Seroprevalence of syphilis among blood donors in Ilorin

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Original Article

ABSTRACT

Background: One of the greatest values of serological test for syphilis is as a surrogate marker for lifestyle known to be associated with high risk of HIV and HCV infections. This study was designed to determine the prevalence of syphilis among blood donors in Ilorin and also the relationship between seropositivity and lifestyle known to be associated with high risk for HIV and Hepatitis infection.

Method: This was a hospital based cross sectional study involving 350 consenting blood donors. The socio-demographic details (*e.g*., age, sex, occupation, risk behavior etc) were obtained using a structured questionnaire designed for the study. Screening for syphilis was carried out using the DiaSpot Rapid Diagnostic Test kit (DS 401-Syphilis test strips; lot: SYP2070028) according to the manufacturer's (Sam Tech Diagnostics) instructions.

Result: The seroprevalence of syphilis among the blood donors was 1.1%. None of the seropositive donors was a homosexual, commercial sex worker or intravenous drug user. None of them had history of blood transfusion. Only one out of the 4 seropositive donors engaged in extramarital sex.

Conclusion: The seroprevalence of syphilis among blood donors in Ilorin was low and therefore the relationship between syphilis seropositivity and high risk lifestyle could not be determined. A prospective study design where cases and controls are appropriately matched to exclude confounders would be more appropriate. The relationship of syphilis seropositivity and high risk lifestyle can therefore be better studied among patients attending Sexually Transmitted Infection clinic and using seronegative patients as controls.

Keywords: syphilis, blood donors, risky lifestyle.

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La séroprévalence de la syphilis chez les donneurs de sang en Ilorin.

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l'article original

RÉSUMÉ

Arrière-plan: L'une des plus grandes valeurs de test sérologique pour le dépistage de la syphilis est comme un marqueur de substitution d'un mode de vie connus pour être associés à haut risque d'infection par le VIH et le VHC infections. Cette étude visait à déterminer la prévalence de la syphilis chez les donneurs de sang à Ilorin et aussi la relation entre séropositivité et vie connus pour être associés à haut risque pour le VIH et l'hépatite.

Méthode: C'était un hôpital en fonction de la section transversale étude impliquant 350 consentante les donneurs de sang. Les caractéristiques socio-démographiques les détails (*p. ex.* ., l'âge, le sexe, la profession, les comportements à risque etc) ont été obtenues en utilisant un questionnaire structuré conçu pour l'étude. Le dépistage de la syphilis a été effectuée à l'aide de l'DiaSpot rapide kit de test de diagnostic (DS 401- La Syphilis bandelettes de test; lot: SYP2070028) selon le fabricant (Sam Tech Diagnostic) instructions.

Résultat: La séroprévalence de la syphilis chez les donneurs de sang a été de 1,1 %. Aucun des donneurs séropositifs était un homosexuel, le sexe commercial travailleur ou toxicomane. Aucun d'eux n'a eu l'histoire de la transfusion sanguine. Seul un des 4 séropositifs donateurs engagés dans l'infidélité conjugale.

Conclusion: La séroprévalence de la syphilis chez les donneurs de sang en Ilorin était faible et, par conséquent, la relation entre la syphilis séropositivité et à haut risque de vie n'a pas pu être déterminée. Une étude prospective conception où les cas et les contrôles sont appariées de façon appropriée pour exclure confusion serait plus approprié. La relation de la syphilis séropositivité et à haut risque de vie peut donc être mieux étudié chez les patients traitant les infections sexuellement transmissibles et clinique aide les patients séronégatifs comme contrôles.

Mots-clés :la syphilis, les donneurs de sang, vie risquée.

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INTRODUCTION

Blood transfusion is considered a fundamental support to several medical activities all over the world.(1) Timely transfusion of blood saves millions of lives, but unsafe transfusion practices put millions of people at risk of transfusion transmissible infections (TTIs) like Human immunodeficiency virus, Hepatitis B , Hepatitis C, syphilis *etc*. (2)

Syphilis is mainly a sexually transmitted infection that is caused by the spirochete *Treponema pallidum*. It can also be transmitted vertically from mother to child and through transfusion of blood and blood products. (1,3)*Treponema pallidum* does not survive well at 4^0C and blood is likely to be non-infective after 4 days refrigeration. Storage does not however affect positive serology and passive transmission of the antibody to a recipient could cause diagnostic confusion. (4)The organism is more likely to be transmitted in platelet concentrate, due to their room temperature storage and short shelf life and also in situations when patients are transfused with fresh whole blood. (4)

Donor screening for syphilis is done routinely in most developed countries but this is not so in Nigeria and some other African countries. (3,5,6,7)The seroprevalence of syphilis varies widely in different parts of the world. In Ghana it is 7.5%(5), 1.3% in Ethiopia (7), 0.5% in Pakistan (8)and between 0.1 and 0.5% in India. (6,9) In Nigeria it is 1.3% among voluntary blood donors in the North Eastern part and 8% among targeted and commercial blood donors in Benin. (10,11)

In Nigeria voluntary donors are scarce; most of our donors are commercial and family replacement donors. Even the so called family replacement donors are commercial donors in disguise. (12)Previous studies in Nigeria have come out with the finding that the seroprevalence of syphilis is higher among commercial donors than voluntary donors.(10,11)The risk of transfusion acquired syphilis in patient that are transfused with fresh blood is therefore high since blood is not routinely screened for syphilis. (11)

One of the greatest values of serological test for syphilis is as a surrogate marker for lifestyle known to be associated with high risk of HIV and HCV infection. (4) Known risk factors for the transmission of HIV, Hepatitis and Syphilis include multiple sexual partners, homosexuality and intravenous drug abuse. (13,14)

The seroprevalence of syphilis among blood donors in Ilorin is not known. This study was therefore designed to determine the prevalence of syphilis among blood donors in Ilorin and also the relationship between seropositivity and lifestyle known to be associated with high risk for HIV and Hepatitis infection.

METHODOLOGY

This was a hospital based cross sectional study of blood donors. Three hundred and fifty (350) consecutive blood donors who consented to participate in this study were recruited at the blood bank of the University of Ilorin Teaching Hospital (UITH). UITH is located in Ilorin the capital of Kwara State, North-Central part of Nigeria.

Standard ethical procedure was complied with in accordance with Helsinki declaration (15). University of Ilorin Teaching Hospital Ethical Review Committee which is a member of the National Health Research Ethics Council approved the study protocol. Written Informed consent of the participants was equally obtained. Donors that did not consent to participate in the study were excluded.

The socio-demographic details (*e.g*., age, sex, occupation, risk behavior etc) were obtained using a structured questionnaire designed for the study. The questionnaire was self-administered and only those who were unable to read and write were assisted by the researchers in completing the questionnaire.
Five ml of venous blood was taken from each subject. The blood sample was used for the screening for syphilis using the DiaSpot Rapid Diagnostic Test kit (DS 401- Syphilis test strips; lot: SYP2070028) according to the manufacturer's (Sam Tech Diagnostics) instructions. According to the kit manual

DiaSpot Syphilis ultra rapid test strip/Device is a lateral flow immunoassay for the detection of human antibodies to *Treponema pallidum* in serum, plasma and whole blood with a high degree of specificity and sensitivity. The kit utilizes a unique combination of syphilis antigen coated particles and anti-human IgG and IgM to detect *Treponema pallidum* qualitatively and selectively in serum or plasma. The relative sensitivity, specificity and accuracy of the test are 99.7%, 99.6% and 99.7% respectively.

Data was analysed using SPSS version 20. Results were calculated as frequencies, means, standard deviations (SD), cross-tabulation, and chi-square. Fisher's exact test, odd ratio at 95% confidence interval calculation was done where necessary, with p-value set at 0.05.

RESULTS

Three hundred and fifty blood donors (339 males and 11 females) aged 31.4±8.3 years (mean± SD) were recruited to this study. Most of the donors were married (58.9%), 40.6% were singles and 0.6% were widowed. Most of them were either civil servants or artisans and had at least secondary school education. (Table 1)

The seroprevalence of syphilis among the blood donors was 1.1%(4 donors out of 350 were positive)There was no significant difference (p- value 0.8) in the mean age of donors positive for syphilis and those that are negative, mean of 32.0 ±12.8 and 31.4±8.3 respectively.(p-value of 0.078) All the 4 seropositive donors were males. None of the seropositive donors was a homosexual or intravenous drug user. None of them had history of blood transfusion. Only one out of the 4 seropositive donors engaged in extramarital sex. (Table 2)

DISCUSSION

The seroprevalence of syphilis among blood donors in this study is low compared to the average prevalence in some other parts of Nigeria (10,11) and Ghana (5), it is similar to the seroprevalence in a study in Ethiopia (7)and higher than that in India (6,9)and Pakistan (8). The fact that most of the donors that are bled in our blood bank are family replacement donors may explain the low prevalence as compared with other studies in Nigeria where commercial donors were used. (11,12)

In developed countries, transfusion transmitted infections are very rare because of stringent donor selection process, universal screening of blood for blood borne pathogens and transfusion of refrigerated blood instead of fresh blood components (5). In underdeveloped countries like Nigeria stringent donor selection process is difficult because voluntary donors are not common and most blood banks depend on family replacement donors and paid donors that disguise as patient relatives (12). The window period risk of transmission of infection is therefore very high in developing countries. Even if it is possible to be stringent with donor selection in the exclusion of high risk donor, it is not likely to be effective because most of those that are involved in the high risk behaviors are not likely to confess. In this study, none of the donors that were seropositive for syphilis was a homosexual, commercial sex worker or intravenous drug user. Serological test for syphilis cannot therefore be used as a surrogate marker for lifestyle known to be associated with high risk of HIV and HCV in this part of the world.

In conclusion the seroprevalence of syphilis among blood donors in Ilorin is low and none of the seropositive donors was involved in high risk lifestyle. The limitation of this study in the determination of the relationship of syphilis seropositivity and high risk lifestyle lies in the very few number of donors that were seropositive compared to those that were negative. It was therefore not possible to use the appropriate statistical tool to determine the relationship of syphilis seropositivity with high risk lifestyle/ behahavior. A prospective study design where cases and controls are appropriately matched to exclude confounders would be more appropriate. The relationship of syphilis seropositivity and high risk lifestyle can therefore be better studied among patients attending Sexually Transmitted

Infection clinic and using seronegative patients as controls.

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Conflict of Interest

The author declares no conflict of interest.

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TABLE 1: Socio-demographic distribution of the blood donors

Variables	Blood donors (N=350) *n (%)*
Gender:	
male	339(96.9)
female	11(3.1)
Age in yrs:	
16-35	252(72.0)
36-55	97(27.7)
56-75	1(0.3)
Mean age:	31.4 ± 8.3
Marital status:	
divorced	-
married	206 (58.9)
single	143 (40.9)
widowed	1 (0.3)
Family type:	
monogamy	185 (89.8)
polygamy	21 (10.2)
Occupation:	
professionals	4(1.1)
civil Servant	96 (27.4)
businessman/woman	30 (8.6)
skilled Artisan	88 (25.1)
petty Traders	16 (4.6)
unemployed/housewife	116(33.1)
Level of education:	
No formal education	18 (5.1)
others	8 (2.3)
primary	21(6)
secondary	122 (34.9)
tertiary	185 (52.9)

TABLE 2: Lifestyles/Risk behaviours of blood donors

Variables	Seropositive (N=4) *n (%)*	Seronegative (N=346) *n (%)*
Alcohol consumption:		
yes	0(0)	37(10.7)
no	4 (100)	309 (89.3)
Cigarettesmoking:		
yes	0(0)	19(5.5)
no	4 (100)	327 (94.5)
Anal sex:		
yes	0(0)	6 (1.7)
no	4 (100)	340 (98.3)
Blood transfusion:		
yes	0 (0)	13 (3.8)
no	4 (100)	333 (96.2)
Extramarital sex:		
yes	1(25)	104 (30.1)
no	3(75)	242 (69.9)
Sex trade:		
yes	0(0)	1(0.3)
no	4 (100)	345(99.7)
Oral sex:		
yes	0(0)	6 (1.7)
no	4(100)	340(98.3)
Self injection:		
yes	0 (0)	1 (0.3)
no	4 (100)	345(99.7)