Chapter 111

Immigration And Tuberculosis In A Brazilian Border State: Epidemiological Characterization Of Cases Among Venezuelan Immigrants In The State Of Roraima, Brazil

https://doi.org/10.56238/colleinternhealthscienv1-111

Maria Soledade Garcia Benedetti
State Secretariat of Health of Roraima
Federal University of Roraima
ORCID: 0000-0002-9529-1968

Émerson Ricardo de Sousa Capistrano
State Secretary of Health of Roraima
ORCID: 0000-0002-4053-9444

Angela Maria Félix Alves Oliveira
State Secretariat of Health of Roraima
ORCID: 0000-0001-5613-7899

Elba Urzedo de Freitas Lamounier
State Secretariat of Health of Roraima
ORCID: 0000-0001-5007-7362

Karla Cristina Souza Rocha
State Secretariat of Health of Roraima
ORCID: 0000-0002-8924-8146

Maria Gorete Sousa Alves
State Secretariat of Health of Roraima
ORCID: 0000-0003-1247-9314

ABSTRACT
Objective: To describe the epidemiological characteristics of tuberculosis among Venezuelan immigrants in the state of Roraima, Brazil. Methods: A descriptive and retrospective study, data were collected from the Information System of Notifiable Diseases - Sinan, in the period from 2012 to 2021. The sociodemographic variables were analyzed: gender, age group, skin color/race, education (by education level), municipality of residence, social situation (population deprived of freedom and homeless population), and clinical: clinical form, type of entry, case closure and comorbidities. The data were organized and analyzed in the Excel Program® and a descriptive analysis of the absolute and percentage frequency of the variables was performed. Results: 347 cases of tuberculosis occurred among Venezuelan immigrants, representing 14.7% of the total cases of the disease reported in the state in the study period. There was a predominance of cases among males (66.3%), 30 to 59 years of age (36.5%), and brown skin color (65.7%). As for the clinic: new cases (88.5%), pulmonary form (82.7%), co-infection with HIV/AIDS (22.1%), cure (44.7%), abandonment (19.6%) and death (8.0%). Conclusion: The detection of cases of tuberculosis among immigrants has increased in recent years, which may be due to their conditions of vulnerability, and therefore, it is essential to adopt strategies to expand access to early diagnosis and treatment for this population, in order to avoid complications and the spread of the disease.

Keywords: State of Roraima, Immigrants, Venezuelans, Tuberculosis.

1 INTRODUCTION

Historically, human migration has determined the spread of many infectious diseases by facilitating temporal outbreaks among populations[1] . In recent years, forced displacement of refugee people has increased in scope, scale, and complexity[2] . Complex humanitarian issues force thousands of people to leave their homes and seek survival in more dignified conditions in Brazil, coming mainly from countries in South and Central America, in a regional and transnational migratory dynamic from regions of poverty, lack of employment or curtailment of civil rights of people subject or subjected[3] .

The migration of Venezuelans is an event with intense transit of people, with the potential to increase the risk of disease dissemination. In this scenario, there is concern about the introduction or reintroduction of diseases, in addition to external causes and overload of services in the healthcare network[4]. This forced displacement is also leading to the importation of infectious diseases, as was recently reported[5] Malaria and other vector-borne diseases[8,9] , tuberculosis, and vaccine-preventable diseases[7,10]. Tuberculosis stands out for its risk factors, such as nutritional vulnerability, human densification of occupations, travel often through endemic (or epidemic) regions, and lack of medical care for diagnosis and treatment where they ultimately settle[3,11] . The most direct consequences in public health are for countries in the Americas, which are receiving the massive flow of migration from Venezuela .[12]

By the end of 2019, it was estimated that more than 4.7 million Venezuelans had left their country of origin. Between 2013 and December 2019, 264,000 Venezuelans applied for refuge or residence in Brazil, the vast majority entering through the state of Roraima[13] . The flow began to intensify in the state in 2016, but it was in 2018 that it actually reached quite high numbers, causing in the state a population increase and consequently an increase in demand for goods and services.

In this context, it is important to report on the scarcity of research on tuberculosis among immigrants in Roraima, a state in the extreme north of the Brazilian Amazon, located on the triple border Brazil - Venezuela - Guyana. With a population of 652,713 inhabitants in 2021[14] , it is the least populated state in the country, and has twin border towns: Bonfim on the border with Lethem in the Republic of Guyana, and Pacaraima on the border with Santa Elena do Uairén in Venezuela. The capital, Boa Vista, concentrates more than 60% of the population and the reference health services in the state.

Between 2008 and 2018 only 32 studies on the topic of tuberculosis in immigrants were published in Brazil. Of these, 73% were conducted with immigrants of Bolivian nationality[15] . Given the above, this study describes the epidemiological characteristics of tuberculosis among Venezuelan immigrants in the state of Roraima, Brazil.

2 METHODS

A descriptive and retrospective study was conducted on the epidemiological characteristics of tuberculosis among Venezuelan immigrants in the state of Roraima from 2012 to 2021.

The variables of interest included in the evaluation were sociodemographic: sex, age (by age groups), skin color/race, education (by level of instruction), municipality of residence, social situation (population deprived of freedom and homeless population), and clinical: clinical form, type of entry in Sinan, case closure and comorbidities. The data were organized and analyzed in the Excel program® and a descriptive analysis of the absolute and percentage frequency of the study variables was performed.

Because it uses only secondary data from the public domain, it was not submitted to the analysis of the Research Ethics Committee, as defined by the National Health Council Resolution (CNS/MS) No. 510, dated April 7, 2016.

3 RESULTS

In the period studied, there were 2,366 cases of tuberculosis in Roraima, of which 347 cases were among Venezuelan immigrants, representing 14.7% of the total cases of tuberculosis reported in the state during the period.

Between 2018 and 2021, 302 cases of the disease were reported - 61 cases in 2018, 80 cases in 2019, 78 cases in 2020 and 83 cases in 2021 - corresponding to an increase of 584% compared to the period from 2012 to 2017 (n=45 cases), representing 87% of the cases of the entire period evaluated (Figure 1).

Figure 1. Number of tuberculosis cases (total), cases in Venezuelan migrants, and the percentage of cases in migrants notified in the state of Roraima from 2012 to 2021

2013	170	5	2,9
2014	151	4	2,6
2015	181	8	4,4
2016	169	10	5,9
2017	217	16	7,4
2018	276	61	22,1
2019	332	80	24,1
2020	341	78	22,9
2021	392	83	21,2

There was a predominance of male cases in 66.3% of the cases, in the age group of 30 to 59 years with 36.5%, of the race/ skin color brown in 65.7% of the cases. Regarding social status, 4.9% are homeless and 4.0% are persons deprived of freedom. Table 1 describes the variables verified.

Table 1. Sociodemographic characteristics of Venezuelan immigrants with tuberculosis notified in the state of Roraima from 2012 to 2021

Sociodemographic variables	**N°**	**%**
Sex		
Male	230	66,3
Female	117	33,7
Age Group		
0 a 9	15	4,3
10 a 19	40	11,5
20 a 29	128	36,9
30 a 59	126	36,3
60 e +	38	11,0
Race/skin color		
Brown	228	65,7
Indigenous	72	20,7
White	23	6,6
Black	13	3,7
Yellow	1	0,3

Ign/white	10	2,9
Social Situation		
Homeless Population	17	4,9
Population Deprived of Freedom	14	4,0

Most reported cases were operationally classified as "new cases" (88.5%) and the predominant clinical form was pulmonary (82.7%). As for case closure (up to 180 days after the date of notification), 44.7% were cured, 19.6% abandoned treatment, 1.7% were diagnosed with drug-resistant tuberculosis (DDR-TB), and 8.0% died, of these 3.7% due to tuberculosis. The most frequent comorbidities/risk factor was HIV/AIDS (22.1%) (Table 2).

Table 2. Clinical characteristics of tuberculosis among Venezuelan immigrants notified in the state of Roraima from 2012 to 2021

Clinical Variables	**N°**	**%**
Input type		
New Case	307	88,5
Transfer	17	4,9
Re-entry	14	4,0
Recurrence	6	1,7
Post-obit	3	0,9
Clinical form		
Pulmonary	287	82,7
Extrapulmonary	27	7,8
Pulmonary+ extrapulmonary	33	9,5
Closing		
Healing	155	44,7
Transfer	63	18,2
Abandonment	68	19,6
Death from another cause	15	4,3
Death from TB	13	3,7
Resistant Tuberculosis (RS-TB)	6	1,7
Ign/white	27	7,8
Comorbidities/risk factors		
HIV/AIDS	77	22,1
Smoking	64	18,4
Alcoholism	42	12,1
Diabetes mellitus	13	3,7
Illicit Drugs	10	2,9

Regarding the place of occurrence, most cases were reported in the municipalities of Boa Vista with 70% of cases (n=243) and Pacaraima with 10.4% (n=36). Until 2017, only the municipality of Pacaraima had notified cases of the disease, altogether they totaled 15 cases (33.3%), and the remaining cases occurred in other municipalities (2.2%) or had this information omitted (blank) in Sinan - 29 cases (64.4%). Only three municipalities did not register cases of tuberculosis in Venezuelan immigrants: Caroebe, São João da Baliza, and Uiramutã.

4 DISCUSSION

The results indicate a high occurrence of tuberculosis among the Venezuelan immigrants notified in Roraima and represent almost 15% of all cases in the state in the period studied. From the data collected, it is not possible to state the probable site of infection, if the infection occurred after arrival in Roraima or if it happened while still in Venezuela.

In the study by Arenas-Suavez et al.[1] it was observed that the tuberculosis profiles of Colombia and Venezuela are identical in terms of disease burden, except for an increase in the incidence of tuberculosis in the departments on the border between the two countries in recent years. The mass migration of Venezuelan citizens to Colombia began in 2005. From there, a second exodus occurred in 2010 with the arrival of middle-class individuals fleeing Venezuela's expropriation and currency devaluation policies. Between 2017 and 2019, over one million Venezuelans arrived in Colombia causing a large-scale migration crisis. The study suggests that Venezuelan mass migration and underfunding may contribute to exacerbating the double burden of tuberculosis and HIV in Colombia, especially on the border with Venezuela.

The increase in cases of tuberculosis among Venezuelan migrants has accompanied the intensification of immigration starting in 2017. According to Unicef[16] , the level of vulnerability of migrants entering Brazil has increased. People arrive in the country in urgent need of humanitarian assistance, without access to food, health and other basic services, and exposed to various types of violence. This has brought an important increase in the search for health, education, and work services, both in Pacaraima-RR and Boa Vista-RR, the main places where the migrants stay. Another important component to consider is that many of them are of indigenous ethnicity and language and do not understand Portuguese and Spanish, which makes it difficult to be received by health units.

In the last three years, the number of cases of tuberculosis has increased in the state and the cases are concentrated, besides Venezuelan immigrants, in other groups considered vulnerable, such as indigenous people, people living on the streets, and the population deprived of freedom. According to Bomfim[17] , in Boa Vista-RR, 96.7% of the immigrants live in shelters or hostels at the time of the interviews, and the places where they live generally have characteristics that facilitate the transmission of TB: a large number of people living together, little ventilation and poor hygiene conditions.

In addition, the data from this study indicate the occurrence of tuberculosis among immigrants deprived of freedom (5%) and homeless people (4%), which increases the vulnerability of this population and the difficulty in completing treatment.

Another point to be highlighted is the verified case relapse of 1.7%, that is, a new episode of the disease after healing of a previous episode, and can result either from endogenous reactivation, from persistent bacilli in the lesion, or from exogenous reinfection[18] , conditions that are clinically indistinguishable[18] , but can be individualized with molecular techniques . [18-20]

Although the causes of tuberculosis relapse is not the objective of this study, the persistence of tuberculosis bacilli in cured patients, determining the relapse of the disease, is an important issue among

both Venezuelan immigrants and non-immigrants, who in turn had a 2.8% relapse rate in the period studied, and requires a detailed study to identify its causes.

In the study by Rodrigues et al.[21] , the variables significantly associated with tuberculosis recurrence were male gender, which had a 1.8 times greater risk than female gender, and the unfavorable outcome after the 7th month of treatment with a six times greater chance of having recurrence.

The percentage of extrapulmonary tuberculosis cases of 7.8% among immigrants in the period studied, and is 85.7% higher than the national percentage of extrapulmonary tuberculosis of 4.2% in 2019[22] . Although they do not represent important risk factors with regard to the transmission of the disease, they can affect several organs and systems, and are responsible for varied clinical pictures. The diagnosis of this clinical form can be made difficult for several reasons, including the poverty of bacilli, which is known to accompany these pictures[23] . This clinical form becomes more important in HIV/AIDS patients, and in this study, the co-infection of tuberculosis with HIV/AIDS was over 20%.

The cure percentage among Venezuelan immigrants of 44.7% is far below the cure percentage among nonimmigrants which is 69.6% in the study period. This cure percentage among nonimmigrants is similar to the national cure percentage of 69.1% in 2019[22] . The percentage of TB deaths of 3.7% was higher than the percentage of nonimmigrants (3.1%), and both, are below the national average of about 6% in 2019[22] . Tuberculosis deaths are generally associated mostly with delayed diagnosis and due to coinfection with HIV/AIDS.

We conclude that the detection of tuberculosis cases among Venezuelan immigrants has increased significantly, which may be associated with their conditions of vulnerability, and therefore it is essential to adopt public health strategies that increase access to early diagnosis and treatment for this population, in order to avoid clinical complications and the spread of the disease.

REFERENCES

1. Arenas-Suarez NE, Cuervo LI, Avila EF, Duitama-Leal A, Pineda-Peña AC.The impact of immigration on tuberculosis and HIV burden between Colombia and Venezuela and across frontier regions. Cad. Saúde Pública 2021; 37(5):e00078820. https://doi.org/10.1590/0102-311X00078820

2. Guedes AL, Oliveira E, Nobre H, Leonor Jungstedt L, Audibert P. A economia de Roraima e o fluxo venezuelano [recurso eletrônico]: evidências e subsídios para políticas públicas/Fundação Getúlio Vargas, Diretoria de Análise de Políticas Públicas. Rio de Janeiro: FGV DAPP, 2020. 146 p.

3. Prado GF. Tuberculose e fluxos migratórios: uma questão que transcende fronteiras. Sociedade Brasileira de Pneumologia e Tisiologia, 2019 [acesso em 22 01 2022]. Disponível em: https://sbpt.org.br/portal/wp-content/uploads/2019/01/Tuberculose-e-fluxos-migrat%C3%B3rios-Dr.-Gustavo-Faibischew-Prado.pdf

4. Moura LN, Souza OMF. Situação dos atendimentos nos serviços de saúde do Estado de Roraima em decorrência do processo migratório. Sala de Situação de Emergência em Saúde dos Imigrantes. Boletim Epidemiológico N. 08, atualizado em: 20/03/2018.

5. Codevida. Coalition of Organizations for the Rights to Health and to Life: complex humanitarian emergency in Venezuela right to health—National Report 2018.

6. Rebolledo-Ponietsky K, Munayco CV, Mezones-Holguin E. Migration crisis in Venezuela: impact on HIV in Peru. J Travel Med. 2019. J Travel Med. 2019;26:1-2:tay155. https://doi.org/10.1093/jtm/tay155.

7. Rodríguez-Morales AJ, Suarez JA, Risquez A, Delgado-Noguera L, Paniz-Mondolfi A. The current syndemic in Venezuela: measles, malaria and more co-infections coupled with a breakdown of social and healthcare infrastructure. Quo vadis? Travel Med Infect Dis. 2019:27(1):5–8. https://doi.org/10.1016/j.tmaid.2018.10.010

8. Rodríguez-Morales AJ, Suárez JA, Risquez A, Villamil-Gómez WE, Paniz- Mondolfi A. Consequences of Venezuela's massive migration crisis on imported malaria in Colombia, 2016–2018. Travel Med Infect Dis.2019; 28:98-99. https://doi.org/10.1016/j.tmaid.2019.02.004.

9. Grillet ME, Hernández-Villena JV, Llewellyn MS, Paniz-Mondolfi AE, Tami A, Vincenti-Gonzalez MF, et al. Venezuela's humanitarian crisis, resurgence of vector-borne diseases, and implications for spillover in the region. Lancet Infect Dis. 2019;19(5):e149-e161. https://doi.org/10.1016/S1473-3099(18)30757-6.

10. Paniz-Mondolfi AE, Tami A, Grillet ME, Marquez M, Hernández-Villena JV, Escalona-Rodriguez MA, et al. Resurgence of vaccine-preventable diseases in venezuela as a regional public health threat in the americas. Emerg Infect Dis. 2019;25(4):625–632. https://doi.org/10.3201/eid2504.181305

11. Rede-TB. Manaus registra mais de 100 casos de tuberculose entre migrantes nos últimos quatro anos [acesso em 2020 out 1]. Disponível em: https://redetb.org.br/manaus-registra-mais-de-100-casos-de-tuberculose-entre-migrantes-nos-ultimos-quatro-anos/#:~:text=O%20maior%20n%C3%BAmero%20de%20casos,18%20e%20em%202017%2C%2014.

12. Rodríguez-Morales et al. Migration crisis in Venezuela and its impact on HIV in other countries: the case of Colombia. Ann Clin Microbiol Antimicrob. 2019; 18:9. https://doiorg/10.1186/s12941-019-0310-4

13. Brasil. Operação Acolhida. Brasília: governo federal, 2020 [acesso em 2020 out. 26]. Disponível em: https://www.gov.br/acolhida/.

14. IBGE. Cidades e Estados. [acesso em 2022 jun 6]. Disponível em: https://www.ibge.gov.br/cidades-e-estados/rr.html

15. Gonçalves D, Alves D, Ruffino Netto A. Magnitude da tuberculose em imigrantes no Brasil: uma revisão integrativa. 54ª Congresso da Sociedade Brasileira de Medicina Tropical. 2 a 5 set 2018. Olinda-PE. Disponível em: http://www.adaltech.com.br/anais/medtrop2018/resumos/PDF-eposter-trab-aceito-1974-1.pdf

16. Unicef Brasil. Crise migratória venezuelana no Brasil [acesso em 2020 fev 10]. Disponível em: https://www.unicef.org/brazil/crise-migratoria-venezuelana-no-brasil

17. Bomfim C. Imigrantes são alvo de pesquisa para ações de controle da tuberculose. Agência Einstein, 08 dez 2020. Disponível em: https://www.uol.com.br/vivabem/noticias/redacao/2020/12/08/imigrantes-sao-alvo-de-pesquisa-para-acoes-de-controle-da-tuberculose.htm?cmpid=copiaecola&cmpid=copiaecola

18. Sonnenberg P, Murray J, Glynn JR, Shearer S, Kambashi B, Godfrey-Faussett P. HIV-1 and recurrence, relapse, and reinfection of tuberculosis after cure: a cohort study in South African mineworkers. Lancet. 2001;358(9294):1687-93. Erratum in: Lancet. 2002;359(9323):2120.

19. Lambert ML, Hasker E, Van Deun A, Roberfroid D, Boelaert M, Van der Stuyft P. Recurrence in tuberculosis: relapse or reinfection? Lancet Infect Dis. 2003;3(5):282-7.

20. Verver S, Warren RM, Beyers N, Richardson M, van der Spuy GD, Borgdorff MW, et al. Rate of reinfection tuberculosis after successful treatment is higher than rate of new tuberculosis. Am J Respir Crit Care Med. 2005;171(12):1430-5.

21. Rodrigues IC, Vendramini SHF, Ponce MAZ, Ruffino-Neto A, Souza NG, Chiavavalloti Neto F, et al. Recidiva da Tuberculose: fatores associados em um Grupo de Vigilância Epidemiológica de São Paulo. Rev. Eletr. Enf. [Internet]. 2017. http://dx.doi.org/10.5216/ree.v19.42691.

21. Brasil. Dados Epidemiológicos da Tuberculose no Brasil. Brasília: Ministério da Saúde, Secretaria de Vigilância em Saúde, Departamento de Doenças de Condições Crônicas e Infecções Sexualmente Transmissíveis, 2021. Disponível em: https://www.gov.br/saude/pt-br/assuntos/saude-de-a-a-z/t/tuberculose/arquivos/apres_padrao_maio_2021.pdf

22. Oliveira HB, Moreira Filho DC. Recidivas em tuberculose e seus fatores de risco. Rev Panam Salud Publica/Pan Am J Public Health. 2000;7(4).