

## PREVALENCE OF ANTIBODIES TO HUMAN T-LYMPHOTROPIC VIRUS TYPE I AMONG BLOOD DONORS IN ACCRA, GHANA

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### SUMMARY

Several infectious diseases have been found to be associated with transfusion of blood or blood components. Reports from studies conducted in many African countries indicate high incidence of blood-borne pathogens such as human T-lymphotropic virus type-I (HTLV-I) infections among healthy blood donors. The prevalence of HTLV-I antibodies in blood donors in Ghana is not well documented. This study was therefore conducted to determine the prevalence of HTLV-I antibodies among blood donors seen between the months of June and July 2001 at the National Blood Transfusion Service, Accra Area Centre (Blood Bank) at the Korle Bu Teaching Hospital, Accra, Ghana. The presence of antibodies specific for HTLV-I was tested using particle agglutination test kit. Of the 265 sera tested, 220 (83%) were males and 45 (17%) were females. A seroprevalence rate of 4.2% (11/265) was found. The prevalence rate of antibody to HTLV-I was significantly ( $P < 0.05$ ) higher in female (8.9%; 4/45) than male (3.2%; 7/220) blood donors. In both sexes, the age distribution of subjects positive for HTLV-I antibodies was from 35 to 54 years. In conclusion, our results indicate that HTLV-I is prevalent among healthy blood donors in Ghana; and that there is the need to introduce screening of donated blood for HTLV-I in Ghana.

**Keywords:** Human T-lymphotropic virus type-I, blood donors, seroprevalence.

### INTRODUCTION

One important danger in blood transfusion is the transmission of blood borne infections. In the developed countries, during the past two decades, transfusion-transmitted infectious disease has become extremely rare because of improved donor selection processes, universal serologic screening

of donors for blood-borne pathogens, and the shift from transfusion of fresh blood components to transfusion of refrigerated products<sup>1,2</sup>. On the other hand, less developed countries, including Ghana, are not able to fully implement the above procedures to ensure safety of transfused donor blood. The demand for blood transfusion service in these countries is high, because of excessive incidence of infections that cause anaemia, malnutrition, surgical and obstetrical emergencies associated with blood loss.

The National Blood Transfusion Service (NBTS), Ghana is only able to screen donor blood for human immunodeficiency virus (HIV 1 & 2) and hepatitis B virus (HBV) because of financial constraints in acquiring enough test kits for serologic screening of other transfusion-associated pathogens. One of the infections that can be transmitted by blood transfusion is that caused by human T-lymphotropic virus type I (HTLV-I)<sup>3</sup>. Reports from studies conducted in other African countries indicate high incidence of blood-borne pathogens such as HTLV-I, hepatitis C virus (HCV) and HBV among healthy blood donors<sup>4,6</sup>. In a study conducted in Nigeria, Fleming *et al.*<sup>7</sup> found a prevalence of antibody to HTLV-I of 2.0% in Nigerian blood donors. Similarly, Sarkodie *et al.*<sup>8</sup> in a recent study done in Kumasi, Ghana, found the sero-prevalence of HTLV-I among blood donors to be 0.5%. In a related study, Lal *et al.*<sup>9</sup> reported a sero-prevalence rate of HTLV-I among urban and rural dwellers in southern Ghana to be 1-2%. In a study conducted in Dar Es Salaam, Tanzania<sup>4</sup>, 1% of the healthy subjects among the population studied had antibodies to HTLV-I. Similarly, Verdier *et al.*<sup>10</sup> in a study conducted in Cote d'Ivoire, found the seroprevalence of antibodies to HTLV-I to be 3.5% in the general population. Reports from other studies suggest that HTLV-I infection is

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prevalent in other parts of Africa; and that the sero-prevalence rate of antibodies to HTLV-I in healthy African Blood Donors ranged from 0-9% and as high as 30% in several at risk groups<sup>7,11-13</sup>.

In view of the large number of transfusions (according to the NBTS estimation, the number of blood units transfused at the Korle Bu Teaching Hospital (KBTH) in 2001 was 16,000 units) carried out at the Accra Area Centre, KBTH, Accra, Ghana and their great potential for transmitting pathogens to recipients, it is therefore extremely necessary to investigate the presence of antibodies to HTLV-I among blood donors, which at present is not screened for at the Accra Area Centre, Korle-Bu Blood Bank. The present study was therefore conducted to determine the prevalence of antibodies to HTLV-I infection among blood donors seen at the NBTS, Accra Area Centre at the Korle Bu Blood Bank.

## MATERIALS AND METHODS

**Study Population:** The study was carried out between the months of June and July 2001 among Blood Donors at the NBTS Centre at the Korle-Bu Blood Bank. This centre serves KBTH, other hospitals/clinic in the Accra metropolitan area, both Governmental and non-Governmental, some parts of Central and Eastern Regions. KBTH is a tertiary and the leading hospital which serves the city of Accra, surrounding urban population and the southern part of Ghana. Accra, the capital city of Ghana, is a rapidly expanding city with a population of about 3 million. In Ghana, blood donors are volunteers and are also sought from family members of patients and friends needing blood transfusion. Blood donors undergo a clinical screening which involves a questionnaire and a routine medical examination and only those found to be healthy are bled. Donated blood is routinely screened for HIV 1&2 antibodies and HBV surface antigen. In this study, an additional sample of blood was also taken from blood donors for detection of antibodies to HTLV-I.

**Sample Collection:** Blood sample (about 3 ml) were collected from blood donors into 5 ml plain tubes. Serum was separated and kept at  $-20^{\circ}\text{C}$  until analyzed.

**Serological Test:** Sera were screened for the presence of HTLV-I antibodies with a commercially available HTLV-I particle agglutination test kit (Serodia Fujirebio Inc. Japan) in accordance with the manufacturer's instructions. The study was approved by the Ethical and Protocol Review

Committee of the University of Ghana Medical School, Accra, Ghana.

**Statistical Analysis:** Statistical analysis of the data was performed by Chi-square test. P values  $<0.05$  were considered significant.

## RESULT

A total of 265 (220[83%] males and 45[17%] females) donors were screened for HTLV-I antibodies. Their ages ranged from 18 to 57 years. All the patients were found healthy on routine medical examination. The test showed that 254 were negative and 11 were positive for HTLV-I antibodies, giving an overall HTLV-I prevalence rate of 4.2%. The prevalence was lower in males (3.2%; 7/220) than females (8.9%; 4/45),  $P < 0.05$ . In both sexes, the age distribution of subjects positive for HTLV-I antibodies was from 35 to 54 years.

## DISCUSSION

The policy concerning blood supply in Ghana is that prospective donors should be screened clinically before selected to donate blood and all donations should be screened or checked anonymously for all transfusion associated pathogens in order to ensure safety to recipients and staff of the blood transfusion services. This indicates that the safety of blood supply is of special importance and a major concern to the Ministry of Health and the National Transfusion Services of Ghana. However, because of lack of facilities, the NBTS is only able to screen for HIV antibodies and HBV surface antigen in donor blood. To our knowledge, this is the first report on the seroprevalence of antibodies to HTLV-I among blood donors in Accra, Ghana. We used a highly sensitive and highly specific partial agglutination test<sup>14-16</sup> to detect antibodies to HTLV-I on recently collected serum samples in Ghana. Serodia HTLV-I is a reagent test kit which reacts on the basis of specific immunological principles; gelatin particles sensitized with HTLV-I are agglutinated by anti-HTLV-I antibodies in human serum specimens. The sensitivity and specificity of the assay are 100% and 98.5%, respectively<sup>14-16</sup>. Positive results from this test only confirm previous exposure to HTLV-I and not necessarily active disease. This study, although limited by the small number of volunteers, highlights the need for screening blood donors for circulating antibodies to HTLV-I infection. This is especially important because of recent reports of close association between HIV and HTLV-I infections<sup>17,18</sup> although our study was not designed to explore such relationships. The results

of this study showed an overall prevalence rate of 4.2% of antibody to HTLV-I among Blood Donors at the Korle-Bu Blood Bank, Accra, Ghana. The present study, which is mainly descriptive was undertaken to investigate the prevalence of antibodies to HTLV-I among blood in Accra, Ghana. Because of the low positive predictive value (79.7%) of the Serodia test used in this study<sup>15</sup>, our data cannot be used to make strict epidemiological comparisons. Despite this limitation, the general observation is that blood donated at the NBTS, Accra Area Centre, contain relatively high prevalence of antibodies to HTLV-I. Further studies are in progress to determine the magnitude and the true prevalence using RT-PCR, ELISA and Serodia tests. However, the prevalence rate reported herein is higher than those observed in Nigeria (2%), Senegal (1.2%) and Liberia (1.6%)<sup>4,7</sup>, thus emphasizing the importance of screening blood donors for antibodies to HTLV-I infection and other transfusion-transmitted pathogens.

Although the sample size (45) of female blood donors is small, the increased prevalence rate (8.9%) of antibody to HTLV-I found in our study is remarkable taking into consideration the increased risk of women in acquisition, contribution, and/or distribution of sexually transmitted infections<sup>19</sup>. It would be interesting to conduct a comprehensive and systematic study of the HTLV-family and the diseases associated with it in the general population within the various regions of the country. This would help confirm or clarify the incidence and/or distribution of HTLV infection in view of the high prevalence rate of antibody to HTLV-I in blood donors reported here in our study. The information obtained would also alert Health Officials and clinicians to formulate strategies and make available the necessary resources for management, treatment and re-emphasize the importance of strengthening prevention programmes in order to reduce or arrest potential risk factors of acquiring HTLV-associated diseases.

Limitations of the study included the small sample size (which is due to financial constraints in acquiring enough test kits) and the small number of female volunteers presenting at the Blood Bank.

In conclusion, the results suggest that HTLV-I is prevalent among healthy blood donors in Ghana, hence, introduction of a scheme to screen donated blood, will help to eliminate the spread of HTLV-I among blood recipients.

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