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Original Research Article

To Study the Prevalence of Human Immunodeficiency Virus in Donors Attending Blood Bank in a Tertiary Care Hospital, Hapur, Uttar Pradesh

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Abstract:

Introduction: In the current scenario, HIV itself is a major health problem with extreme social and economic association, though India got its first case far much later as compare to other parts of the world. HIV can be transmitted through different routes like anal or vaginal sex without condom, having sexually transmitted infection such as Herpes, Syphilis, Gonorrhea etc, use of alcohol or drugs, by using contaminated needles, syringes etc for injecting drugs or any accidental needle stick injury, but transfusion of contaminated blood is one of the main route of transmission. With the upcoming latest and effective treatment and prevention programs globally, a new ray of hope has lightened in global aids epidemic. NACO has increased access to services and productive connection for behavior changes, thus leading to vast challenge of HIV threat.

Aim and objective: The main objective of our study is to determine the overall prevalence of HIV infection among blood donors attending blood bank in SIMS, Hapur, UP.

Materials and method: The duration of the study was for a period of one year i.e. from February 2023 to January 2024. Total numbers of donors taken for this study were 1456. We included immunocompetent donors of 16-60 years of age. Rapid immunochromatographic kits were used to screen the donors followed by ELISA test in blood bank for the confirmation.

Result: A total of 1456 donors were screened for HIV infection, where we documented 03 positive cases with overall prevalence of 0.20%. Male dominance (0.20%) was observed as compared to female. Higher HIV infection incidence was observed in Pilakhua followed by Hapur.

Conclusion: HIV prevalence of 0.20% among blood donors has alarmed a need to spread the public awareness, diligent donor selection and screening with newer techniques.

Keywords: HIV, Prevalence, Blood Donor Screening, Immunochromatographic Kit, ELISA.

Introduction

Human Immunodeficiency Virus (HIV) is responsible for the destruction and impairment of immune cells leading to detoriation of immune system ultimately causing Acquired Immuno Deficiency Syndrome (AIDS). Though HIV can be transmitted through different routes like anal or vaginal sex without condom, having sexually transmitted infection such as Herpes, Syphilis, Gonorrhea etc, use of alcohol or drugs, by using contaminated needles, syringes etc for injecting drugs or any accidental needle stick injury, but transfusion of contaminated blood is one of the main route of transmission. [1]

In the current scenario, HIV itself is a major health problem with extreme social and economic association, though India got its first case far much later as compare to the other parts of the world. People with HIV positive can result in disgrace like insulted, gossiped, fear, attitude of negativity, rejected and neglected from social life. [2] In 2023, WHO has defined Advanced HIV Disease (AHD) as CD4 cell count is <200 cells/mm3 in adults and

adolescents. Also, children less than five years of age with HIV are considered to have AHD. At the end of year 2023, 39.9 million people were HIV infected in which 1.4 million were children and adults usually more than 15 years old were 38.6 million. [1]

According to National Aids Control Organization (NACO), 3.14 million people were infected with HIV in India in 2023. [3] In spite of being third-highest prevalent country; AIDS prevalence rate is much lower than many other countries. [4] With the upcoming latest and effective treatment and prevention programs globally, a new ray of hope has lightened in global aids epidemic. [5-7] NACO has increased access to the services and productive connection for behavior changes, thus leading to vast challenge of HIV threat. [1] The numbers of free antiretroviral treatment centers have been increased by NACO from 54 to 91 centers, and all these centers are comprised of trained doctors, counselors, and lab technicians where they initiate antiretroviral treatment and follow-up care with confidentiality of the patient. [8]

Material & Methods

Study setting: Study carried out in Blood bank, Saraswathi Institute of Medical Sciences (SIMS), Hapur, UP.

Study Design and source: This was the retrospective study and the data were collected from voluntary and replacement donors in the hospital.

Study Period: Data were collected from February 2023 to January 2024 in a period of one year.

Study Population: Donors of the 16 to 60 year old age group of both genders were included in the study.

Sample Size: Total numbers of blood donors taken for this study were 1456.

Consent from blood donors- pre and post counseling for HIV testing done.

Criteria for selection of study group:

Inclusion Criteria: In our study, immunocompetent donors of the 16 to 60 year old age were included. All voluntary and replacement donors who arrived in the hospital were investigated.

Exclusion Criteria: Our aim of the study was to eliminate professional donors, donors with co-morbidities, drug abusers, truck drivers, sex workers, IV drug users, under malnutrition donors and pregnant females. Careful clinical examination and the history were taken.

Sampling methods: For the screening of HIV, rapid immunochromatographic kit (HIV TRI-DOT) was used followed by confirmation by a specific ELISA test (fourth generation Microlisa-HIV Ag & Ab) in the blood bank.

Protocol of HIV TRI-DOT: Immobilization on a porous immunofiltration membrane of HIV was done. Reagents and samples were absorbed into the underlying adsorbent. If HIV antibodies were present in the patient's sample, they binded to the immobobilised antigens and against the white background pinkish-purple dots appeared when the conjugate binded to the Fc portion of the HIV antibodies.

Protocol of Microlisa-HIV Ag & Ab: It is based on "Sandwich ELISA". gp41, gp120 for HIV-1 and gp36 for HIV-2 represented immunodominant epitopes and anti-HIV-1 p24 antibodies were coated in wells. Controls along with samples were added into the wells and incubated. Binding of HIV-1 and HIV-2 antigens to their antibodies was observed onto the surface of the wells. Horseradish peroxidase (HRP) conjugated gp41, gp120 for HIV-1 and gp36 for HIV-2 and anti-HIV-1 p24 antibodies were added to each well. This conjugate binded to HIV antigen-antibody or anti-p24 antibody-antigen complex. Chromogen and hydrogen peroxide were added to the wells and incubated. A blue color reaction was developed in the positive specimen which was stopped by stop solution.

At a wavelength of 450 nm this color reaction was read by EIA reader for absorbance.

Statistical Analysis: Data was entered in to Microsoft excel sheet and analyzed using SPSS Software 22.0. Categorical data was expressed into the form of proportions and percentages.

Result

A total of 1456 blood donors were reviewed within a period of one year from Feb 2023 to January 2024. Out of 1456, 3 donors were positive. Age group 16-30 consisted of two cases followed by one case that belonged to 31-45 years of the age group. (Table-1) In our study, total 1181 were males and 275 were females. 3 males were positive, while zero positivity for females was observed in each age group. (Table-2) Table-3 describes the area-wise distribution of HIV infection among blood donors in different cities of western Uttar Pradesh namely, Anwarpur, Baghpat, Bijnor, Bulandshahar, Ghaziabad, Garh, Hapur, Meerut, Pilakhua and Noida. Out of these cities, 02 positive cases were from Pilakhua and 01 from Hapur.

Table 1: Prevalence of HIV infection among blood donors.

Age Group (In Years)	Total Cases(N)	Positive Cases Of HIV (N)	Prevalence Of HIV (%)
16-30	812	02	0.14
31-45	572	01	0.06
46-60	72	00	00
Total	1456	03	0.20

Table 2: Gender wise distribution of HIV infection among blood donors.

Age Group (In Years)	Male Donors	Female Donors	Positive Male Donors	Positive Female Donors
16-30	677	135	02	00
31-45	440	132	01	00
46-60	64	08	00	00
	1181 (81.11%)	275 (18.88%)	03 (0.20%)	00

Table 3: Area-wise distribution of HIV infection among blood donors.

Area	Age Group (in years)			Positive Donors
	16-30	31-45	46-60	
Anwarpur	30	20	00	00
Baghpat	10	16	00	00
Bijnor	00	02	00	00
Bulandshshar	70	23	16	00
Ghaziabad	111	72	10	00
Garh	02	00	00	00
Hapur	333	263	12	**01**
Meerut	18	14	00	00
Pilakhua	218	160	30	**02**
Noida	20	12	04	00

Discussion

Blood and blood components transfusion save millions of patient's lives worldwide. Though plenty of strategies have been implicated to prevent the spread of blood-borne infections but HIV transmission still occurs. Time to time epidemiological evaluation of HIV infection allows us to provide safety and education in context of blood donation. In India, there is lack of awareness of screening and testing among blood donors as compared to other developed nations where there is improved quality of screening and testing. Our study has recorded the prevalence of HIV infection among blood donors in SIMS, Hapur, UP. The overall prevalence of HIV infection in a one- year study was 0.20% among blood donors which is comparable to the study of Inderjeet Singh et. al from Haryana. [9] Similar observations were documented by Chandra T et.al from UP with sero positivity ranging from 0.03% to 0.27%. [10]

The overall prevalence of HIV infection in blood donors in other studies like Mandal R et.al- 2.93%, Karmakar et al- 2.79% and Sanjay C Chaudhary et al- 2.12% which was far much higher than our observation. [11-13] Our present study included males (81.11%) as the main donor population instead of females (18.88%) which simulates the findings observed in other studies by Chavan S K and Chavan K V who observed males (97.3%) and females (2.7%). [14] Male predominance was also documented by Kalpana SR et.al and Barla N et.al. [15,16]

The limitation of our study was that the majority of the donor population was males as compared to females, so prevalence cannot be generalized.

Conclusion

In our retrospective study, the overall prevalence of HIV infection among blood donors in SIMS was 0.20%. We observed male dominance over female especially in the age group of 16 to 30 years. So this age group, consisting of the majority of male positivity, should be focused on the prevalence of HIV transmission. So, to minimize HIV prevalence, awareness and educational programs of the transmission of blood-borne infections should be carried out. Periodic screening of blood donors for the blood borne infection is also important to prevent the carrier stage.

Ethical Clearance: taken with reference number-SIMS/FMT/ETHI/34/2024.

Limitation of the Study: The data reported by the blood donors could be distorted due to social taboo or recollect fallacy.

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