# Seroprevalence of HTLV-type-1 and type-2 among Blood Donors in Some Iraqi Provinces

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## Abstract

**Context**: Human T-cell lymphotropic viruses Type 1&2 (HTLV-1&2) screening test is endemic in some Iraq's provinces. HTLV-1&2 test is not performed in routine screening tests of Iraqi blood donors banks. With my thought it represent essential test to prevent complications the virus in our country and other neighbour countries in Middle East. The results of the following study do not included all Iraq's provinces but only seven provinces (Baghdad, Karbala, Al-Qadisiyyah, Al-Najaf, Al-Muthanna, Al-Basrah, Wasit). **Aims**: to review prevalence of HTLV-1&2 infections among Iraq's blood donors. **Settings and Design**: The study where performed in Iraqi National blood bank in Baghdad city and national companies for blood donation in Karbala and Najaf provinces, the study included 15239 blood donors. **Methods and Material**: ELISA (Murex HTLV 1&2 Ab, USA, LOT: D3101210) 480.T was used for HTLV screening for detection antibodies to HTLV-1&2 in the serum of human followed by accurate confirmatory test CMIA (Chemiluminescent microparticle immunoassay) architect plus for confirmatory. **Results**: The study included 15239 blood donors, thirty nine of him appeared seropositive for HTLV-1&2, and the prevalence of HTLV-1&2 was appeared in some provinces of Iraq country highly prevalence of HTLV-1&2 were seen in Baghdad 24(61.5%), then Karbala 5(12.8%), Al-Qadisiyyah 4(10.2%), Al-Najaf 2 (5.1%), Al-Muthanna 2 (5.1%), Al-Basrah1(2.5%), and Wasit province1 (2.5%) respectively. **Conclusions**: first study conducted in Iraq in 2015 appeared the prevalence of HTLV-1&2 infections among blood donors only in six provinces and not included all Iraq's provinces. So another study is requested for determination the distribution of HTLV-1&2 in all Iraq's provinces, districts and areas.

***Key-words:*** *HTLV-1&2, Retrovirus, CMIA technique, ELISA technique, blood donors.*

## Introduction

Human T-lymphotropic virus type 1&2 (HTLV-1&2) is retroviral group, mainly affects T-lymphocyte.[1] Their infections are diagnosed after blood donation. HTLV-1 is the causative agent of "myelopathy/tropical spastic Para paresis (HAM/TSP)".[2] HTLV-2 virus is appeared among indigenous America's people,[3] Brazil population.[4] HTLV-1 infections is endemic in Australian populations,[5] another factor determinant of HTLV-1 prevalence is economic status.[6] In Japan showed incidence of HTLV-1 per year.[7] HTLV-1&2 is endemic in south western of Japan, Caribbean islands, Africa, Austral-Melanesia,[8] north eastern Iran (in Mashhad city).[9,10] HTLV-1 is lifelong disease.[11] HTLV-2 included 4 subtypes.[12,13,14] the aim of the study was to review the prevalence of the virus among Iraq's blood donors.

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## Subjects and Methods

Samples: The study included 15239 blood donors where collected by Iraqi National blood bank and donation campaign in Karbala and Najaf. A donor selection criterion was followed, agreement was obtained and the study aim was explained to the blood donors; all ethical aspects were considered and confidentiality was maintained.

Instrumentation: ELISA (Murex HTLV 1&2 Ab, USA, LOT: D3101210) 480.T was used for HTLV screening followed by CMIA (Chemiluminescent microparticle immunoassay) architect plus for confirmatory. ELISA Kit is an enzyme-linked immunosorbent assay used for antibodies determination, was used for detection the presence of antibodies against HTLV-1&2 virus in the serum. This kit was used for screening the blood donors and diagnosed the clinical conditions of infection with HTLV-1&2, and the result of ELISA was followed by accurate confirmatory by CMIA technique.

## Results

Collection of samples depend on blood donors of voluntary campaigns conducted in National Iraqi blood donor bank in Baghdad and occasional voluntary campaigns conducted in Karbala and Najaf, continued between June/2015 to December/2015 to determined HTLV 1&2 infections, the study included 15239 blood donors. The result of the current study was limited on volunteers from National Iraqi blood donor bank in Baghdad and occasional voluntary campaigns conduct in Karbala and Najaf only, the volunteers of Karbala and Najaf campaigns were from Baghdad city and some Iraq's provinces; of which: Al-Qadisiyyah, Al-Muthanna, Al-Basrah, and Wasit province, in addition to volunteers from Karbala and Al-Najaf provinces. Numbers of HTLV-1&2 infection and their ratio in Baghdad and other Iraq's provinces appeared as shown in (Table-1) and Fig. (1). Distribution of the donors' age lies between 20 and 57 years (mean of the age was 36) as shown in (Table-2).

Highest seroprevalence of HTLV-1&2 were appeared among blood donors in Baghdad city; represent the centre of Iraq.

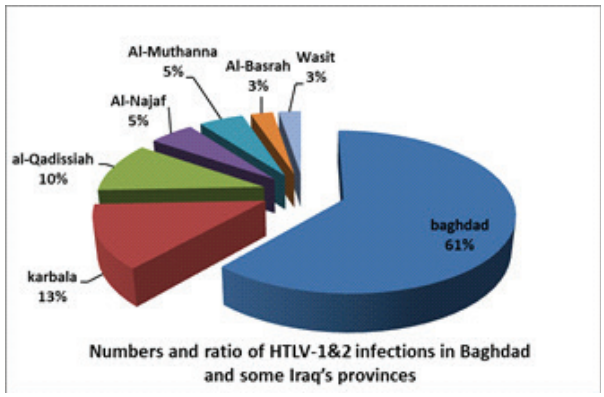


**Fig. (1): Distribution of HTLV-1&2 infections among blood donors in some Iraq's provinces.**

## Discussion

This is the first study was performed on Human T-lymphotropic virus type 1 and 2 (HTLV 1&2) in Iraq in 2015. No previous studies published on HTLV-1&2 in Iraq, where combined the screening test (by using ELISA technique) with accurate confirmatory test CMIA (Chemiluminescent microparticle immunoassay). 39 individual have infected with HTLV 1&2. Total of 15,239 blood donors collected from June 2015 to December 2015 was screening test for antibodies against HTLV-1&2. only 0.25% of which is seropositive to HTLV-1&2, 38 of which are male and only one is female, highest prevalence was appeared in Baghdad 24(61.5%) due to the high donation in Iraqi National Blood bank in Baghdad, in spite some Baghdad people participated in donation in Karbala and Najaf campaigns. So we cannot depend on this result to evaluate the real distribution of infection in Iraqi's provinces compared with Baghdad city.

Another study performed on Human T-lymphotropic virus type 1&2 in Iraq in 2017 correlated HTLV 1&2 infections with lymphoma and leukemia patients by their effects on human lymphocytes and other blood components.[15] Similar study conducted in Northern Pakistan where included 2100 blood donors, 0.19% were positive to HTLV-1 only not HTLV-2 and all donors were male.[16] In Saudi Arabia, the seroprevalence of HTLV-1is positive in 0.006% of blood donations, one of these positive donors was a native Saudi while the other two were Indian expatriates.[17] In Kuwait, the study included HTLV-1&2 infections; shown that the result of seroprevalence of HTLV-1infection among Kuwaiti donors was 1:7212 out of 46,039.[18] In

Iran the overall prevalence for HTLV-1 was 0.119% among blood donors in seven provinces of Iran (in Razavi Khorasan, seropositive for HTLV-1 were (0.38-1.16%), in West Azarbaijan, seropositive for HTLV-1 were (0.34%), in Ilam, seropositive for HTLV-1 were (0.21%), in Hormozgan, seropositive for HTLV-1 were (0.18%), in Alborz, seropositive for HTLV-1 were (0.11%), in South Khorasan, seropositive for HTLV-1 were (0.04%), and in Bushehr, seropositive for HTLV-1 were (0.01%).[19] Another study also conducted in Iran on 1864489 blood donation at seven centers from peroid 2009 through 2013 their age ranged between 18 and 65 years (with mean of age 34.8), seropositive for HTLV-1infection was 0.098%, all of seropositive donation were confirmed by western blot.[20] We can see the percentage of HTLV-1&2 prevalence is lower in our regions in the Middle East in comparison with high prevalence of infections in other parts of the world like United states the seroprevalence of HTLV-1&2 infections was 22 for each 100,000 population, were HTLV-2 more common in America than HTLV-1.[21] In Manaus and amazon state of Brazil, the seropositive result for HTLV-1&2 was 116(0.13%) from 87,402 individuals screened by ELISA and then the positive individuals were confirmed by western blot assays in 2017.[22] in Africa especially Malawi, seroprevalence was 2.6% (11/418) were tested in mother and children to investigate the transmission between mother and her child.[23]In china the seropositive prevalence of HTLV-1 was 0.06% of blood donors. [24] In Vietnam, 0.23% was seropositive for HTLV1&2 infections from 14,819 of blood donors in 2019.[25]

In this study 39 seropositive donors had antibodies against HTLV-1&2 which was independently confirmed by CMIA test, most studies conducted in our regions detected only HTLV-1 while in our country (Iraq) HTLV-1&2 infection was detected in 39 (0.26%) out of 15,239 blood donors, their age ranged between 20 to 57 with mean age 36 years, so we can see there's no correlates between age and HTLV-1&2 infection. Seroprevalence of HTLV-1&2 is higher in females than in males, [26] but in these study most positive individuals is males due to the most blood donors are males by Blood Bank of blood donors in Baghdad and national companies for blood donors in Karbala and Najaf province while only one female is appeared in this study positive to HTLV-1&2. Our results agreed with Pakistan study, where most positive individuals are males than females due to high numbers of males participated in blood donor.[16] Many studies correlate between HTLV-1&2 infections and Hepatitis B and C. In Brazil, 11-years follow up study cleared the importance of HTLV co-infection with hepatitis B &C virus.[27] In this study co-infection was not identified in positive donors.

This study included HTLV-1&2 test in some Iraq's provinces and not all provinces, and the numbers of the positive donors are not compatible and varying among all provinces, so it is necessary to put screening program for HTLV-1&2 in each province because the infection with this virus is differs in many provinces of the country. Screening of blood donors is important to prevent HTLV-1&2 transmissions. In our country (Iraq) this test is not routine screening test in blood banks for blood donors. So necessary performed this test with other routine screening tests (routine screening for Iraqi Blood Donors Banks: HIV, HBsAg, anti-HBc, HCV, and syphilis) to increase the safety of blood, where only 0.5% of HTLV-1&2 develops into Aggressive malignant disease.

Many studies recorded rapid development of myelopathy after infection with HTLV-1 acquired by blood transfusion.[28] This appeared the importance of screening program for prevent or decrease the prevalence of this virus among blood donors in country introduced this program, like Japan where HTLV is reduced since 1988, and US since early nineteen.[26] Prevalence of this virus is endemic and was declined in developed country introduced screening program for HTLV-1&2 and Less developing country like Iraq, need for such screening to control transmission of this virus. Note that Iraq now is open on the world and there's no health control on expatriates introduced to the country especially from west, Iran, US, & etc.

**Table 1: Seroprevalence of HTLV 1&2 in Iraqi Blood Bank/Baghdad and donation campaign in Karbala and Najaf. 15239 blood donors and result of confirmatory testing of CMIA-positive sample.**

| Provinces | Positive for HTLV 1&2 No. (%) | Positive for CMIA |
|---|---|---|
| Baghdad | 24(61.5%) | 24(61.5%) |
| Karbala | 5(12.8%) | 16(0.35) |
| Al-Qadisiyyah | 4(10.2%) | 39(0.25) |
| Najaf | 2(5.1%) | 2(5.1%) |
| Al-Muthanna | 2(5.1%) | 2(5.1%) |
| Al-Basrah | 1(2.5%) | 1(2.5%) |
| Wasit | 1(2.5%) | 1(2.5%) |
| Sum | 39 (100%) | 39(100%) |

**Table 2 : Donors' age range among blood donors included in the study.**

| Age group | No. | % |
|---|---|---|
| 57-47 | 10 | 25.6 |
| 46-36 | 10 | 25.6 |
| 35-25 | 10 | 25.6 |
| 24 | 9 | 23.2 |
| Sum | 39 | 100 |

**Ethical Clearance**: The Research Ethical Committee at scientific research by ethical approval of both MOH and MOHSER in Iraq

**Conflict of Interest:** Non

**Funding**: Self-funding

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