

## Homeless people: profile of tuberculosis and HIV coinfection cases

### População em situação de rua: perfil dos casos de coinfeção tuberculose e HIV

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**ABSTRACT | OBJECTIVE:** To analyze the Homeless Population profile with tuberculosis (TB)/HIV coinfection in Porto Velho - RO, between 2015 and 2018. **MATERIALS AND METHODS:** A descriptive, cross-sectional study with a quantitative approach carried out from the survey the sociodemographic, clinical variables and the treatment of cases in the National Information System on Notifiable Diseases, and later analysis by frequency distribution, after meeting the ethical precepts. **RESULTS:** Seven cases of TB/HIV were reported as homeless population. The sample was predominantly female, between 31 and 38 years old, mulattos ("pardos"), low schooling, had associated diseases and illnesses, were not special segments, notified in 2016, in the tertiary reference, new cases or reentry after abandonment, pulmonary clinical form, suspected chest X-ray, negative sputum smear microscopy, molecular rapid test for TB and culture not performed, sensitivity test and blank monthly control, up to three identified contacts, and none examined, did not perform Directly Observed Treatment, were treated in the tertiary referral, from 61 to 120 days and more than 181 days, and a high percentage of abandonment. **CONCLUSION:** It is essential to review the strategies for accessing services and actions offered to meet the health demands of the Homeless Population, aimed at both diseases.

**DESCRIPTORS:** Homeless Persons. Tuberculosis. HIV. Coinfection.

**RESUMO | OBJETIVO:** Analisar o perfil da População em Situação de Rua (PSR) com a coinfeção tuberculose (TB)/HIV em Porto Velho-RO, entre 2015 a 2018. **MATERIAIS E MÉTODOS:** Estudo descritivo, transversal com abordagem quantitativa realizado a partir do levantamento das variáveis sociodemográficas, clínicas e do tratamento dos casos no Sistema de Informação Nacional de Agravos de Notificação, e posteriormente análise por distribuição de frequência, após atender aos preceitos éticos. **RESULTADOS:** Foram notificados sete casos de TB/HIV entre as PSR. A maioria era do sexo feminino, entre 31 a 38 anos, parda, baixa escolaridade, apresentavam doenças e agravos associados, não eram população especial, notificadas em 2016, na referência terciária, era caso novo ou reingresso após abandono, forma clínica pulmonar, radiografia de tórax suspeito, baciloscopia de escarro negativa, teste molecular rápido para a TB e cultura não realizadas, teste de sensibilidade e controle mensal em branco, até três contatos identificados e nenhum examinado, não realizaram Tratamento Diretamente Observado, tratamento na referência terciária, de 61 a 120 dias e mais do que 181 dias, e elevado percentual de abandono. **CONCLUSÃO:** Torna-se essencial rever as estratégias de acesso aos serviços e ações ofertadas para atender as demandas de saúde da PSR, voltadas para ambos os agravos.

**DESCRIPTORES:** Pessoas em Situação de Rua. Tuberculose. HIV. Coinfeção.

## Introduction

Tuberculosis (TB) is a current and pertinent public health problem, causing, in 2018, 10 million new cases and approximately 1,451 million deaths. Brazil is among the countries with the highest burden of the disease in the world, being one of the priorities for tuberculosis/Human Immunodeficiency Virus (TB/HIV) coinfection, according to the World Health Organization (WHO)<sup>1</sup>.

In Brazil, it was estimated that in 2018, 72,788 new TB cases were reported (incidence coefficient of 34.8 cases/100 thousand inhabitants), of which 8.8% had TB/HIV coinfection, besides 4,490 deaths (mortality rate of 2.2 deaths/100 thousand inhabitants). In the same period, Rondônia recorded a TB incidence coefficient of 28.5 cases/100 thousand inhabitants and mortality of 1.3 cases/100 thousand inhabitants, although the majority of these cases (59.5%) occurred in the capital - Porto Velho, which has such coefficients higher than the state, such as 59.5 cases/100 thousand inhabitants and 1.5 deaths/100 thousand inhabitants, respectively<sup>2,3</sup>. Complementarily, 72.2% of new TB cases were tested for HIV in the state, and 7.7% were coinfecting with TB/HIV<sup>3</sup>.

Conditions of vulnerability, such as extreme poverty, exposure to violence, restriction of the basic conditions of survival, psychosocial fragility, social exclusion, frequent migration, a high relationship with alcohol and drugs characterized the homeless population. Epidemiological data show that the risk of illness from TB among this population is 56 times higher when compared to the general population<sup>4</sup>. This range of factors ends up making it difficult to monitor cases, control contacts, and performing Directly Observed Treatment (DOT) for TB<sup>4,5</sup>.

The main obstacles encountered by the homeless population in coping with TB are related to the

difficulty in accessing health services, delay in diagnosis and starting treatment, the fragility of intersectoral policies, communication, and articulation for horizontal and vertical integration<sup>6</sup>.

At the same time, the association between the homeless population and TB/HIV coinfection is a multi-causal phenomenon, in which, when diagnosed with TB, HIV screening in health units is recommended through rapid testing, in addition to annual TB monitoring among people living with HIV, considering that the impairment of the immune system increases the risk of becoming ill, and TB, as it is characterized as an opportunistic disease, is the one that most leads these populations to death<sup>4</sup>.

Hence, this study aimed to analyze the homeless population profile with tuberculosis (TB)/HIV coinfection in Porto Velho - RO, between 2015 and 2018.

## Materials and methods

It is a descriptive study, carried out in a cross-sectional way, using a quantitative approach, developed in Porto Velho, capital of Rondônia state, belonging to the Amazon region, which borders Bolivia and the Brazilian states of Amazonas, Mato Grosso, and Acre. The municipality has 34,090,962 km<sup>2</sup> in territorial area, estimated population, in 2018, of 519,531 inhabitants, indicating a demographic density of 12.57 inhabitants/km<sup>2</sup><sup>7</sup>.

TB care in the municipality has Primary Health Care (PHC) as the gateway, with the main competencies being the search for respiratory symptomatic, requesting diagnostic tests for TB and HIV, notification in the Health Information System Notification Service (SINAN), treatment follow-up, DOT offer, evaluation of contacts and, if necessary, referral to other levels of care.

In a complementary way, the municipality has an outpatient support network for the monitoring of childhood TB, and extrapulmonary clinical form and TB/HIV coinfection; in addition to the tertiary level that constitutes a state reference for the cases of drug-resistant TB (DR-TB), Nontuberculous Mycobacteria (NTM) and hospitalization due to complications. As laboratory support, it has one at the municipal level for performing sputum smear microscopy and molecular rapid test for TB, besides another laboratory at the state level, responsible for sputum culture and sensitivity testing.

Currently, PHC totals 54 health units, divided into 17 basic health units and 37 family health units, of which 20 in the urban area and 33 in the rural area, being subdivided into 18 land units and 15 riverside units, and a river mobile unit, also counting on a street clinic teams to serve the urban area<sup>8</sup>.

The study population comprised all TB case records cases among the homeless population notified in Porto Velho, at SINAN, from 2015 to 2018. As inclusion criteria, the records of TB/HIV coinfection cases were considered, as exclusion criteria, those whose treatment outcomes were blank.

Data collection was performed based on the survey of sociodemographic variables (sex, age range, race/color, education, associated diseases and illnesses, and special segments), clinical (year of notification, notification unit, type of case, clinical form, diagnostic tests (chest X-ray, sputum smear microscopy, molecular rapid test for TB, sputum culture and sensitivity test), HIV and monthly control (sputum smear microscopy), and treatment (contact control,

treatment unit, DOT treatment regimen, start and end date of treatment, and closure status) at SINAN.

The collected data was stored in the Microsoft Excel program and subsequently analyzed using TIBCO's Statistica 13.4 software through frequency distribution.

In compliance with the recommendations of Resolution 466/12 of the National Health Council<sup>9</sup>, the matrix project entitled "Evaluation of the epidemiological situation of tuberculosis in the city of Porto Velho - RO" was approved by the Research Ethics Committee of the Universidade Federal de Rondônia, according to opinion number 2,399,327.

## Results

In the period between 2015 to 2018, 3,050 TB cases were reported in Rondônia, of which 2,050 (67.2%) were in Porto Velho, with 48 cases (2.3%) among the homeless population, and of these seven cases (14, 6%) had TB/HIV coinfection.

Regarding the sociodemographic profile, the majority belonged to the female sex (57.1%), with an age range between 31 to 38 years old in both sexes (71.4%), self-declared race/color mulatto ("pardo") (85.7%), from one to four years of study (42.9%). They had associated diseases and conditions, such as aids (100%), alcoholism (57.1%), use of illicit drugs (100%), and were not characterized as a special segment (Table 1).

**Table 1.** Distribution of the sociodemographic profile of homeless population with TB/HIV coinfection, regarding female and male in Porto Velho, Rondônia, between 2015 to 2018

Variables	Female		Male		Total		
	n	%	n	%	n	%	
<b>Age range (years)</b>							
31 to 38	2	50	3	100	5	71,4	
39 or more	2	50	-	-	2	28,6	
<b>Race/color</b>							
Mulatto ("pardo")	3	75	3	100	6	85,7	
Black	1	25	-	-	1	14,3	
<b>Scholarity</b>							
1 to 4 years	2	50	1	33,3	3	42,9	
5 to 8 years	2	50	-	-	2	28,6	
More than 8 years	-	-	2	66,7	2	28,6	
<b>Associated diseases and conditions *</b>							
Aids	Yes	4	100	3	100	7	100
Alcoholism	Yes	2	50	2	66,7	4	57,1
	No	2	50	1	33,3	3	42,9
Use of illicit drugs	Yes	4	100	3	100	7	100
	No	4	100	2	66,7	6	85,7
Tabagism	Yes	-	-	1	33,3	1	14,3
	No	4	100	3	100	7	100
Diabetes	No	4	100	3	100	7	100
Mental disease	No	4	100	3	100	7	100
Other	No	4	100	3	100	7	100
<b>Special segments</b>							
Freedom-deprived population	Yes	-	-	1	33,3	1	14,3
	No	4	100	2	66,7	6	85,7
Health professional	Yes	-	-	1	33,3	1	14,3
	No	4	100	2	66,7	6	85,7
Immigrants	No	4	100	3	100	7	100
<b>Total</b>		4	57,1	3	42,9	7	100

Source: SINAN, 2019.

\* The same case could present more than one disease or condition associated.

Conventional sign used: - Numeric data equal to zero not resulting from rounding.

As for the clinical and treatment profile, the majority of cases were reported in 2016 (42.9%), in the tertiary reference (85.7%), new case or reentry after abandonment (42.9%), pulmonary clinical form (71.4%), suspicious chest X-ray for TB (85.7%), negative sputum smear microscopy (71.4%), not performed molecular rapid test for TB (57.1%), sputum culture not performed (57.1%), blank sensitivity test (100%), blank monthly control, with one to three identified contacts (42.9%) and none examined (85.7%), treatment in the tertiary reference (57.1%), failure to perform DOT (85.7%), treatment time from 61 to 120 days (28.6%) and more than 181 days (28.6%), in addition to the high percentage of treatment abandonment (57.1%) (Table 2).

**Table 2.** Distribution of the clinical and treatment profile of homeless population with TB/HIV coinfection, regarding female and male in Porto Velho, Rondônia, between 2015 to 2018

Variables	Female		Male		Total			
	n	%	n	%	N	%		
<b>Year of notification</b>	2015	2	50	-	2	28,6		
	2016	1	25	2	66,7	3	42,9	
	2018	1	25	1	33,3	2	28,6	
<b>Notification Unit</b>	Tertiary reference	4	100	2	66,7	6	85,7	
	Primary Health Care	-	-	1	33,3	1	14,3	
	New case	2	50	1	33,3	3	42,9	
<b>Type of case</b>	Relapse	-	-	1	33,3	1	14,3	
	Reentry after abandonment	2	50	1	33,3	3	42,9	
<b>Clinical form</b>	Pulmonary	3	75	2	66,7	5	71,4	
	Extrapulmonary	1	25	-	-	1	14,3	
	Pulmonary+Extrapulmonary	-	-	1	33,3	1	14,3	
<b>Diagnostic tests</b>	Chest X-ray	TB suspect	4	100	2	66,7	6	85,7
		Unrealized	-	-	1	33,3	1	14,3
	Sputum smear microscopy	Negative	4	100	1	33,3	5	71,4
		Positive	-	-	1	33,3	1	14,3
		Unrealized	-	-	1	33,3	1	14,3
	Molecular Rapid test for TB	Unrealized	2	50	2	66,7	4	57,1
		Detectable sensitive to Rifampicin	-	-	1	33,3	1	14,3
		Not detectable	2	50	-	-	2	28,6
	Sputum culture	Negative	3	75	-	-	3	42,9
		Unrealized	1	25	3	100	4	57,1
Sensitivity test	Blank	4	100	3	100	7	100	
<b>Monthly control</b>	1st month	Negative	-	-	1	100	1	14,3
		Unrealized	1	25	-	-	1	14,3
		Blank	3	75	2	-	5	71,4
	2nd month	Unrealized	1	25	-	-	1	14,3
		Blank	3	75	3	100	6	85,7
	3rd month	Unrealized	1	25	-	-	1	14,3
		Blank	3	75	3	100	6	85,7
	4th month	Unrealized	1	25	-	-	1	14,3
		Blank	3	75	3	100	6	85,7
	5th month	Unrealized	1	25	-	-	1	14,3
		Blank	3	75	3	100	6	85,7
	6th month	Unrealized	1	25	-	-	1	14,3
Blank		3	75	3	100	6	85,7	
<b>Contact control</b>	Identified	Zero	2	50	2	66,7	4	57,1
		1 to 3	2	50	1	33,3	3	42,9
	Examined	Zero	3	75	3	100	6	85,7
		Blank	1	25	-	-	1	14,3
<b>Treatment Unit</b>	Tertiary Reference	3	75	1	33,3	4	57,1	
	Specialized Ambulatory	1	25	1	33,3	2	28,6	
	Primary Health Care	-	-	1	33,3	1	14,3	
<b>DOT</b>	Not	3	75	3	100	6	85,7	
	Blank	1	25	-	-	1	14,3	
<b>Treatment time (in days)</b>	Zero	1	25	-	-	1	14,3	
	To 60	-	-	1	33,3	1	14,3	
	61 to 120	1	25	1	33,3	2	28,6	
	121 to 180	-	-	1	33,3	1	14,3	
	More than 181	2	50	-	-	2	28,6	
<b>Closure Situation</b>	Cure	2	50	-	-	2	28,6	
	Abandonment	1	25	3	100	4	57,1	
	Transfer	1	25	-	-	1	14,3	

Source: SINAN, 2019

Conventional sign used: - Numeric data equal to zero not resulting from rounding.

It should also be noted that the average treatment time, regardless of sex, was 116.7 days (SD± 80.75), with a minimum of zero and a maximum of 225 days, which corresponds to approximately four months of treatment.

## Discussion

The homeless population inserted in a context of social invisibility and naturalization of their living conditions, which, linked to social and health inequities, directly implies the definition of public policies, the adoption of effective strategies, in addition to the real knowledge about its quantity, which includes in Porto Velho, for example, immigrants from different countries, such as Haiti and Venezuela.

Such aspects, added to the difficulty of access to health services, even with the performance of the street clinic teams, interfere in the monitoring of cases, and in the surveillance actions from the screening of respiratory symptoms until the end of treatment. In this sense, it is important to consider that the under-reporting of TB cases among the homeless population deserves attention, in addition to HIV diagnosis for early detection and immediate initiation of therapy.

Based on this assumption, it is relevant to emphasize that the incidence rate found in this study reflects the vulnerability to which this population group is exposed, whose risk of becoming ill with TB is 56 times higher when compared to the population in general, and among people living with HIV, 28 times higher<sup>4</sup>, even though health is characterized as a constitutional right and which requires as a priority point of discussion in different spheres of government, in an intersectoral way, to meet the principles and guidelines of the Unified Health System.

Although the incidence of TB/HIV coinfection among the homeless population in the city of Porto Velho does not represent the real magnitude of both diseases in this population (1.2 cases/100 inhabitants), studies indicate incidences ranging from 6.21 cases of TB/HIV/100 inhabitants<sup>10</sup>, and up to 122 cases of TB/100 thousand only in the homeless population<sup>11</sup>.

Regarding the sociodemographic profile, the literature points out that TB and HIV affect the male sex more, which is also most of the homeless population<sup>12</sup>, differently from the findings found in this study, where it was possible to identify that notification in the studied scenario occurred among females, which reinforces the complexity of health care for homeless women<sup>6,13</sup>.

Concerning the age range, self-declared race/color mulatto ("pardo") and low scholarly, the similarity with other studies that address the general population that fell ill with TB<sup>14,15</sup>, and that does not differ with the profile found in the census of the homeless population<sup>12</sup> or with the findings evidenced in this study.

It is also important to consider that presenting associated diseases and conditions, such as alcoholism and use of illicit drugs, also constitute one of the main reasons for living on the street<sup>12</sup>, while interfering with the continuity of treatment<sup>16</sup> for both comorbidities, TB and HIV, in the delay in the search for the health service, since the use of psychoactive drugs conceals the symptoms and affects the perception about the health status itself<sup>17</sup>. This influences the worsening of clinical signs, diagnostic clarification, and even continuity of treatment because of the complexity in the tertiary referral service, as also found in this study.

A study carried out in Portugal showed an unfavorable rate of TB treatment results among the homeless population, significantly associated with increasing age, injecting drug use, and HIV coinfection<sup>11</sup>, which contributes to the understanding of the association of these risk factors with the results identified in the present study.

Besides, 100% of the homeless population with TB/HIV coinfection had a diagnosis of aids, which questions the effectiveness of the strategies that have been used for the monitoring and treatment of HIV by the reference services integrated with the street clinic teams, considering that the perspective of viral suppression is expected, in an attempt to improve the quality of life and prognosis of both diseases, although the other factors that influence adherence and follow-up for this population are known.

Another important aspect is the quality of the data, since the same homeless population with TB/HIV coinfection was also characterized, simultaneously, as deprived of liberty and as a health professional, according to the SINAN record. In these cases, permanent health education comes as a potential tool for the continuous qualification of health professionals regarding the correct notification of cases, to avoid doubts. It is understood that the quality of the data is an important tool to obtain information that contributes to the planning of health actions, as well as the expenditure of necessary resources to carry out strategies for disease prevention, health promotion, and reduction of diseases.

In the clinical profile, it is possible to question the absence of notification of the homeless population with TB/HIV coinfection in 2017, considering that the type of entry identified as a new case or reentry after abandonment contributes to the continuity of transmission chain, mainly due to the pulmonary form and unfavorable outcomes, which interfere with the increase in the disease's prevalence in the municipality.

The diagnostic elucidation was performed with the aid of imaging tests, such as x-ray for its easy performance, and laboratory tests, such as sputum smear microscopy, in which, although in this study they obtained a negative result, stands out the lack of other laboratory tests, such as the molecular rapid test for TB for new cases to speed up the result for diagnosis, sputum culture, since there are high percentages of NTM and reentry after abandonment in the State of Rondonia, besides the sensitivity test to detect drug resistance and the effectiveness of these antituberculostatics through sputum smear microscopy for monthly control.

Studies have shown the impact of the provision of targeted and timely screening, through x-ray examinations for the homeless population and users of illicit drugs, as a new approach to screening and active search for TB, which could be integrated into disease control actions through TB control programs, as it provides a high rate of case detection<sup>18,19</sup>, especially considering low-incidence regions<sup>20</sup>, as identified in the municipality.

Among TB surveillance and control actions, it is noteworthy that contact control allows the identification of cases of latent Mycobacterium tuberculosis infection (LTBI) and active TB, and the offer and performance of DOT to guarantee treatment adherence, strengthen the bond, and bring service, user, family, and community closer together, especially for those who have and are inserted in contexts of social vulnerability, such as the homeless population who still have TB/HIV coinfection as stigmatizing diseases and which potentiate social exclusion.

As limitations of this study, the weaknesses in the feedback and completeness of the data in SINAN are highlighted, since failing to record information about the actions performed does not allow to infer their performance (or not), as well as duplication of activities, also not contributing to the planning and not allowing to know the real magnitude of the problem among the homeless population co-infected with TB and HIV. In a complementary way, official and updated data in the municipality, lack research and studies on this population.

## Conclusion

Given the findings in this study, it was verified that the sociodemographic profile included mainly the female sex, age range between 31 to 38 years old, self-declared race/color mulatto ("pardo"), low education, associated diseases and conditions, such as aids, alcoholism and drug illicit use, in addition to not being characterized as a special population. In a complementary way, they were reported and treated in the tertiary reference, they were a new case or reentry after abandonment, with a pulmonary clinical form, suspected chest X-ray for TB, negative sputum smear microscopy, molecular rapid test for TB and sputum culture not performed, sensitivity test and monthly control in blank, with one to three identified contacts and none examined, DOT not performed, treatment time from 61 to 120 days and over 181 days, besides the high percentage of treatment abandonment.

From a social point of view, this study has implications for public health that pervade the focus on inequities and social determinants of health, since the homeless population has specific demands, which must be considered, especially to access to health services and actions offered.

The notification and treatment of cases in the tertiary reference and the clinical risk profile contribute to the maintenance of the transmission chain between the homeless population and the general population, worsening of signs and symptoms, and may have reflected in the unfavorable outcome of the abandonment. In this sense, the effectiveness of the disease control actions in PHC and the articulation with the street clinic teams and other levels of care in the health care network are questioned.

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### Author contributions

Orfão NH and Silva KM participated in the conception, design, search and statistical analysis of the research data, interpretation of results and writing of the scientific article. Ferreira MRL participated in the writing and critical review of the scientific article. Brunello MEF participated in the critical review of the scientific article. All authors approved the final version to be published and agree on all aspects of the work, ensuring its accuracy and integrity.

### Competing interests

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

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