

## Tuberculosis/HIV coinfection in the Western Amazon: epidemiological profile according to sex

### Coinfecção tuberculose/HIV na Amazônia Ocidental: perfil epidemiológico segundo sexo

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**ABSTRACT | OBJECTIVE:** To analyze the epidemiological profile of tuberculosis/HIV coinfection according to the sex in a municipality in the Western Amazon in Brazil. **METHODS:** Cross-sectional study accomplished through sociodemographic, clinical, and follow-up variables of 278 cases of coinfection reported in the Notifiable Diseases Information System between 2014 and 2018. Data were analyzed by descriptive statistics, Chi-square, and Fisher's exact tests. **RESULTS:** Most cases were black race/color (79.5%); had less than eight years of schooling (64.4%). The minority constituted special populations ( $\leq 5.4\%$ ) and present comorbidities ( $\leq 21.2\%$ ). New cases (62.2%) and pulmonary tuberculosis (61.5%) were predominant in both sexes. Most cases were reported in hospitals (67.3%); were not submitted to rapid molecular test (63.6%) nor sensitivity test (94.1%); had an image suggestive of tuberculosis (79.1%); was accompanied by a specialized service (68.7%); and did not perform Directly Observed Treatment (83.8%). Positive results of smear microscopy and accomplishment of smear microscopy in the first month of treatment were associated with males. The cure rate was low, and treatment default was high in both sexes. Death was high among males. **CONCLUSION:** Epidemiological profile of the cases studied differed between sexes in terms of the result of the diagnostic microscopy and the accomplishment of the treatment microscopy.

**DESCRIPTORS:** Tuberculosis. HIV. Coinfection. Health Profile.

**RESUMO | OBJETIVO:** Analisar o perfil epidemiológico da coinfecção tuberculose/HIV segundo o sexo em um município da Amazônia Ocidental. **MÉTODOS:** Estudo transversal, realizado com variáveis sociodemográficas, clínicas e de acompanhamento de 278 casos de coinfecção notificados no Sistema de Informação de Agravos de Notificação entre 2014 a 2018. Foi realizada estatística descritiva, teste Qui-quadrado e exato de Fisher. **RESULTADOS:** A maioria dos casos apresentava raça/cor parda (79,5%); menos de oito anos de escolaridade (64,4%). A minoria constituía populações especiais ( $\leq 5,4\%$ ) e apresentava comorbidades ( $\leq 21,2\%$ ). Casos novos (62,2%) e forma clínica pulmonar (61,5%) eram predominantes em ambos os sexos. A maioria foi notificada em hospitais (67,3%); não realizou teste rápido molecular (63,6%), nem teste de sensibilidade (94,1%); apresentava imagem sugestiva de TB (79,1%); era acompanhada por serviço especializado (68,7%); não realizava Tratamento Diretamente Observado (83,8%). Resultado positivo de baciloscopia de diagnóstico e realização de baciloscopia no primeiro mês de tratamento estiveram associadas ao sexo masculino. A taxa de cura foi baixa e de abandono do tratamento foi alta em ambos os sexos. O óbito foi alto entre o sexo masculino. **CONCLUSÃO:** O perfil epidemiológico dos casos diferiu entre o sexo quanto ao resultado da baciloscopia de diagnóstico e realização da baciloscopia de controle.

**DESCRITORES:** Tuberculose. HIV. Coinfecção. Perfil de Saúde.

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## Introduction

Brazil is one of the countries with the highest number of tuberculosis (TB) cases worldwide and notified 73,864 new cases in 2019, of which 6,221 (8.4%) were coinfection with HIV.<sup>1</sup> It is known that the risk of TB illness in people living with HIV (PLHIV) increases up to 28 times when compared to individuals not infected by the virus<sup>2</sup> and that TB is the leading cause of death in this population, revealing the impact that these conditions of health exercise on each other.<sup>3</sup>

TB is an infectious disease with high morbidity and mortality rates, reaching the population disproportionately according to socioeconomic situation and gender. Regarding gender, it is estimated that male accounted for 56% of TB cases worldwide in 2019 and is the majority of deaths from the disease.<sup>3</sup> In Brazil, the same is valid for HIV infection and in 2019, the reason for gender involvement was 26 men for ten women infected.<sup>4</sup>

Although worldwide, men are more likely to develop TB and/or get infected with HIV, the way the disease manifests, evolves, and ends in each sex can present differences due to the divergence of perceptions about health care and behaviors regarding the adoption of prevention and self-care actions, as well as adherence to treatment and outcome of cases. In addition, historically, the impact of TB illness diffused over a considerable period, when, for example, the man was the primary provider of the house, and his illness could lead to economic damage to the family. Also, during this period, the woman was the main caregiver of the home and represented the primary source of disease transmission to the whole family.<sup>5</sup>

It is noted that although TB was more diagnosed in males, the disease among women until the late twentieth century caused more deaths than all the causes of maternal mortality together, being a cause for great concern despite being an avoidable disease, treated and curable.<sup>6</sup>

Regarding the socioeconomic context, literature proves that TB is a disease of solid social determination and, when associated with HIV, are added and overlapping individual and collective vulnerabilities inherent to the biological, behavioral, and cultural situation.<sup>7</sup>

Thus, when considering the sanitary and epidemiological context of coinfection TB/HIV, the expanded concept of health needs, the multiplicity of dimensions involved, and the complexity of health actions, the organization of work processes proves to be the main question to be faced change the care model, to put it operating in a user-centered way and its needs.<sup>8</sup>

In this context, it is essential to emphasize the role of nursing as a professional practice that is part of a collective work process to produce health actions through specific knowledge, articulated with other team members in the social-political context of the sector health.<sup>9</sup> The performance of nurses in Sistema Único de Saúde - SUS (Unified Health System) has been an instrument of changes in health care practices in SUS, responding to the proposal of the care model that is not centered on the clinic and cure, but above all, on the integrality of care, in the front intervention risk factors, in disease prevention, and health promotion and quality of life.

In this sense, identifying the way coinfection TB/HIV affects and evolves in both sexes enables the qualification of care processes based on the elaboration of strategies in the face of the disease aligned with the specificities of each gender to ensure access to diagnosis, proper treatment, and management of cases, according to their individuality.

Thus, this study aimed to analyze the epidemiological profile of coinfection TB/HIV according to sex in a municipality in the Western Amazon.

## Methods

It is a cross-sectional study developed in Porto Velho, the capital of the state of Rondônia. This municipality has an estimated population, in 2018, of 519,531 inhabitants<sup>10</sup> and a Serviço de Assistência Especializada - SAE (Specialized Assistance Service) responsible for tracking, treating, and monitoring cases of HIV and coinfection TB/HIV.

The population of this study was made up of all cases of coinfection TB/HIV notified in the Sistema de Informação de Agravos de Notificação - SINAN

(Notification Disease Information System) from 2014 to 2018. As inclusion criteria, individuals of eighteen years old or older and resident in Porto Velho. Furthermore, as exclusion, those whose gender and/or HIV variables were blank, ignored, in progress, or not performed.

Among 430 cases of coinfection TB/HIV identified in the State of Rondônia from 2014 to 2018, 64.9% (279) were residents in Porto Velho, among whom one was excluded by the age under 18 years old; totaling 278 cases for this study.

The data were collected through a survey at SINAN, considering sociodemographic variables (sex, age, race/color, education, and special population - people deprived of liberty, homeless population, health professional, immigrant), clinics (type of entry, clinical form, disease, and associated diseases - alcoholism, use of illicit drugs, smoking, diabetes, and mental illness), diagnosis (notification unit, examinations - sputum smear microscopy, sputum culture, Rapid Molecular Test for TB (RMT-TB), Sensitivity Test, Chest X-ray and anti-HIV) and Treatment (treatment unit, treatment regime - Treatment Directly Observed (TDO), monthly control sputum smear microscopy and outcomes).

The data collected were stored in the Microsoft Excel program and analyzed through descriptive statistics in TIBCO® Statistica™ 13.4 software. The Chi-square test and Fischer's exact test were used, which were used in contingency tables when more than 20% of the expected values were less than five or when the expected frequency was less than 1. When the results of both tests pointed to a statistically significant association between the

variables, the interdependence pattern between them was tested through standard and adjusted residue analysis (difference between observed and expected) in a standard and adjusted form, in a way that waste above 1.96 or below -1.96 indicated, respectively, a significant positive or negative association between the variables. For all tests, a significance level of 5% was adopted.

In response to the recommendations of Resolution No. 466/2012 of the National Health Council<sup>11</sup>, the study was approved by the Research Ethics Committee of the Federal University of Rondônia, according to protocol 2,399,327 (CAAE 29113520.6.0000.5300).

## Results

Of the 278 cases analyzed, the majority (205 - 73.7%) were male, and the medium age among them was 37.23 years (SD = ± 10.69), being a minimum of 18 and a full 72 years. Among females, the average age was 41.21 years (SD = ± 12.41), a minimum of 18 and a maximum of 74 years.

Regarding the sociodemographic profile of reported cases of coinfection TB/HIV by gender, there is a predominance of individuals of both sexes of the black color, with 1 to 8 years of study and not belonging to the special populations (deprived of liberty, homeless population, health professional and immigrants) in both sexes. The sociodemographic variables did not have an association with the sex of participants (values in Table 1).

**Table 1.** Distribution of sociodemographic variables of cases reported in SINAN of TB/HIV coinfection, according to sex, Porto Velho, 2014-2018. (n=278)

Variables	Sex		p-value
	Female n(%)	Male n(%)	
<b>Race/color</b>			0.080*
Black	62(84.9)	159(77.6)	
Not black	10(13.7)	46(22.4)	
Blank/Ignored	1(1.4)	-	
<b>Education</b>			0.550
Illiterate	5(6.9)	12(5.9)	
1 to 8 years of study	46(63.0)	116(56.6)	
9 years or more of study	17(23.3)	66(32.2)	
Blank/Ignored	5(6.9)	11(5.4)	
<b>Special populations</b>			
<b>People deprived of liberty</b>			0.449
Yes	2(2.7)	13(6.3)	
No	57(78.1)	159(77.6)	
Blank/Ignored	14(19.2)	33(16.1)	
<b>Homeless population</b>			0,321
Yes	3(4.1)	3(1.5)	
No	56(76.7)	169(82.4)	
Blank/Ignored	14(19.2)	33(16.1)	
<b>Health professional</b>			0.553*
Yes	-	2(1.0)	
No	59(80.8)	170(82.9)	
Blank/Ignored	14(19.2)	33(16.1)	
<b>Immigrant</b>			0.553*
Yes	-	2(1.0)	
No	59(80.8)	170(82.9)	
Blank/Ignored	14(19.2)	33(16.1)	

\*Fischer's exact test

Regarding clinical variables, there was no association with the gender of the participants. However, it was evident that new cases with clinical pulmonary form of TB were predominant in both sexes and that, among male cases, 23.4 % were alcoholics, and 10.2% were smokers. In contrast, among females, 15.1% made use of illicit drugs. A small portion of cases had diabetes and mental illness (Table 2).

**Table 2.** Distribution of clinical variables of cases reported in SINAN of TB/HIV coinfection, according to sex, Porto Velho, 2014-2018. (n=278)

Variables	Sex		p-value
	Female	Male	
	n(%)	n(%)	
<b>Type of entry</b>			0.335
New cases	42(57.5)	131(63.9)	
Other*	31(42.5)	74(36.1)	
<b>Clinical form</b>			0.162
Pulmonary	51(69.9)	120(58.5)	
Extrapulmonary	15(20.5)	66(32.2)	
Pulmonary + extrapulmonary	7(9.6)	19(9.3)	
<b>Disease and associated diseases</b>			
<b>Alcoholism</b>			0.134
Yes	11(15.1)	48(23.4)	
No	62(84.9)	157(76.6)	
<b>Use of illicit drugs</b>			0.887
Yes	11(15.1)	29(14.1)	
No	48(65.7)	141(68.8)	
Blank/Ignored	14(19.2)	35(17.1)	
<b>Smoking</b>			0.431
Yes	4(5.5)	21(10.2)	
No	55(75.3)	151(73.7)	
Blank/Ignored	14(19.2)	33(16.1)	
<b>Diabetes</b>			0.604**
Yes	1(1.4)	4(1.9)	
No	72(98.6)	200(97.6)	
Blank/Ignored	-	1(0.5)	
<b>Mental illness</b>			0.715**
Yes	-	3(1.5)	
No	72(98.6)	201(98.0)	
Blank/Ignored	1(1.4)	1(0.5)	

\* Includes relapse, re-entry after abandonment, and transfer.

\*\* Fischer's exact test.

Regarding diagnostic variables, most cases were notified in tertiary reference and did not perform molecular rapid testing or sensitivity test. The association between female and negative sputum smear microscopy and sputum culture was identified. The males were associated with a positive outcome of sputum smear microscopy. Most cases had a suggestive image of TB on the chest x-ray (values in Table 3).

**Table 3.** Distribution of diagnosis variables of cases reported in SINAN of TB/HIV coinfection, according to sex, Porto Velho, 2014-2018.

Variables	Sex		p-value
	Female	Male	
	n(%)	n(%)	
<b>Notification Unit</b> (n=278)			0.204
Tertiary Reference	45(61.6)	142(69.3)	
Primary Health Care	5(6.8)	11(5.4)	
Specialized Assistance Service	23(31.5)	46(22.4)	
Penitentiary Complex	-	6(2.9)	
<b>Sputum smear microscopy**</b> (n=197)			<b>0.003*</b>
Positive	15(25.9)	65(46.8) <sup>+</sup>	
Negative	32(55.1) <sup>+</sup>	50(36.0)	
Unrealized	11(19.0)	23(16.5)	
Not applicable	-	1(0.7)	
<b>Sputum culture**</b> (n=197)			<b>0.024*</b>
Positive	1(1.7)	8(5.8)	
Negative	6(10.3) <sup>+</sup>	3(2.2)	
Unrealized	51(87.9)	128(92.1)	
<b>Rapid Molecular Test for TB ***</b> (n=154)			0.228
Detectable	5(11.9)	19(17.0)	
Undetectable/ Inconclusive	13(31.0)	19(17.0)	
Not applicable	24(57.14)	74(66.1)	
<b>Sensitivity Test</b> (n=85)			0.246*
Sensitive	2(11.1)	2(2.3)	
Unrealized/in progress	7(38.9)	31(47.7)	
Blank/Ignored	9(50.0)	33(50.0)	
<b>Chest X-ray</b> (n=278)			0.091
Suggestive of tuberculosis	65(89.1)	155(75.6)	
Normal / suggestive of another pathology	6(8.2)	31(15.1)	
Unrealized	2(2.7)	19(9.3)	

\* Fischer's exact test.

\*\* Only cases of pulmonary TB and pulmonary + extrapulmonary TB were considered.

\*\*\* It was only considered after the implementation of the RMT-TB in 2015.

As for the treatment variables, most cases were followed up by the Specialized Assistance Service and did not undergo Directly Observed Treatment. There was an association between the realization of control sputum smear microscopy in the first month of treatment and male individuals. As for the treatment outcome, the healing rate in both sexes is low, and treatment abandonment is high. The death was also high among male individuals (values in Table 4).

**Table 4.** Distribution of treatment variables of cases reported in SINAN of TB/HIV co-infection, according to sex, Porto Velho, 2014-2018. (to be continued)

Variable	Sex		p-value
	Female	Male	
	n(%)	n(%)	
<b>Treatment Unit (n=278)</b>			0.337
Specialized Assistance Service	51(69.9)	140(68.3)	
Tertiary Reference	16(21.9)	38(18.5)	
Primary Health Care	5(6.8)	16(7.8)	
Penitentiary Complex	-	10(4.9)	
Medical Specialties Center	1(1.4)	1(0.5)	
<b>Directly Observed Treatment (n=278)</b>			0.265*
Yes	1(1.4)	-	
No	61(83.6)	172(83.9)	
Blank/Ignored	11(15.1)	33(16.1)	
<b>Monthly control sputum smear microscopy ** (n=197)</b>			
<b>1<sup>st</sup> month</b>			<b>0.020</b>
Realized	-	9(6.5) <sup>†</sup>	
Unrealized	27(46.6)	47(33.8)	
Blank/Ignored	31(53.4)	73(52.5)	
Not applicable	-	10(7.2)	
<b>2<sup>nd</sup> month</b>			<b>0.030*</b>
Realized	-	8(5.8)	
Unrealized	26(44.8)	43(30.9)	
Blank/Ignored	32(55.2)	78(56.1)	
Not applicable	-	10(7.2)	
<b>3<sup>rd</sup> month</b>			0.058*
Realized	-	7(5.0)	
Unrealized	21(36.2)	38(27.3)	
Blank/Ignored	37(63.8)	84(60.4)	
Not applicable	-	10(7.2)	
<b>4<sup>th</sup> month</b>			0.054*
Realized	-	7(5.0)	
Unrealized	19(32.8)	33(23.7)	
Blank/Ignored	39(67.2)	89(64.0)	
Not applicable	-	10(7.2) <sup>†</sup>	

**Table 4.** Distribution of treatment variables of cases reported in SINAN of TB/HIV co-infection, according to sex, Porto Velho, 2014-2018. (conclusion)

Variable	Sex		p-value
	Female	Male	
	n(%)	n(%)	
<b>5<sup>th</sup> month</b>			0.376*
Realized	1(1.7)	5(3.6)	
Unrealized	16(27.6)	32(23.0)	
Blank/Ignored	41(70.7)	92(66.2)	
Not applicable	-	10(7.2)	
<b>6<sup>th</sup> month</b>			0.289*
Realized	2(3.5)	8(5.8)	
Unrealized	15(25.9)	27(19.4)	
Blank/Ignored	41(70.7)	94(67.6)	
Not applicable	-	10(7.2)	
<b>Outcomes (n=278)</b>			0.372
Cure	33(45.2)	83(40.5)	
Abandonment	24(32.9)	71(34.6)	
Death	2(2.7)	17(8.3)	
Transference	5(6.9)	20(9.8)	
Other	8(11.0)	13(6.3)	
Ignored/ Blank	1(1.4)	1(0.5)	

\* Fischer's exact test

\*\* Only cases of pulmonary TB and pulmonary + extrapulmonary TB were considered.

## Discussion

The high number of cases of coinfection TB/HIV in Porto Velho may be, above all, a consequence of the insufficient coverage of Primary Health Care services for the community, making the prevention and protection actions against communicable diseases insufficient, as well as making tracking and early diagnosis difficult, both for HIV infection and illness by TB. In addition, the precariousness of public health services in this region is highlighted when compared to other urban centers in the country, making it challenging to provide services and causing dissatisfaction by users, sometimes leading to a lower search for health care, contributing negatively to the treatment and control of health problems.<sup>12</sup>

Considering that the main measures for the control of the disease and to stop the transmission chain are the offer of antiretroviral therapy to people living with HIV and the strengthening of surveillance and attention to people seeking respiratory symptomatic<sup>4</sup>, nursing should play an active role in this process, both in HIV referral centers and primary care. It is noteworthy that the nurse's performance in Brazilian PHC should prioritize integral assistance to this population through situational diagnosis, the evaluation of health conditions, determinants for the emergence and worsening of the disease, and that contribute to health promotion.<sup>9</sup> These actions should include the search for the care of individuals according to the specificities of the various life cycles, humanized approach, bond establishment, early tuberculosis detection according to public policies in force in the country and implementation of effective therapeutic measures<sup>13</sup>, aiming at a service that can assist in reducing this prevalence.



Although coinfection reaches disproportionately men and women, the sociodemographic characteristics analyzed in the study showed no evidence of association with the sex of participants. It is verified that both TB and HIV are predominant diseases in the economically active and with low education population<sup>12,14</sup>, characteristics that both women and men with a coinfection of this study presented.

Thus, the most significant illness for coinfection TB/HIV in men seems to involve aspects beyond sociodemographic but those marked by biological, cultural, and behavioral determinants.<sup>15</sup> In this sense, given the greater involvement of males both for coinfection TB/HIV and diseases in isolation, it is identified the need for greater attention of health professionals to this audience, empowering and raising awareness among the male population regarding the multi-determinant factors of their health-disease process and promoting autonomy for self-care, thus contributing to the overcoming of taboos and paradigms that removes men from the search for promotion and maintenance actions of their health.<sup>16</sup> To this end, the figure of the nurses stands out as indispensable, especially in the context of the Estratégia Saúde da Família - ESF (Family Health Strategy), as the protagonist of health educational practices, both focused on the community and health team in PHC, given their excellent approximation not only with the community, as in all its multi-professional context.<sup>17,18</sup>

Regarding sociodemographic characteristics, the most remarkable accuracy of black color in the study population coincides with the ethnic profile of the country's northern region since more than 70% of it has been self-declared black.<sup>19</sup>

Among the special populations, most lived in the street, followed by the people deprived of liberty, but there was no statistical association with the sexes for this variable. However, it is noteworthy that low percentages of involvement of special populations for both men and women may reflect the incompleteness and quality of the data and the under notification of cases. Thus, it is questioned about the reliability of the data since both TB and HIV are prevalent and have a greater concentration in less favored social groups and with greater vulnerability to illness.<sup>20</sup>

Regarding the clinical variables, it was found that most were new case and clinical pulmonary form in both sexes. This profile was also described in other studies<sup>21-23</sup> and can be explained according to the aerobic characteristics of bacillus, as well as airway transmission, which favor this type of infection, whose development for the active form of the disease is accentuated by the profile PLHIV immunosuppression.

As for diseases and associated diseases, none presented a statistical association with sex, even though smoking and alcoholism worldwide are more common practices among men.<sup>3</sup> For the population of this study, regardless of gender, there was a greater prevalence of illicit drugs and alcoholism and lower prevalence of diabetes and mental disorder among people with coinfection TB/HIV.

Regarding the diagnosis of cases, there seems to be a difficulty in primary and secondary care services in confirming the diagnosis of TB among people with HIV coinfection or an aggravation of the clinical picture at the early stage of the disease, regardless of gender, since most were reported in the tertiary reference, reinforcing the severity of signs and symptoms, requiring hospitalization.

It is also evident that female people have had a higher negative result for sputum smear microscopy and sputum culture, which may be related to the inferior quality of the sputum sample between women and the paucibacillary characteristic of cases of coinfection TB/HIV, resulting in a more significant number of negative results. Such peculiarities, therefore, justify the importance of performing RMT-TB among this population since it requires small amounts of bacilli in sputum to perform it and has greater sensitivity and speed to obtain the result concerning sputum smear.<sup>2</sup>

In addition, it is noteworthy that the delay in the search for diagnosis by men<sup>24</sup> makes the identification of the disease occur with advanced and present signs and symptoms for a longer time, with greater chances of having TB, contributing to the revelation of a positive result.

Except for sputum culture, the percentages of not performing other diagnostic examinations, although

they showed no statistically significant difference, were greater in men than women in the period studied. Search and access to health services, as well as acceptance for TB investigation is lower in males due to several barriers, especially related to the maintenance of work since the search for health care can be affected by the workday and the diagnostic confirmation of diseases can lead to the removal from work activities.<sup>24</sup>

In this study, there was a low percentage of sputum culture since more than 85% of individuals with TB/HIV coinfection of both sexes did not perform the exam, even though it was the gold standard exam for TB diagnosis and essential for cases that performed the RMT-TB. Also important are the local specificities of the study scenario, which has a high incidence of non-tuberculous mycobacteria, emphasizing the importance of offering and performing the sputum culture for differentiation between microorganisms and, from this, direction to the proper treatment, considering that this is a precise examination, but may face difficulties in its expansion due to the barriers to access health services and/or to non-request by health professionals.

It is also noteworthy that the sensitivity test had most of its completion blank and not performed, representing weaknesses in completing data and coverage of the examination, neglecting the detection of resistant cases of TB in PLHIV, contributing to therapeutic ineffectiveness and clinical aggravation of cases.

Regarding chest radiography, this method contributes to the pulmonary clinical form diagnosis of the 25 cases of coinfection TB/HIV and, although not associated with sex, was widely performed, and resulted in the suspicion of many cases of TB in both sexes.

The low conduct of monthly control sputum smear microscopy was verified in both sexes, highlighting possible neglect of the services in the offering and registration of such exams for monitoring cases, regardless of sex. Still on these results, it should be noted that the situation in women seems to be even more worrying, and this may occur because they have presented more negative results to sputum-smear and sputum culture at the time of diagnosis or even difficulty in collecting the sputum sample.

The percentages of healing were much lower than what is advocated by the World Health Organization for both sexes, and there was a high abandonment. Regardless of gender, there is a need for adequacy and qualification of the service for the management of TB and HIV, with the need to develop actions aimed at the offer of antiretroviral therapy, promotion of self-care and adherence to treatment for both health conditions in question. For this, the SAE must articulate with the primary care services to the Municipality so that they are qualified and help more in monitoring the cases of coinfection TB/HIV and in the realization of the TDO, which is poorly offered by the Municipality and, consequently, would contribute to the reversal of the situation presented.

Thus, in view of the terrible indicators found regarding TB/HIV coinfection for both sexes, and in order to achieve the goals advocated by health agencies, it is highlighted the need for professional performance focused on preventive practices stands out directly in the community: operative groups, health education actions for the prevention of sexually transmitted infections, encouraging rapid tests and awareness of the population regarding the identification of respiratory symptoms and reducing stigma against TB patients, all of which the nursing profession can and must act as a protagonist, considering his technical and scientific qualification.

In addition, the nurse also participates in the assessment of the quality of attention and control of TB, HIV, and coinfection by both diseases, from the implementation of strategies to expand the diagnosis, trace new cases, and maintenance of treatment through the establishment of a link between user and service and expansion of the application of TDO.<sup>26</sup> Thus, to achieve the actions mentioned, in addition to the actions and collective strategies, the attention directed to the specific needs of a person is valid, mainly encompassing actions that promote greater inclusion of male users in PHC and not only in other levels of complexity, also sensitizing them to the continuity of their care through the family health teams.

Nurse in PHC has the possibility of expanding their autonomy in the management and control of TB/HIV coinfection through a clinical practice sustained from the perspective of integrality and care.

In this logic, the health system calls for investments in the adequacy of curricula of undergraduate and postgraduate courses in the health area, especially nursing. It is based on the premise of training professionals focused on PHC, on epidemiological surveillance as part of the care process adapting the health training to the health needs of PLHIV, people with TB, and TB/HIV.

Among the limitations of the study, there is a possible bias of information due to the obtaining of data through a secondary source, as well as the non-control of confusion variables, which requires caution in relation to the generalization of the results.

## Conclusion

There was no significant association between the sexes and the sociodemographic and clinical characteristics of the cases of coinfection TB/HIV. However, females presented a statistically significant association with negative results for sputum smear microscopy and sputum culture.

In addition, it was identified the need for more significant expansion of examinations for diagnosis (RMT-TB and sputum culture) and the monitoring of cases, regardless of gender, and the need to establish articulation between SAE and PHC units in the development of strategies for promoting treatment adherence and good closure of cases of coinfection TB/HIV.

It is necessary that users, regardless of gender, be welcomed and accompanied in their needs, intervening in imposed barriers, and establishing a bond between users and health services, as well as the timely and appropriate diagnosis of coinfection TB/HIV and treatment adherence.

To this end, the development of competencies and skills in academic and permanent formation must be considered so that nurses, and other health professionals, constitute themselves as subjects committed to the pursuit of complete care.

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## Authors' contributions

Mariano AS and Orfão NH participated in this study with the conception and design of the work, data collection, analysis, interpretation of the data, and writing of the article. Magnabosco GT and Andrade RLP contributed to this study with the article's writing. All authors reviewed and approved the final version and are in agreement with its publication.

## Conflict of interest

No financial, legal or political conflicts involving third parties (government, companies and private foundations, etc.) were declared for any aspect of this submitted manuscript (including, but not limited to grants and funding, participation in an advisory board, study design, manuscript preparation, statistical analysis, etc.).

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