Original Article

The seroepidemiology of HTLV-1 and HTLV-2 in Neyshabour City, Northeast of Iran, during 2010-2014

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Abstract

Background and Aims: HTLV-1 and HTLV-2 are widespread worldwide and endemic in several areas such as Northeastern Iran. The present survey aimed to determine the prevalence of HTLV-1 and HTLV-2 among healthy individuals in Neyshabour City during the years of 2010-2014.

Materials and Methods: A total of 8054 blood samples were collected from participants referred to the great medical diagnostic laboratory in Neyshabur, Northeast Iran. Travelers to the city were excluded from the study. History of patients was also assessed for the existence of virus before test and likewise each of patient’s consent was prepared. The history of syringe transfusion and literacy of patients were also prepared. From each individual, 5 ml of blood sample was collected. Serum samples were prepared through centrifugation and stored at -20°C. Sera samples were screened for the presence of specific antibodies against HTLV-1 and HTLV-2 by the Enzyme-linked Immuno-sorbent Assay (ELISA) test (Dia.pro diagnostic bioprobes, Italy) according to the manufacturer’s instructions.

Results: HTLV-1/2 infections were positive in 6.55% (528/8054) of the participants according to the results of ELISA test. The prevalence of total HTLV-1 and HTLV-2 in each year of 2010, 2011, 2012, 2013 and 2014 was 6.82%, 6.15%, 6.2%, 5.18% and 4.31%, respectively. The individuals with more than 40 years had higher rate of infection (12% and upper).

Conclusion: the both HTLV-1/2 infections were detected in healthy individuals blood donors in Neyshabur city during 2010-2014. The rate of infections showed a decrease state from far to the recent years.

Keywords: HTLV-1, HTLV-2, ELISA

Introduction

Human T-lymphotropic virus (including common HTLV-1 and HTLV-2) belong to the retroviridae family (1-3). The virus prevalence is widespread worldwide and is endemic in several areas; such as North of Iran (4-6). According to the previous studies, the rate of infection was less than 0.26% in Mashhad North Eest of Iran. However, it does not exceed more than 0.34% in several other areas of the country (7). The transcontinental subgroup (TC) is the predominant HTLV in Iran and other Middle Eastern countries (8). Among other countries such as Turkmenistan, Brazil, Spain, Korea and Japan the prevalence was 0.007 (9), 1.9 (10), 0.001 (11), 0.27 (12), and 0.12% (13), respectively. The HTLV-1 causes a lymphoproliferative malignancy of CD4 positive cells
in adults (T-cell leukaemia/lymphoma or ATL) and a chronic myelopathy called tropical spastic paraparesis/HTLV-1-associated myelopathy (TSP/HAM) (14, 15). HTLV-2 has 70% similarity with HTLV-1 genomic structure (16). Carriers of HTLV-1 and HTLV-2 infect in prolonged time asymptotically (17). As HTLVs are mostly transmitted through blood transfusion, the screening for antibodies and discarding seropositive units must efficiently prevent this transmission (18). The transmission routes of these retroviruses vary and include: vertical; mostly from mother to child (through infected milk lymphocytes) (19), by cellular blood products transfusion (20), by sharing contaminated needles and sexual contact (bi-directional but higher from male to female) (21) and also rarely through liver, kidney, and lung transplants (22). The aim of the present survey was determination of prevalence of HTLV-1 and 2 among healthy individuals attending a great medical diagnostic laboratory in Neyshabur, Northeast of Iran during the years of 2010-2014.

Methods

Study population
A total of 8054 blood samples were collected from participants referred to the great medical diagnostic laboratory in Neyshabur Northeast Iran (stored in -20°C). Travelers to the city were excluded from the study. History of patients was also assessed for the existence of virus before test and likewise the patients consent was prepared. The history of syringe transfusion and literacy of patients were also prepared.

Serological assay and confirmation tests
From each individual 5 ml of blood was collected. Sera samples were prepared through centrifugation and stored at -20°C. Sera samples were screened for the presence of specific antibodies against HTLV-1 and HTLV-2 by the Enzyme-linked Immunosorbent Assay (ELISA) test (Dia.pro diagnostic bioprobes, Italy) according to the manufacturer’s instructions.

Statistical analysis
Descriptive data were normalized as mean, standard deviation and percent. The SPSS software (version 20, copyright IBM Crop. 1989, 2011 © was employed for data analysis using Chi Square and t-test. variables included age and sex of patients. A p value <0.05 was considered statistically significant.

Results
The population studied herein consisted of 5084 individuals ranging from 1 to 90 years old. On-thousand five hundred sixty five five of them were males (19.4%) and 6489 (81.6%) were females. The mean age of males and females were 46±3 and 51±3, respectively. The distribution of patients based on the age and sex has been depicted in table 1. Total of repeatedly reaction against HTLV-1 plus HTLV-2 specific antibodies was observed in 6.55% (528/8054) of the participants (including 3.6% HTLV1 and 1.4% HTLV2) in the ELISA test. Because of no previous transfusion among positive patients, no relationship found regarding this route of transmission. As shown, the age ranges of 30-39 and upper than 40 years old demonstrated more positive results. The prevalence of total HTLV-1 and 2 in each year has been demonstrated in table 2.

Discussion
Several previous studies from Northeast Iran have revealed that the both HTLV-1 and HTLV-2 were endemic in this area (23). However, the rate of sero-positivity of HTLV-1 has decreased gradually since 1996 to 2014 from 1.97% to 0.26% (24-26). Similarly, the results of the current study showed that the prevalence of HTLV-1 and HTLV-2 has decreased in Neyshabur since 2010 to 2014. In a survey in Mashhad in 2012, the rate of HTLV was 0.47% (27). Moreover, in a previous study by Safabakhsh, the sero-prevalence of HTLV-1 not exceeded than 0.19% (7). The main reasons for the declining rate of HTLV-1 possibly include: improvement
of donor selection in the Blood Transfusion and awareness increasing among blood donors. However, in Rafatpanah’s study in Mashhad, although the prevalence of HTLV-1 was 20% (10 positive samples), no evidence of HTLV-II infection was determined among immuno blot samples together with Nested-PCR (28). However, in the present study more than 1% of healthy individuals were positive for HTLV-2 each year. To the best of our knowledge, the published data regarding HTLV-2 prevalence is low in Iran. In a study by Durojaiye in Nigeria, the sero-prevalence of HTLV-1 was 0.5% among healthy blood donors (29).

Reportedly, the sero-prevalence of HTLV-1 has been very low in North America and Europe, for example 0.01-0.03% in USA and Canada (30, 31), 0.002% in Norway and 0.0056% in Greece (32). In the present survey, none of individuals had a history of previous transfusion and we could not find any relationship in this regard. There was a higher rate of positive HTLV1/2 samples in the current investigation in comparison with some other studies from the country. The presumed reasons are possibly a more endemic region of study and the use of more careful techniques such as western blott analysis and Plymerase

<table>
<thead>
<tr>
<th>Variable</th>
<th>No.</th>
<th>Positive cases (%)</th>
<th>Odd Ratio (OR)</th>
<th>OR95%CI</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0-19</td>
<td>429</td>
<td>13(3.03)</td>
<td>Baseline</td>
<td></td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>20-29</td>
<td>2556</td>
<td>49(1.92)</td>
<td>0.625</td>
<td>0.336-1.163</td>
<td></td>
</tr>
<tr>
<td>30-39</td>
<td>2018</td>
<td>88(4.36)</td>
<td>1.459</td>
<td>0.807-2.637</td>
<td></td>
</tr>
<tr>
<td>≥40</td>
<td>3051</td>
<td>377(12.36)</td>
<td>4.512</td>
<td>2.571-7.918</td>
<td></td>
</tr>
<tr>
<td>Sex</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>1565</td>
<td>130(8.31)</td>
<td>1.386</td>
<td>1.128-1.704</td>
<td>0.002</td>
</tr>
<tr>
<td>Female</td>
<td>6489</td>
<td>398(6.13)</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Year</th>
<th>Number</th>
<th>HTLV-1 (%)</th>
<th>HTLV-2 (%)</th>
<th>Total Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>2014</td>
<td>Positive: 58</td>
<td>3.01</td>
<td>1.30</td>
<td>4.31</td>
</tr>
<tr>
<td></td>
<td>Total: 1350</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2013</td>
<td>Positive: 94</td>
<td>4.11</td>
<td>1.07</td>
<td>5.18</td>
</tr>
<tr>
<td></td>
<td>Total: 2337</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2012</td>
<td>Positive: 115</td>
<td>5.12</td>
<td>1.00</td>
<td>6.12</td>
</tr>
<tr>
<td></td>
<td>Total: 2188</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2011</td>
<td>Positive: 117</td>
<td>5.13</td>
<td>1.02</td>
<td>6.15</td>
</tr>
<tr>
<td></td>
<td>Total: 2057</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2010</td>
<td>Positive: 122</td>
<td>5.74</td>
<td>1.08</td>
<td>6.82</td>
</tr>
<tr>
<td></td>
<td>Total: 1789</td>
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chain reaction (PCR) in some of those studies. Furthermore, in this study the age group of upper 40 years had a higher prevalence of HTLV-1 and 2, suggesting a higher carrier state for the virus. The results depicted that the both HTLV-1 and HTLV-2 are present in Neyshabur city, Northeast of Iran and the seroepidemiology of these agents is decreasing similar to other previous studies from other Northern cities.

**Conclusion**

In this study the both HTLV-1 and HTLV-2 was positive with a high rate among blood donors of Neyshabur city in each year from 2010-2014. The prevalence of HTLV-1 was higher than HTLV-2 in all the years of this study.

**Acknowledgement**

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**References**


