

Prevalence of Some Transfusion Transmissible Viral Infections among Blood Donors in Federal Medical Centre, Owerri, Nigeria

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ABSTRACT

Background: Blood transfusion is an integral part of medical care and treatment. Transfusion-transmissible viral infections, such as hepatitis B (HBV) hepatitis C (HCV) and human immunodeficiency virus (HIV), remain major public health problems in developing countries. The prevalence of these viral infections among blood donors may reflect the burden of these diseases among the general population. **Aim and Objectives:** The aim of this study was to determine the prevalence of some transfusion-transmissible viral infections among blood donors at the Federal Medical Centre, Owerri, Nigeria. The objectives include; determining the age and gender-related prevalence of transfusion transmissible viral infections among blood donors. **Methodology:** A Prospective cross-sectional study was carried out during the period of August-October, 2019. The study group consisted of blood donors who donated blood to the blood transfusion unit of Federal Medical Centre, Owerri. A total of 150 blood donors were recruited for the study. Questionnaires were used to collect relevant demographic data. Blood samples were collected and screened for the presence of HBV, HCV, Syphilis (VDRL) and HIV I & II. Data generated were analyzed using Chi-square statistical method and the variables were considered significant at $p < 0.05$. **Results:** Out of the 150 subjects screened for HBV, 31 (20.7%) were positive, while 119 (79.3%) were negative, 7 (4.7%) were positive for syphilis, while 143 (95.3%) were negative. For HIV I & II, 40 (26.7%) were positive, while 110 (73.3%) were negative. **Conclusion:** The study has shown that the relatively high prevalence of transfusion transmissible infections poses a greater threat to blood safety. Therefore, there is need for proper screening of blood donors using standard techniques before transfusion, and strict adherence to selection criteria should be employed to prevent adverse outcome in the recipient.

Key words: Prevalence, HBV, HCV, Syphilis, HIV, Blood donors

INTRODUCTION

Blood transfusion is an important therapeutic intervention that has a critical role in patient management (1, 2, and 3). Nonetheless, availability of safe blood products is still a significant public health concern in sub-Saharan Africa (SSA). This phenomenon is driven by a range of over-arching factors, including endemicity of infections associated with anaemia, high prevalence of sickle cell anaemia, blood loss

linked to accidents, surgical and/or obstetrical emergencies and malnutrition among others (4, 5, and 6). Despite the existence of World Health Organization (WHO) approved national hemovigilance protocols in most countries in the region, blood transfusion continues to carry a certain margin of risk for both patients and healthcare workers (4).

Transfusion Transmissible Infections (TTIs) are viruses, parasites or other pathogens that can be transmitted in donated

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blood through a transfusion to a recipient (WHO, 2012). Hypersensitivity reactions and direct or residual risk associated with a spectrum of TTIs e.g Human Immunodeficiency Virus (HIV), Hepatitis B Virus (HBV), Hepatitis C virus (HCV) and syphilis-causing *Treponemapallidium* (*T. pallidium*) are the major concerns (4). Overall, the reported proportions of TTIs in Nigeria are much higher than in industrialized countries(6).

JUSTIFICATION

Blood transfusion is an integral part of medical care and treatment. Adequate safe and timely given transfusion save millions of life. However, unsafe transfusion leads to many life-threatening complications and increases the possibility of TTIs (5). Unsafe transfusions are costly from both human and economic points of view and lead to high morbidity and mortality (7). Most common TTIs are HIV, HBV, HCV, Syphilis and malaria. An effective donor screening tests and effective discarding techniques for reactive units can ensure a reduction in the risk of acquiring TTIs (6).

MATERIALS AND METHODS

- This research was a cross-sectional study carried out at the blood transfusion unit of Federal Medical Centre, Owerri Imo state, Nigeria. Institution ethical approval for the study was obtained and individual consent bought for.

- A total of 150 apparently healthy blood donors within the ages of 18-55 years were recruited for the study.

Sample Collection

Five milliliters (5ml) of venous blood was collected from the antecubital vein of each donor with minimal stasis by means of a hypodermic syringe and needle. The blood was allowed to retract and then centrifuged at 1500 rpm to obtain the sera which were stored at 20°C until tested. These blood samples were then screened for the presence of HBV, HCV, Syphilis and HIV 1 and 11 using test strip methods and recombinant HIV I & II test strip and Uni-Gold method for HIV.

Statistical Analysis

All data collected were analyzed in statistical package for social sciences (SPSS) and results were expressed in percentage frequency. P value <0.05 was considered to be statistically significant.

RESULTS

Table 1 shows the prevalence of HBV, HCV, Syphilis and HIV among blood donors.

There was a statistically significant decrease in the number of donors that tested positive for HBV, 31(20.7%), HCV,

14 (9.3%), Syphilis, 7(4.7%), and HIV, 40 (26.7%) when compared to those that tested negative; HBV, 119 (79.3%), HCV, 136 (90.7%), Syphilis, 143(95.3%) and HIV, 110 (73.3%) (P < 0.001).

Table 1. Prevalence of HBV, HCV, Syphilis and HIV among blood donors.

| Variable | No | Positive | Negative | X ² | P-value |
|------------|-----|------------|-------------|----------------|---------|
| HBsAg | 150 | 31(20.7%), | 119(79.3%), | 54.00 | <0.001* |
| HCV | 150 | 14(9.3)% | 136 (90.7%) | 34.00 | <0.001* |
| Syphilis | 150 | 7(4.7%) | 143(95.3%) | 24.00 | <0.001* |
| HIV I & II | 150 | 40(26.7%) | 110(73.3%) | 32.67 | <0.001* |

* - p values <0.05 were considered significant,

X²– mean

HBV – Hepatitis B Virus

HCV – Hepatitis C Virus

HIV I & II – Human Immunodeficiency Virus I & II

Table 2 shows the prevalence of HBV, HCV, Syphilis and HIV among blood donors according to age.

For HBV, the age group 18-28 years was found to have a statistically significant high prevalence (14.0%) when compared to those within the age range of 29-39(5.3%) and 40-50(1.3%)(P<0.001).

For HCV, age group 18-28 years had the highest prevalence (5.3%) when compared to age groups 29-39(2.7%) and 40-50(1.3%) (P<0.001). The age group 29-39 years had the highest prevalence (4.0%) when compared to age groups 18-28years (0%) and 40-50years (0.7%) (P<0.001) for syphilis, while for HIV I & II, age group 18-28years (17.3%) was found to have the highest prevalence when compared to age groups 29-39 years(6.0%) and 40-50years (3.3%) (P<0.001).

Table 2. Prevalence of HBV, HCV, Syphilis and HIV among blood donors according to age.

| Age - Range(Years) | No | HBV | | x ² | p – Value |
|--------------------|-----|-----------|------------|----------------|-----------|
| | | Positive | Negative | | |
| 18 – 28 | 88 | 21(14%) | 67(44.7%) | 153.12 | <0.001* |
| 29 -39 | 46 | 8(5.3%) | 38(25.3%) | | |
| 40 – 50 | 16 | 2(1.3%) | 14(9.3%) | | |
| Total | 150 | 31(20.6%) | 119(79.3%) | | |
| HCV | | | | | |
| | | Positive | Negative | | |
| 18 – 28 | 88 | 8(5.3%) | 80(53.3%) | 154.59 | <0.001* |
| 29 -39 | 46 | 4(2.7%) | 42(28.0%) | | |
| 40 – 50 | 16 | 2(1.3%) | 14(9.3%) | | |
| Total | 150 | 14(9.3%) | 136(79.3%) | | |

| SYPHILIS | | | | | |
|----------|-----|-----------|------------|--------|---------|
| | | Positive | Negative | | |
| 18 – 28 | 88 | 0(0%) | 88(58.7%) | 140.11 | <0.001* |
| 29 -39 | 46 | 6(4.0%) | 40(26.7%) | | |
| 40 – 50 | 16 | 1(0.7%) | 15(10.0%) | | |
| Total | 150 | 7(4.7%) | 143(95.3%) | | |
| HIV I&II | | | | | |
| | | Positive | Negative | | |
| 18 – 28 | 88 | 26(17.3%) | 62(41.3%) | 154.76 | <0.001* |
| 29 -39 | 46 | 9(6.0%) | 37(24.7%) | | |
| 40 – 50 | 16 | 5(3.3%) | 11(7.3%) | | |
| Total | 150 | 40(26.7%) | 110(73.3%) | | |

| HIV 1 & 11 | | | | | |
|------------|-----|-----------|------------|--------|---------|
| | | Positive | Negative | | |
| Male | 96 | 26(17.3%) | 70(46.7%) | 158.11 | <0.001* |
| Female | 54 | 14(9.3%) | 40(26.7%) | | |
| Total | 150 | 40(26.7%) | 110(73.3%) | | |

*- significant
 HBV– Hepatitis B Virus
 HCV – Hepatitis C Virus
 HIV – Human Immunodeficiency Virus

DISCUSSION

Blood transfusion is considered to be a potential risk factor for the transmission of viruses such as HBV, HCV, Syphilis and HIV, which are life-threatening and global public health problems (8, 9, and 10).

In this present study, the prevalence of HBV was 20.7%. This is high compared to 8.1% obtained in Nigeria by Hepatitis B advocates (11, 12, and 13). (7), showed a prevalence of 18.6%. (15) Reported a prevalence of 14.0%. (14), Reported a prevalence of 5.8% in Ethiopia.

This study has shown a prevalence of 9.3% for HCV. (16), showed a prevalence of 0.7% in Abuja, Nigeria. The possible explanation for the variation in the magnitude of HCV infections across studies might be due to differences in risk behaviors across different geographical locations and differences in socio-cultural practices (17, 18).

Cultural practices such as tattooing and sharing of contaminated materials such as needles are common among uneducated people (19). These practices could increase the risk of being infected with HCV. Donors that are employed were more infected than student donors (20), and this might be attributed to occupational injuries, such as needle sticks in health care setting (21, 22).

The sero-prevalence of HIV in this study was 26.7%. This is similar to the result obtained from the Nigeria demographic and health survey report (17), who reported a prevalence of 24.1% among donors. The high prevalence may be due to low socio-economic levels of donors in Owerri, as they are most likely to indulge in risky sexual relationships which expose them to transmission transmissible infections (17).

In this study, the prevalence of syphilis among blood donors was 4.7%. (9) Reported a prevalence of 0.9% in Jos, Nigeria.

The study also revealed that the age group 18-28 had the highest prevalence of hepatitis B, hepatitis C and HIV. This age group represents vibrant youths who are mainly unemployed. Unemployment might lead them into sexual relationships that may expose them to transfusion transmissible infections. They

p values <0.05 were considered significant
 * indicates statistically significant values.
 HIV- human immunodeficiency virus
 Table 3 shows the prevalence of HBV, HCV, syphilis and HIV amongst blood denors according to sex.

For HBV, the males (15.3%) where positive when compared to females (5.3%), showing a higher prevalence of HBV in males than in females (p<0.001). The females (5.3%) had a higher prevalence of HCV when compared to males (4.0%). For syphilis, 2.7% of males were positive, while 2.0% females tested positive, showing a higher prevalence of syphilis in males when compared to females (P<0.001), while males (17.3%) had a higher prevalence of HIV when compared to females (9.3 %) (p<0.001).

Table 3. Prevalence HBV, HCV, Syphilis and HIV among Blood Donors According to Sex.

| Sex | No | HBV | | X ² | p – Value |
|----------|-----|-----------|------------|----------------|-----------|
| | | positive | negative | | |
| Male | 96 | 23(15.3%) | 73(48.7%) | 154.79 | <0.001* |
| Female | 54 | 8(5.3%) | 46(30.6%) | | |
| Total | 150 | 31(20.6%) | 119(79.3%) | | |
| HCV | | | | | |
| | | Positive | Negative | | |
| Male | 96 | 4(4.0%) | 90(60.0%) | 170.11 | <0.001* |
| Female | 54 | 8(5.3%) | 46(30.6%) | | |
| Total | 150 | 14(9.3%) | 136(90.7%) | | |
| SYPHILIS | | | | | |
| | | Positive | Negative | | |
| Male | 96 | 4(2.7%) | 92(61.3%) | 180.12 | <0.001* |
| Female | 54 | 3(2.0%) | 51(34.0%) | | |
| Total | 150 | 7(4.7%) | 143(95.3%) | | |

may also be involved in practices such as sharing personal care items, like razor or toothbrushes. (17). the age group 29-39 had the highest prevalence of syphilis. (22), reported highest prevalence in age group 40-49 years, followed by the age group 50-59 and 18-39.

This study reveals that males had a higher prevalence of HBV, Syphilis and HIV, while females recorded a higher prevalence of HCV. This might be due to sexual promiscuity and unprotected sexual activities among them. This study is supported by researchers such as (8), who reported a high prevalence of TTTs.

CONCLUSION

The relatively high prevalence of transfusion transmissible infections poses a greater threat to blood safety. Therefore proper screening of blood donors using standard techniques should be employed for safe blood transfusion and strict adherence to selection criteria should also be employed.

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