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Original Article

Seroprevalence of Human T-lymphotropic Virus Infections among Pregnant Women in Urmia, Northwest Iran

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A B S T R A C T

Introduction: The human T-lymphotropic virus (HTLV)-1/2 is a retrovirus that can cause adult T-cell leukemia/lymphoma, tissue-necrotizing lymphadenitis, and tropical spastic paraparesis. The purpose of this study was to determine the prevalence of HTLV infection in pregnant women receiving care in Urmia, sited in northwest Iran.

Materials and Methods: A cross-sectional study was conducted on 86 pregnant women in Urmia between May and September 2014. Following interviews and blood sample collection, the participants were screened for IgG antibodies against HTLV-1/2 using commercial enzyme-linked immunosorbent assays.

Results: The average age of the participants was 25.56 ± 5.30 years, with 3 individuals (3.49%) reporting a history of blood transfusion and 18 patients (20.93%) having experienced previous abortions. Serological testing did not reveal any evidence of HTLV-1/2 infection in the study population.

Conclusion: While screening for HTLV-1/2 infection in pregnant women holds significance, it appears that during the study period, this issue was not recognized as a major health concern among pregnant women in Urmia. This observation aligns with findings from other research in Iran, where awareness and emphasis on HTLV-1/2 screening in pregnant populations remain relatively low.

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Introduction

Human T-lymphotropic virus (HTLV) infection in pregnant women poses a significant public health concern, especially in endemic areas. The prevalence of this infection varies depending on the region. In endemic areas of Iran, such as Mashhad and Neyshabur, the incidence rate among pregnant women ranges from 1.5% to 3.3% [1]. Brazil has an estimated infection rate of 1.05% [2]. A recent study conducted in the Peruvian Amazon revealed a prevalence of 1.7% among pregnant women [3]. The prevalence of HTLV-1/2 infection among pregnant women from the Caribbean, South America, and Central America regions CSA & C regions is reported to be 1.3%, with HTLV-1 being the predominant type. This rate exceeds that of other routinely screened microbial agents during antenatal care, such as human immunodeficiency virus (HIV), hepatitis B, and syphilis. Consequently, mandatory antenatal testing for HTLV-1/2 is recommended for pregnant women from the CSA & C globally [4]. The research on HTLV prevalence in pregnant women has significant implications for public health policy, clinical practice, and further research in the field of HTLV infection. This study aimed to ascertain the prevalence of HTLV infection among pregnant women receiving care in Urmia, located in northwest Iran.

Materials and Methods

This cross-sectional study was conducted in Urmia, the capital city of West Azerbaijan Province in the northwest of Iran. Eighty-six pregnant women were randomly selected from those referred to health centers in Urmia for routine pregnancy follow-up. These women resided in various areas of the city. The study took place from September 2014 to May 2015. The participants completed a questionnaire through interviews. The questionnaire asked about previous pregnancy outcomes, including the medical history of abortion (number of times abortion occurred during pregnancy) and the number of previous pregnancies. Serum samples were separated and stored at -20 °C. Zero point five cubic centimeters 0.5 cc of serum sample was required for each test. HTLV-1/HTLV-2 IgG was determined using enzyme-linked Immunosorbent assay (ELISA; DIA.PRO Diagnostic Bioprobes Srl, Italy; sensitivity of 100% and a specificity greater than 99.5%). Frequency tables were utilized, and a bar chart was employed to display the characteristics of the study population. Data were analyzed using SPSS version 20 and Excel Software 2007.

Results

The average age of the patients was 25.56 years (SD = 5.3). The majority of the patients were born in rural areas, but currently, most of them reside in urban areas. Approximately 60% of the patients had completed undergraduate education. A significant proportion of the pregnant women studied (72.23%) reported a history of one abortion (Table 1). In the ELISA examination of the samples, all serum samples tested negative for IgG HTLV-I/II.

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Table 1. Characteristics of the study population

Variables		
Mean of Age (years)		25.56 ± 5.3 *
Place of birth	Urban	42 (48.83) **
	Rural	44 (51.17)
Residency	Urban	77 (89.53)
	Rural	9 (10.47)
Educational level	Illiterate	30 (34.88)
	Undergraduate	52 (60.46)
	Graduate	4 (4.66)
History of blood transfusion		3 (3.49)
History of tattoo		4 (4.65)
History of abortion		18 (20.93)
No. of abortion	1	13 (72.23)
	2	2 (11.11)
	3	2 (11.11)
	4	1 (5.55)

* Standard Deviation; ** Data are presented as N (%)

Discussion

This study examined the serological status of HTLV I/II in pregnant women receiving healthcare at government health centers in Urmia, an area of Iran that is not endemic to the virus. However, the study population showed a 0% prevalence of HTLV I/II.

The occurrence rates within different demographic groups demonstrate a higher prevalence in nations with lower Human Development Index (HDI) scores compared to those with higher HDI scores, highlighting the existing disparity and underscoring significant implications for public health and policy, particularly in the realms of disease prevention and healthcare resource allocation. The global prevalence of HTLV-1 infection varies significantly, with an estimated prevalence of 0.91%. Notably, in countries with high HDI, the prevalence is approximately three times lower than in countries with low HDI. Moreover, the prevalence in the general population surpasses that in pregnant women by about fivefold and is 41 times more prevalent than in blood donors [5].

Previous studies in Urmia have assessed the serological status of HTLV among kidney graft recipients, hemodialysis patients, and patients with hereditary bleeding diseases [6-8]. One out of 91 (1.09%) renal transplant recipients were HTLV positive [6]. Among hemodialysis and blood donor patients in Urmia between 2005 and 2006, 2.6% of cases tested positive for HTLV by ELISA. The total seroprevalence of HTLV in healthy blood donors was 0.34% [7]. Seropositivity of HTLV-1 among kidney graft recipients was 1.09% in Urmia in 2010 [6]. Infection was not

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found in any of the patients with Hereditary Bleeding in Urmia [8].

Research on HTLV infection in pregnant women in Iran has been conducted. Studies have shown a higher prevalence of HTLV-1 infection in pregnant women compared to non-pregnant women in cities such as Mashhad and Neyshabur, located in Razavi Khorasan Province, which are endemic areas for HTLV-1 infection in Iran. The incidence rate of HTLV-1 infection in pregnant women in these areas ranges from 1.5% to 3.3% [1]. Additionally, a study in Mashhad, Iran, investigated the role of genetic polymorphisms in the *MASP2* gene and its association with susceptibility to HTLV-1 infection. The study found that specific genetic variations in the *MASP2* gene were associated with a higher risk of HTLV-1 acquisition in blood donors from Mashhad, Iran [9].

On the contrary, the southeastern regions of Iran have been identified as endemic areas for HTLV. Around the same period as our study, a separate investigation conducted in Sari, Iran, involving 1092 pregnant women, reported an HTLV prevalence of 0.2%. Consequently, due to the low prevalence of this infection, screening was not advised [10]. In different regions of Golestan province, HTLV-1 seroprevalence rates among healthy individuals were noted as follows: 0%, 0%, 0.1%, 1.9%, 0.3%, 0%, and 2.6%. The eastern part, which borders Khorasan province, exhibited the highest rate of 2.6% [11].

It is important to note that although the prevalence of HTLV infection varies by location [12], in non-endemic regions like Urmia, there is no available research indicating a complete absence of HTLV infection among pregnant women. To draw meaningful conclusions about the absence of HTLV prevalence, researchers need studies that specifically test pregnant women for HTLV and consistently find zero cases across numerous large and representative samples. Presently, existing literature tends to focus on determining the prevalence rather than reporting instances of no infections. While reporting null results is crucial to mitigate publication bias, the emphasis in current research lies more on quantifying prevalence rather than studies that do not detect any infections. A more thorough reporting of research outcomes, including studies with no observed HTLV cases, would offer a more comprehensive understanding of the epidemiological landscape within this population.

Considering the current knowledge and valuable evidence available, it is important to highlight that HTLV-1 infection poses a significant health concern among Iranian patients who receive multiple transfusions. The prevalence of HTLV-1 infection among individuals who undergo frequent transfusions in Iran varies significantly across different regions of the country; however, it is endemic in nearly all provinces [13].

Conclusion

While HTLV infection may not be as prevalent in Urmia compared to some other regions, it remains crucial to screen pregnant women for this condition. Factors that are

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linked to a higher prevalence of HTLV include lower educational attainment, lack of condom use before pregnancy, and a family history of infectious diseases. This study suggests conducting further research to assess the clinical evidence regarding the absence of HTLV I/II infection in pregnant women in this province. The 2014 study was carried out in the West Azerbaijan region. It is noteworthy that publishing articles on seronegative HTLV in pregnant women is significant as it highlights the potential limitations of current screening procedures and their implications for the vertical transmission of the virus. Understanding the factors contributing to false-negative results in HTLV testing among pregnant women is vital for improving diagnostic precision and implementing effective preventive measures. Research on seronegative HTLV in pregnant women can also guide healthcare practices and policies aimed at reducing the risk of mother-to-child transmission and enhancing outcomes for both mothers and infants.

Ethical Considerations

The Ethics Committee of Urmia University of Medical Sciences approved the study with the code No. IR.UMSU.REC.1394.30

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The responsible author covered the experiment and other associated costs.

Conflict of Interest

The authors declared no conflict of interest.

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Authors' Contributions

Z.R. was responsible for designing the review protocol, conducting the literature review, providing feedback on the manuscripts, writing the manuscript and improving the interpretation of the results. S.O. was responsible for writing the manuscript, assembling data, analyzing data, and interpreting analyses.

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