has quickly become a global issue of prime importance. Millions of people are infected by the deadly HIV, the sole causative agent of AIDS. Infections have been reported from general populations (Qian et al., 2005) as well as every group of individuals including health staff (Sheng and Cao 2008), blood donors (Choudhury et al., 2000; Khattak et al., 2002; Sheng and Cao, 2008), sexual workers (Sherman, 2003; Baral et al., 2010; Morineau et al., 2011; Mishra et al., 2013), client of sex workers (Jin et al., 2010) and Injection drug users (IDUs) from all over the world (Kottiri et al., 2002; Sherman, 2003).

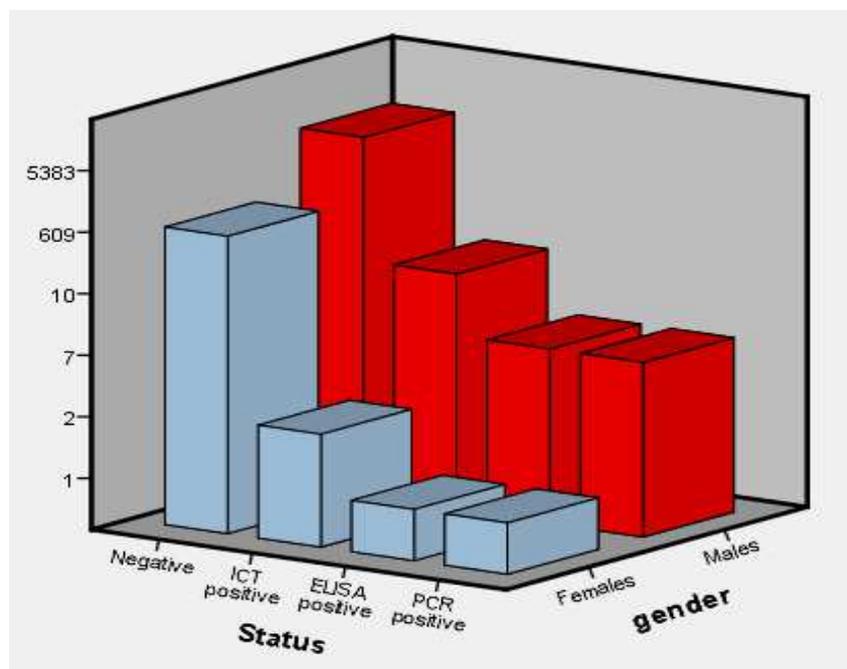
Pakistan is the sixth most populated country of the world with a population of above 176 million. It has four provinces Punjab, Sindh, Khyber Pakhtunkhwa and Balochistan. HIV was first reported in Pakistan in 1987 (Abdul and Hashmi, 1988; Khanani et al., 1988; Baqi et al., 1999). In Pakistan, prevalence of HIV has been reported in general population and different risk groups. In general population HIV prevalence was reported to be 0.04% (Singh et al., 2013). While in high risk groups, IDUs are considered the high risk group with 20% incidence rate (Brown and Peerapatanapokin, 2004; Burki, 2008). The spread of HIV in IDUs is believed to have occurred lately as there were no reports of HIV in IDUs till 2003 (Emmanuel et al., 2004; Haque et al., 2004; Burki, 2008). In sex workers, HIV prevalence was about 1.5% and 1% of taxi and truck drivers are reported to have HIV infection. While prevalence in healthy blood donors has been reported between 0 to 0.06% till 2005 (Sultan et al., 2007; Khan et al., 2010).

Out of the 6000 patient's sera samples collected for this study, we found 0.2% (12/6000) HIV prevalence in the healthy blood donors of KPK using Immuno-chromatographic tests. Upon confirmation with ELISA, only 0.13% (8/6000) of the total samples were found positive. However, PCR analysis confirmed positivity of all 8 (0.13%) ELISA positive samples. While 99.86% (5992/6000) were found to be negative for HIV specific antibodies (figure 1).



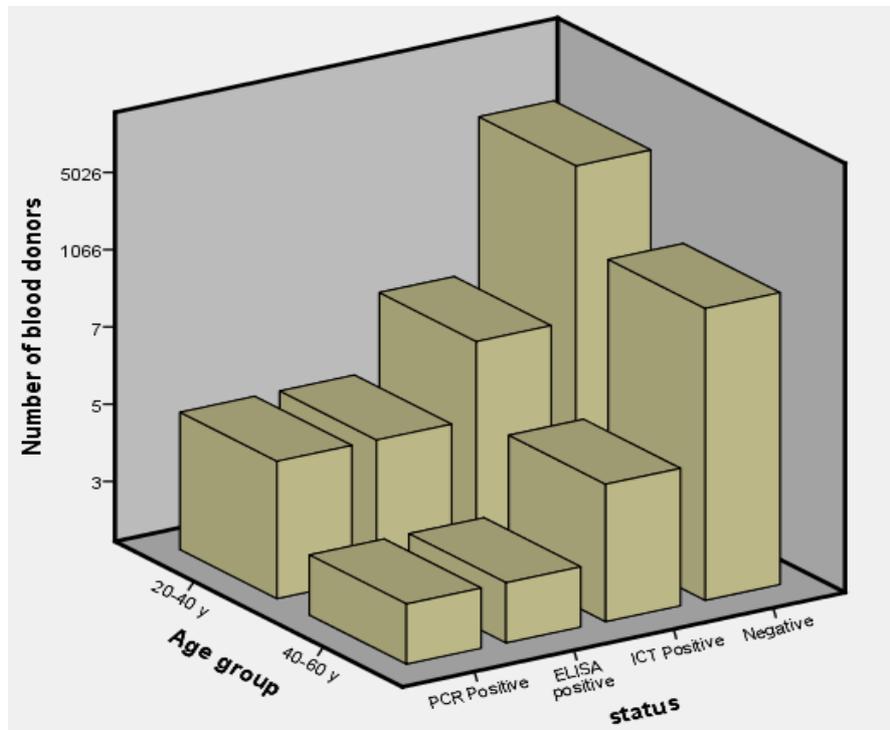
**Figure 1:** Showing the proportion of HIV negative blood donors along with the ICT, ELISA and PCR positive blood donors

The incidence of HIV was recorded to be low in the female blood donors of KPK, as only 2 females were found to be infected while in males the frequency of HIV infection was much higher as shown in figure 2. HIV infection is higher in females as compared to males in KPK because of the fact that females are mostly confined to their homes and hence relatively less vulnerable to HIV infection.



**Figure 2:** Showing the gender based prevalence of HIV infection in blood donors of KPK, HIV prevalence is higher in males as compared to females.

The volunteers were divided into two age groups i.e. from 20 to 40 years and 40 to 60 years. The prevalence of HIV was higher in the more juvenile group i.e. in the volunteers with an age of less than 40 years (7/12) as compared to the aged blood donors (5/12).



**Figure 3:** Showing HIV prevalence in different age groups of the blood donors of KPK; blood donors of the age group 20-40 years showed higher prevalence than the age group of 40-60 years

Over all 6 male and one female blood donors of the first age group (20-40 years) were found to be ICT positive while 4 male and one female volunteers of the second age group (40-60 years) were also found to have HIV specific antibodies as shown in table 1.

**Table 1:** Showing HIV prevalence in males and females of the defined two age groups

Age group and gender		ICT positive	ELISA positive	PCR positive
20-40 y	Males	6	4	4
	Females	1	1	1
40-60 y	Males	4	3	3
	Females	1	0	0
<b>Total</b>		<b>12</b>	<b>8</b>	<b>8</b>

Situation is worse by the recent catastrophic acts of terrorism along with a significant reduction in external funding and a decreasing donor focus on HIV specific support since 2010–11 that affected the anti HIV campaigns in Pakistan (Singh et al., 2013). Poverty, sexual risk, low HIV awareness and illiteracy are contributing to the increase in HIV spread in Pakistan (Khan et al., 2010).

Khyber Pakhtunkhwa has a low literacy rate as compared to other provinces of Pakistan that's why people have social phobia about HIV and AIDS. As HIV is correlated to sexual activities, the infectees fear of being considered sinful. As a result of this social phobia, a significant number of people refused to be a part of this study. To address these complicated issues, awareness among the local communities is extremely important.

#### 4. Conclusions:

HIV is on the rise in Pakistan, certain risk factors such as individual injection drug use, poverty, illegal sexual relations, low HIV awareness, illiteracy are contributing to its spread in Pakistan. To forfend future threat of HIV infections, sterilization and screening procedures must be made mandatory on government and public sector health care units. Blood transfusion should be made safe by hiring well trained Blood bank staff, well aware of the potential threads in dealing with apparently healthy looking blood donors. Due to lack of awareness, social and psychological complexes, many blood donors refused to be screened for HIV. Keeping in mind this refusal, one should expect that the actual numbers of HIV infections might be much higher than those reported as in KPK's social setup HIV infected don't want to be exposed. Awareness should be created that HIV infected person can still be and should be a respectable individual of the society.

#### Acknowledgements

Authors highly acknowledge the support of Directorate of Science and Technology (DoST) and National AIDS Control Program Pakistan

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