

Structure Of The Single Health System For Diagnosis Of Htlv-1/2 In The Northern Region Of Tocantins

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Abstract:

Background: The Human T-cell Lymphotropic Virus (HTLV), the first human retrovirus discovered, is associated with oncogenesis and is subdivided into several groups, with types 1 and 2 being the most prevalent and clinically relevant. Its main forms of transmission include unprotected sexual intercourse, blood transfusions, tissue and organ transplants, as well as vertical transmission (mother to newborn). In Brazil, mandatory testing for HTLV was implemented in the 1990s for blood donations and transplants, and expanded in 2024 by Ordinance No. 3,148 of the Ministry of Health, which includes testing during prenatal care. **Objective:** This study aimed to evaluate the structure of the Unified Health System (SUS) in the municipalities of the far north of Tocantins for the diagnosis of HTLV-1/2. **Methodology:** This is a qualitative study, in which semi-structured questionnaires were applied to Primary Care professionals and municipal health managers. **Results:** The results indicated significant deficiencies in knowledge of national protocols and the absence of a structured municipal flow for testing. **Conclusion:** It can be concluded that the health structure of the municipalities evaluated is insufficient for the effective diagnosis of HTLV-1/2.

Key Word: Htlv-1\2; Structure; Diagnosis; Public Health.

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I. Introduction

The Human T-Cell Lymphotropic Virus (HTLV) belongs to the Retroviridae family, which is characterized by the presence of the enzyme reverse transcriptase, responsible for synthesizing DNA from RNA. Part of the Deltaretrovirus genus (Coffin, 1996), HTLV was the first human retrovirus diagnosed in 1980 and is associated with oncogenesis. Molecular analysis reveals that HTLV has a spherical structure, surrounded by the glycoproteins gp46 and gp21, with its core composed of RNA, protected by a capsid formed by the proteins p15, p19 and p24 (Johnson et al., 2001; Shimotohno et al., 1985). Four distinct types of HTLV have been identified (HTLV-1, HTLV-2, HTLV-3 and HTLV-4), of which only types 1 and 2 infect humans. HTLV-1, the first to be identified, is subdivided into six subtypes (a, b, c, d, e, f), while HTLV-2 is classified into four subtypes (a, b, c, d), with subtype C being found exclusively in indigenous Brazilian populations (Rosada et al., 2021). As a virus, HTLV does not have its own metabolism and therefore depends on a host for its replication.

Transmission of the virus occurs through the transfer of infected T lymphocytes (CD4+ or CD8+) present in body fluids such as blood, breast milk, vaginal secretions and semen (Gallo, 2005). These fluids can be transmitted through unprotected sexual intercourse, breastfeeding, vertical transmission during pregnancy, blood and organ transfusions, and contact with contaminated sharps (Schierhout et al., 2020). In Brazil, mandatory HTLV testing was implemented in 1993 for blood donors and in 2009 for organ donors (Rosada et al., 2021). On April 4, 2022, the Ministry of Health published Ordinance No. 3,148, which includes HTLV testing in prenatal care.

An analysis of the clinical conditions of people living with HTLV (PLWHIV) shows that the pathological complications vary according to the type of virus. HTLV-1, for example, mainly attacks CD4+ T cells, leading to a series of clinical conditions, such as adult T-cell leukemia/lymphoma (ATLL) - a neoplasm in peripheral T cells - HTLV-1-associated myelopathy (HAM), a neurodegenerative disease, and some dermatitis (Rosada et al., 2021). In contrast, HTLV-2 is associated with CD8+ T-cell attack, but has a limited association with specific clinical conditions. This virus has adapted so much to humans that it can serve as a marker of migration. Recently, some studies have identified rare diseases in indigenous populations in North America, endemic for HTLV-2, which are related to this type of virus (Ishak; Ishak; Vallinoto, 2020).

HTLV infection is diagnosed in two stages. The first stage consists of a screening test that analyzes serum and blood plasma to detect antibodies against the virus. If the result is positive, a second stage is carried out with a confirmatory test (Rosada et al., 2021). Treatment, in turn, focuses on dealing with the clinical complications caused by the HTLV-1 and HTLV-2 viruses, since no effective tools have yet been developed to directly combat the virus.

In the clinical context, some groups have received greater attention due to the incidence of cases or the possibility of prevention. Currently, pregnant and puerperal women are the target of special attention, since vertical transmission of the virus, which occurs mainly through breastfeeding, can be interrupted with early diagnosis of the infection. The general objective of this study is to evaluate the structure of the Unified Health System (SUS) in the municipalities of the far north of Tocantins for the diagnosis of HTLV-1/2.

II. Material And Methods

The research was carried out in the municipalities of Augustinópolis, Araguatins, Praia Norte and Sampaio, Tocantins, Brazil, between August 2022 and June 2023. This is a descriptive study, with a quantitative approach, focusing on assessing health professionals' knowledge of HTLV. The sample included primary care health professionals (doctors and nurses) and public managers who agreed to participate voluntarily. The research aimed to understand the knowledge of professionals in the region about HTLV, without the intention of comparing knowledge between municipalities or professional categories. Therefore, the exact number of participants per municipality and category was not recorded.

Participants were informed about the research by means of a Free and Informed Consent Form (FICF), which they signed before taking part. Two types of questionnaire were used: one with 14 questions for health professionals and another with 8 questions for health managers, both containing open and closed questions. The interviews took place according to the availability of the participants. The data was analyzed using Microsoft Excel 2010, with quantification in absolute numbers and percentages, presented in tables and charts. The study guaranteed the confidentiality of the participants' personal and professional information, following the ethical guidelines of Resolution No. 466/12, which ensure protection and privacy during research. The research was approved by the Research Ethics Committee (CEP) of the State University of Tocantins, under opinion no. 58733622.7.0000.8023.

III. Result Discussion

Due to high turnover, overload of duties and other obstacles, only two municipal health managers (from the 4 municipalities surveyed) agreed to take part in the survey, even after several appointments. The data related to their knowledge and planning regarding HTLV-1/2 is shown in Table 1.

Analyzing the initial data of the first variants (in Table 1), which assess the participants' raw knowledge (such as the basic concept and forms of diagnosis), it can be seen that 50% of the managers interviewed claim to be aware of the virus and its screening. However, it should be emphasized that the low adherence of other health managers raises the hypothesis that the relative frequency found is far from reality. This hypothesis was raised due to the lack of studies and teaching resources on the virus, in addition to some other studies carried out on the general knowledge of health managers which show, for example, that a large proportion of municipal health secretaries are not aware of the National Policy for Integrative and Complementary Practices (PNPIC) (Silva; Feitosa, 2018).

The data obtained also makes it possible to evaluate the material and human resources involved in diagnosis and qualified follow-up for people living with HTLV-1/2 (HTLV-PV), in the variables that ask about the flow of testing, the training of professionals and the occurrence of cases. Only one of the managers interviewed knew how to carry out the diagnostic test for the virus. This same manager detailed in the questionnaire how testing worked in his municipality:

"[...] there is a group of students, coordinated by a professor from a higher education institution, who develop actions and carry out the tests on a routine basis or when requested".

With this discursive response from the manager who said he knew how to carry out the testing, we can see that the municipality does not have its own flowchart for screening or referral to the state laboratory network.

Thus, it is clear that the municipality was unable to comply with the requirement made by Ordinance No. 715 (before its repeal), regarding mandatory testing for HTLV-1/2 during prenatal care.

By examining some of the other variables in Table 1, it is also possible to assess the experience of these managers with suspected or confirmed cases of HTLV-1/2. When asked about requests for testing from users or PHC professionals in their municipalities, only one said that such a request had occurred. However, when asked how he proceeded with this request, the manager gave a totally disconnected answer:

“Health education on the subject; round table discussions and testing”.

Still on the subject of managers' experience with suspected or confirmed cases of HTLV-1/2, one of the municipal health secretaries claimed to have had a case diagnosed in the municipality during his time in office. When asked how this person living with HTLV was followed up, the manager's response was:

“At the time, there was no specific follow-up due to a lack of knowledge on the part of the professionals and even due to the change in management and turnover of professionals.”

This shows that, despite the manager's initial positive response to the experiences with HTLV-1/2 testing and diagnosis, the procedures and concepts discussed in the open questions are at odds with the protocol. Since the ideal test would be to perform or refer to a reference laboratory that performs two stages: a screening stage (enzyme-linked immunosorbent assay, chemiluminescence or particle agglutination) and a confirmation stage (western blot, ELISA or PCR) (Brazil, 2022). In addition, follow-up for HTLV PV is essential for monitoring clinical findings, and family screening should also be carried out (Rosada et al., 2021).

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Table 1. Health managers' knowledge of HTLV.

Variable	N	%
Do you know about HTLV?		
No	1	50,0
Yes	1	50,0
Do you know how to diagnose HTLV-1/2?		
Yes	1	50,0
No	1	50,0
Do you know how the HTLV-1/2 diagnostic test can be carried out within the municipality under your management?		
Yes	1	50,0
No	1	50,0
In the municipality under your management, have you carried out any awareness-raising activities for the population about HTLV-1/2?		
Yes	1	50,0
No	1	50,0
Have PHC health professionals in the municipality under your management received any training on HTLV-1/2 during your administration?		
Yes	1	50,0
No	1	50,0
Table 1- continuation		
Have professionals or any SUS users asked for HTLV-1/2 testing to be reassessed in the territory under your		

administration?		
Yes	1	50,0
No	1	50,0
Have any patients been diagnosed with HTLV-1/2 in the municipality you manage?		
Yes	1	50,0
No	1	50,0
Are you aware of Ministry of Health Ordinance No. 715, published on April 4, 2022?		
Yes	1	50,0
No	1	50,0
In the municipality under your management, is HTLV-1/2 screening carried out during prenatal care?		
Yes	1	50,0
No	1	50,0

N = absolute frequency, % = relative frequency

Source: Authors

Among the health professionals (doctors and nurses) working in Primary Health Care (PHC) in the four municipalities selected in Tocantins, only 30 agreed to take part in the survey, and not all of them answered the questionnaire completely. This limited number was due to the high turnover of some professionals and their absence on the days the basic units were visited. The data obtained was organized into several tables to facilitate interpretation.

Table 2 brings together the variables that allow us to analyze the professionals' knowledge of the clinical and molecular universe of HTLV-1/2. The first variable indicates that the majority of participants (70%) have knowledge of HTLV, which contrasts with previous studies, such as Nascimento et al. (2022), which found that 60% of nursing professionals in the interior of Pará have little or no knowledge of the virus. However, the knowledge of these professionals cannot be assessed by this first variable alone, because in the subsequent questions, the levels of correct answers and the proportion of affirmative answers decrease.

In the second variable, for example, only 46.42% of participants said they knew the subtypes of HTLV, and only 41.66% answered correctly about the type of treatment for HTLV. Other variables show that a significant number of participants (68.18%) answered correctly about the pathologies associated with HTLV, such as leukemia and spastic paraparesis. In addition, 66.66% said they knew how the virus is transmitted and 65.51% knew how to prevent it. Although the level of knowledge of the professionals interviewed is higher than that observed by Nascimento et al. (2022), the initial figure of 70% of professionals having knowledge of HTLV should be reconsidered, since, in basic concepts of the virus, such as transmission, diagnosis and treatment, the percentage and absolute number of correct answers were lower than this initial estimate.

Table 2. Knowledge of health professionals working in primary health care (PHC) in the municipalities of northern Tocantins about HTLV-1/2.

Variable	N	%
Do you know about HTLV?		
Yes	21	70,0
No	9	30,0
Do you know the types of HTLV?		
Yes	13	46,42
No	15	53,57
Do you know the forms of transmission for HTLV?		
Yes	20	66,66
No	10	33,33
Do you know how HTLV-1/2 is diagnosed?		
Yes	17	60,71
No	9	32,14
What type of treatment is used for HTLV?		
Antibiotics	3	12,50
Antiviral	11	45,83
No treatment	10	41,66
Which of the following pathologies are associated with HTLV?		
Leukemia and spastic paraparesis	15	68,18
Kidney disease and diabetes	0	-
Dyslipidemia and changes in liver enzymes	7	31,81
Do you know how to prevent HTLV?		
Yes	19	65,51
Table 2- continuation		
No	10	34,48

N = absolute frequency, % = relative frequency

Source: Authors

Table 3 shows the level of clinical education and knowledge of the participants (doctors and nurses) about the Ministry of Health (MoH) protocols, according to the questions in these official documents. It is worth noting that Ordinance No. 715, of April 2022, which made testing mandatory, was revoked on January 13, 2023 and replaced by Ordinance No. 3,148, of February 6, 2024. Thus, while the questionnaires were being administered, the previous ordinance was still in force. The stork network, replaced by RAMI and then by the stork network again, was more familiar to professionals, and the changes between the programs were reflected in Ordinance No. 715.

Looking at Table 3, the reduction in absolute frequency compared to the initial variables in the questionnaire is remarkable. A significant number (47.36%) answered incorrectly about the program developed by the Ministry of Health for HTLV testing. Two other important variables, knowledge of the Clinical Management Manual for HTLV-1/2 and Ordinance No. 715, showed high frequencies of ignorance, with 91.66% and 84.61%, respectively. This data is in line with studies showing the low level of knowledge among health professionals about national health policies and programs, such as the lack of knowledge about the National Policy for Integrative and Complementary Practices (Silva; Feitosa, 2018). Lack of knowledge of official protocols compromises the applicability of health strategies, as it prevents standardization and quality in the provision and execution of services.

Table 3. Applicability of the Clinical Management Manual and Ordinance No. 715, both published by the Ministry of Health, in the municipalities of the far north of Tocantins.

Variable	N	%
Is there a program currently developed by the Ministry of Health that performs HTLV testing?		
Men's health	9	47,36
Elderly health	0	-
Stork Network	10	52,63
Hiperdia	0	-
Does the pregnant woman need specific guidance on HTLV?		
Yes	28	96,55
No	1	3,44
Are you aware of Ministry of Health Ordinance No. 715, published on April 4, 2022?		
Yes	4	15,38
No	22	84,61
Are you aware of the Clinical Management Manual for HTLV-1/2 published by the Ministry of Health?		
Yes	2	8,33
No	22	91,66
In the municipality where you work, is screening for HTLV-1/2 carried out during prenatal care?		
Yes	5	20,83
No	19	79,16

N = absolute frequency, % = relative frequency

Source: Authors

An interesting fact is the high percentage of participants who said that pregnant women need specific guidance on HTLV, with 96.55% (N=28) marking "yes". However, only 14 of the 28 participants who recognized the need for guidance for pregnant women mentioned some form of guidance in the questionnaire. Of these 14 open answers, only 11 were considered valid according to current literature, covering aspects such as restricting breastfeeding, special care during childbirth and condom use. The remaining three participants characterized the virus infection as a diagnosis of disease, perpetuating stigmas associated with sexually transmitted infections. Table 4 shows variables that allow us to infer the experience of Primary Health Care (PHC) professionals (doctors and nurses) in the selected municipalities in relation to HTLV.

Table 4: Experiences of PHC professionals (doctors and nurses) related to HTLV-1/2.

Variable	N	%
In the unit where you work, is there or has there been any action on HTLV?		
Yes	6	22,22
No	21	77,77
Have any patients been diagnosed with the HTLV-1/2 virus in the unit where you work?		
Yes	3	12
No	22	88

N = absolute frequency, % = relative frequency

Source: Authors

Looking at the data in Table 4, it can be seen that most of the professionals interviewed (77.77%) had never offered any popular health education on HTLV in their basic units. This data reinforces the neglect of the

virus, contributing to the persistence of a high number of users and health professionals with little or no knowledge of HTLV (Nascimento et al., 2022).

The last variable in Table 4 reveals that only 12% (N=3) of the professionals who answered this question had ever had a patient diagnosed with the virus. Of those who reported having seen diagnosed patients, only two described their recommendations. The first reported referring the patient to an infectious disease referral center, but did not say whether there was a counter-referral. The second only warned about the risks of breastfeeding. In none of the cases mentioned was family screening carried out (Rosada et al., 2021) or counseling according to current literature guidelines.

IV. Conclusion

Given the data and analysis presented, it is clear that health managers lack knowledge about HTLV-1/2. Although one of the participants claimed to have knowledge of the virus, his discursive answers showed superficiality and disagreement with the official protocols, and none of the municipalities has a pre-established flow for screening or confirmatory tests. This has a negative impact on the quality of life of people living with HTLV, compromises the qualifications of municipal health professionals and limits the effective dissemination of prevention measures. In addition, health professionals in the municipalities studied have an intermediate knowledge of basic concepts of the virus, but are uninformed about official protocols, such as the Clinical Management Manual and Ordinance No. 715. This lack of knowledge results in inadequate clinical conduct, lags in referrals and counter-referrals, and insufficient health education. In short, the municipalities in the far north of Tocantins lack the necessary structure for the proper diagnosis and management of HTLV-1/2.

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