

Blood donation and sero-positive of syphilis at North Darfur State- Sudan 2018

Abstract

Objective: To determine the prevalence of syphilis sero-positivity among blood donors, as well as the interaction between syphilis and age as well as demographic details.

Methods: In North Darfur State, Western Sudan, a retrospective analysis of consecutive blood donation records from January to December 2018 was implemented. The quantitative descriptive is computed using percentages. Chi-square was used to analyze trends, and the p-value was used to determine the statistical significance of the parameter.

Results: There were 4969 men between the ages of 15 to 55 who were eligible to donate blood, were screened for syphilis, 646 (13.0%) had biomarker evidence of syphilis, while the rest (87%) were negative. A strong association has been reported between residential and biomarker evidence of syphilis infection in the study ($P = 0.001$). The occurrence of transfusion-transmissible infections was disproportionate to age ($P = 0.63$). As compared to the other age groups, the (15-25) and (26-35) year age groups has a higher prevalence: 243 (4.8%) and 276 (5.5%) were positive, accordingly.

Conclusion: There seems to be an increasing proportion of sero-positive VDRL in blood donations in North Darfur State. An association between syphilis infection and residency was realized, as well as a high prevalence within a particular age demographic without a statistically meaningful correlation.

Keywords: syphilis, Blood donors, Darfur, Sudan

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Introduction

Although early transfusion saving millions of people's lives nationwide annually, hazardous transfusion practices put millions more at hazard of Transfusion Communicable Infections.¹ Documentation on TTIs in blood and blood product donors, along with HIV, HBV, HCV, syphilis, and malaria, enables for an assessment of the occurrence of infections in the blood donor populace and, as a consequence, the quality of the donations.² Perhaps it provides a better understanding of the community's epidemiology of these infections.³ Infections triggered by blood transfusions are also a significant issue throughout the world.² TTIs may present in donors without inducing symptoms, so they must be examined for infections combined with excessive behaviors. Unsafe blood transfusions account for 5-10% of HIV transmission in Africa.⁴ Hepatitis B and C infection is a major public health challenge since it causes significant demise, morbidity, and financial burden.⁵ More than 10% of patients who receive blood transfusion are at hazards of post-transfusion hepatitis in Saharan Africa.⁶ Syphilis is less commonly conveyed through blood, and the incidence has been approved in most reports to be negligible.² Syphilis is less commonly conveyed through blood, and the incidence has been approved in most reports to be negligible. According to studies implemented in West Africa, plasmodium falciparum is present in 30.2 and 33.5 percent of blood donors, respectively.⁷

Syphilis is an infection transmitted by the bacterium *Treponema pallidum* that can be transmitted by unprotected sex, blood transfusions, and mother to child transmission.⁸ Syphilis exist an important public health issue, and also constitute a new strain for morbidity and mortality through association with increased risk of HIV co-morbidity in sub-Saharan Africa.⁹

Materials and methods

Study design

This cross-sectional hospital-based study was held between January and December 2018 among blood donors at El fashir Main Blood Center.

Study area

The investigation was carried out in El fashir Zone, the capital of North Darfur State (residing between longitudes 31.5-34 east and latitude 15-16 north), which has an area of approximately 28.165 square kilometers⁷.

Study population

During the study period, all blood donors, whether volunteers or relatives or friends of recipients, were invited to fill a standardized questionnaire containing socio-demographic facts. (Age, gender, and state of residence), previous disease and medical problem, blood transfusion experience, and jaundice. Those that tend to be in better health and were between ages of 18 and 55 are eligible to donate blood.

Study variable

The syphilis test result was the dependent variable in this report, whereas the independent variables were residency and age.

Sample size and data collection

Five milliliters of blood were pulled from each subject, sera were extracted, and syphilis non-specific antibodies were screened at the

venereal disease research laboratory (VDRL) with a quick Dip-strip (manufactured in the UK by fortress diagnostic LTD). Blood was retrieved from 4969 blood donors in free anticoagulant clear tubes, and details such as age and ethnicity of all participants were acquired using a standardized interview questionnaire. The study’s purposes were clarified to all respondents, and their verbal consent was achieved.

Ethical approve

The ethics known performance from the Ministry of Health. For being enrolled in the study, all respondents were asked to report their consent. This study required all participants to provide information

Data analysis

For entering data and analysis of the volunteers’ characteristics, the Statistical Package for Social Sciences program (SPSS Inc., Chicago, IL, USA) version 20 was used. Incredibly simple descriptive statistics were used to analyze the laboratory results of the VDRL test as well as demographic data. Any two variables were compared using the Chi-square test. A p value of less than 0.05 was considered statistically acceptable.

Table 2 Correlation between syphilis and age group

Age group	Frequency	Percent	P-value
15 - 25	1916	38.6	0.63
26 - 35	2083	41.9	
36 - 45	815	16.4	
46 - 55	136	2.7	
More than 55	19	0.4	
Total	4969	100.0	

Table 3 Correlation between syphilis infection and residence

Residence	Count	Syphilis		Total	P value
		Positive	Negative		
Almalha	Count	15	36	51	0.001
	% within Residence	29.4%	70.6%	100.0%	
	% within Syphilis	2.3%	0.8%	1.0%	
Camp	Count	141	1065	1206	
	% within Residence	11.7%	88.3%	100.0%	
	% within Syphilis	21.8%	24.6%	24.3%	
Elfashir	Count	391	2738	3129	
	% within Residence	12.5%	87.5%	100.0%	
	% within Syphilis	60.5%	63.3%	63.0%	
Kalamendo	Count	21	37	58	
	% within Residence	36.2%	63.8%	100.0%	
	% within Syphilis	3.3%	0.9%	1.2%	
Malit	Count	36	89	125	
	% within Residence	28.8%	71.2%	100.0%	
	% within Syphilis	5.6%	2.1%	2.5%	
Others	Count	42	319	361	
	% within Residence	13.0%	87.0%	100.0%	
	% within Syphilis	6.5%	8.3%	14.9%	
Total	Count	646	4323	4969	
	% within Residence	13.0%	87.0%	100.0%	
	% within Syphilis	100.0%	100.0%	100.0%	

Results

A total of 4969 male blood donors from different localities of North Darfur State, were enrolled in this study, their mean age was 29.4 years. The ages of the participant ranged from 15 to 65 years. VDRL positive was found to be 13.0% (646/4969). Table 1

Study showed statistically insignificant correlation between syphilis and age (P = 0.63), but the majority of positive serological evidence of syphilis among ages of (15-25), and (26-35) years 243 (4.8%), 276 (5.5%) respectively. Table 2

There was statistically significant correlation between serological evidence of syphilis infection and residence (P = 0.00). Table 3

Table 1 Distribution of VDRL test

Syphilis	Frequency	Percent
Positive	646	13.0
Negative	4323	87.0
Total	4969	100.0

Discussion

Transfusion safety has advanced to an extremely high degree. Even so, certain residual TTI concerns must be discussed prior to blood donation. The syphilis vulnerable population is comparable to that of HIV, with similar biological and behavioral variables. A similar situation arises in the case of HBV and HCV infection. Blood donors who are afflicted with syphilis are also at risk for other blood-borne infections.¹⁰ In the present study the prevalence of syphilis in the present study was 13.0% which is higher than study implemented in Kosti- White Nile State-Sudan (6.8%).¹¹ And recent study conducted in Eastern Ethiopia where prevalence was (0.1%)¹² this comparison should be considered cautiously since our study was conducted in area of conflicts and compulsory migration with lack of standard health service facilities. To manage this dilemma, the federal and state ministries of health must adopt stringent policies that encourage safety blood transfusions.

Highest prevalence infection was documented in age group between (15 and 25) and (26 and 35) years old without significant correlation ($p = 0.63$). This result was agreed with study conducted at Kosti- White Nile State, Sudan which revealed high prevalence infection among age group (20-40) years old.¹¹ This age group considered as sexually active and reproductive age, high prevalence may be due to lack of health education regarding sexual transmitted infections and prevention modalities. This conclusion also may be considered an indicator of sexual maturity and reproduction due to environmental differences between central and western Sudan.

The study revealed there was statistically significant correlation between syphilis infection and residence ($p = 0.001$). This information has been documented by other study conducted in Rwanda was revealed the association of syphilis prevalence and rural localities where there is lack of health education and facilities Mutagoma,¹³ Before blood donation, medical advice and identification of high-risk populations must be strengthened. The priority of blood donor recruitment should be on excluding high-risk donors and enrolling more low-risk donors. As a result, syphilis in the blood should not be neglected. The study provides an important resource for disseminating syphilis-related information and is effective in preventing blood donor risk behaviors. Furthermore, with the rapid growth of the economy, the entire country should raise investment in blood collection and supply, as well as boost health education. While high-risk blood donors must be eliminated, it is vital to guarantee that a sufficient number of low-risk blood donors participate in voluntary blood donation.

Moreover, predonation health consultations are now required for screening for high-risk populations prior to blood donation. Blood donors must report their medical history and risk behavior to evaluate if they may give blood or whether they must reschedule or discontinue from the process.

For the aforementioned reasons, a single positive result was considered positive. There was no confirmatory checking. As a consequence, false positives cannot be ruled out, and true infectious disease rates could be lower than documented; these are called constraints of the ongoing study.

Conflicts of interest

The authors declare that there are no conflicts of interest regarding this study.

Authors' contributions

The authors have contributed equally to the study design and manuscript write-up. All authors read and approved the final version of the manuscript.

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