

## Seroepidemiology of HTLV-1 and HTLV-2 Infection in Neyshabur City, North-Eastern Iran, during 2010-2014

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### ABSTRACT

**Background:** Retroviruses of human T-lymphotropic viruses (HTLV-1 and HTLV-2) have been demonstrated to be endemic in the north-eastern region of Iran. This study was aimed to determine the HTLV-1 and HTLV-2 prevalence among healthy individuals in Neyshabur City during 2010-2014. **Methods:** A total of 8054 blood samples were collected from healthy participants in Neyshabur, North-Eastern Iran. The blood samples were screened for the presence of specific antibodies against HTLV-1 and HTLV-2 by using ELISA according to the manufacturer's instructions. **Results:** The overall seropositivity rate for HTLV-1 and HTLV-2 was found to be 6.55% (528 out of 8054) among participants. **Conclusion:** Both HTLV-1 and HTLV-2 were demonstrated to be at a high rate in healthy individuals. However, a smaller number of asymptomatic carriers were found in this study, as compared to those identified in previous investigations in the city. **DOI: 10.6091/21.1.57**

**Keywords:** Human T-lymphotropic virus, Seroepidemiology, Enzyme-linked immunosorbent assay, Iran

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### INTRODUCTION

Human T-lymphotropic viruses (HTLV-1 and HTLV-2), classified in the retroviridae family, are among the first identified species<sup>[1-3]</sup>. HTLV-1 and HTLV-2 are widespread all over the world and are endemic in different areas, including North-Eastern Iran<sup>[4-6]</sup>. According to a previous study, the rate of HTLV-1 infection has been reported to be less than 0.26% in Mashhad, North-Eastern Iran, while it does not exceed 0.34% in other areas of the country<sup>[7]</sup>. The prevalence of HTLV-1 infection in other countries such as Turkmenistan, Brazil, Spain, Korea and Japan was found to be 0.007%<sup>[8]</sup>, 1.9%<sup>[9]</sup>, 0.001%<sup>[10]</sup>, 0.27%<sup>[11]</sup>, and 0.12%<sup>[12]</sup>, respectively.

HTLV-1- and HTLV-2-infected carriers remain asymptomatic for a long time, serving as a potential source for the transmission of the disease<sup>[13]</sup>. The aim of this investigation was to determine the prevalence of HTLV-1 and HTLV-2 among healthy individuals in Neyshabur, North-Eastern Iran, during 2010-2014.

### MATERIALS AND METHODS

#### Study population

A total of 8054 healthy individuals from Neyshabur, North-Eastern Iran, were included in this study. Serum samples (5 ml) were prepared from the individuals and stored at -20°C until the ELISA test.

**Table 1.** Age- and sex-based distribution of individuals and overall HTLV-positive cases

Variable	No.	Positive cases (%)	Odds Ratio (OR)	OR (95%CI)	P value
Age (year)					
0-19	429	13(3.03)	Baseline		<0.0001
20-29	2556	49(1.92)	0.625	0.336-1.163	
30-39	2018	88(4.36)	1.459	0.807-2.637	
≥40	3051	377(12.36)	4.512	2.571-7.918	
Gender					
Male	1565	130(8.31)	1.386	1.128-1.704	0.002
Female	6489	398(6.13)			

### Serological assays and confirmation tests

Serum samples were screened for the presence of specific antibodies against HTLV-1 and HTLV-2 by ELISA (Dia.Pro Diagnostic Bioprobes, Italy) according to the manufacturer's instructions<sup>[14]</sup>.

### Statistical analysis

The SPSS software (version 20) was employed to analyze all data using chi-square and *t*-test. A  $P < 0.05$  was considered to be statistically significant.

## RESULTS AND DISCUSSION

Of 8054 healthy individuals participated in the study, 1565 (19.4%) and 6489 (80.6%) were males and females, respectively. As shown in Table 1, the mean age of males and females was  $46 \pm 3$  and  $51 \pm 3$  years, respectively. The positivity of the samples was 6.55% (528 out of 8054), including 3.6% for HTLV-1 and 1.4% for HTLV-2. Table 2 indicates the total prevalence of HTLV-1 and HTLV-2 in each year.

Previous studies have revealed that HTLV-1 is endemic in North-Eastern Iran<sup>[15]</sup>. Another study in Neyshabur has indicated that the prevalence of HTLV-

1 is 7.2% (35 out of 483)<sup>[16]</sup>. However, the rate of HTLV-1 seropositivity has gradually decreased from 1.97% in 1996 to 0.26% in 2014<sup>[17-19]</sup> in other regions of North-Eastern Iran. Similarly, the results of the present study demonstrated that the prevalence of HTLV-1 has decreased in Neyshabur from 2010 to 2014. In a survey carried out in Mashhad in 2012, the rate of HTLV-1 was detected to be 0.47%<sup>[20]</sup>. The seroprevalence of HTLV-1 did not exceed 0.19% in a study conducted by Safabakhsh *et al.*<sup>[7]</sup>. It seems that the reduction in HTLV-1 rate is mainly due to the improvement of blood donor selection and increased awareness among blood donors. However, in a study performed by Rafatpanah *et al.*<sup>[21]</sup> in Mashhad, it was revealed that the prevalence of HTLV-1 is 20% (10 positive samples), although no evidence of HTLV-2 infection was found among immunoblotted samples and nested PCR.

In the current study, over 3% of healthy individuals were positive for HTLV-1 in all five years. To the best of our knowledge, there is a small number of published data regarding HTLV-2 prevalence in Iran. Also, a lower rate of positive HTLV-1 infection was identified in the present investigation, when compared to a previously study in Neyshabur<sup>[22]</sup>. This finding

**Table 2.** The annual prevalence of HTLV-1 and HTLV-2 investigated in this study

Year	Number	HTLV-1 (%)	HTLV-2 (%)	Total percentage
2014	Positive: 58 Total: 1350	3.01	ND	3.01
2013	Positive: 94 Total: 2337	4.11	ND	4.11
2012	Positive: 115 Total: 2188	5.12	ND	5.12
2011	Positive: 117 Total: 2057	5.13	ND	5.12
2010	Positive: 122 Total: 1789	5.74	ND	5.74

ND, not determined

highlights that Neyshabur is a major endemic region for HTLV-1. In addition, a higher prevalence of HTLV-1 was found in the age groups over 40 years, suggesting that there is a relationship between HTLVs and the age of individuals.

In the present study, a high rate of HTLV-1 among serum samples was detected using the ELISA test among healthy individuals in Neyshabur city during 2010-2014. The results from this study emphasize that HTLV is still an important endemic disease in Neyshabur. More importantly, the prevalence of HTLV-1 in Neyshabur was detected to be higher than other city (Mashhad) in all duration of this study, though being in a decreasing status compared to the previous reports.

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**CONFLICT OF INTEREST.** None declared.

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