Temporal trend analysis of confirmed tuberculosis cases in Brazil from 2011 to 2020

RESUMO
Objetivo: Analisar a tendência temporal de casos confirmados e notificados de Tuberculose (TB) no Brasil de 2011 à 2020, segundo características demográficas, socioeconômicas e regionais. Método: Trata-se de um estudo de série temporal com dados oriundos do Sistema de Informação de Agravos de Notificação (SINAN). A análise de tendência foi obtida utilizando-se regressão linear simples, com nível de significância de 5%. Para o processamento dos dados e análises estatísticas, utilizou-se o Software for Statistics and Data Science (Stata). Resultado: Evidenciou-se uma tendência de estabilidade dos casos de TB no Brasil. Houve aumento significativo dos casos entre homens, pardos, pessoas acima de 55 anos, residentes na região norte do país, bem como o expressivo aumento entre pessoas alcoólicas e diabéticas. Conclusão: Apesar de sugerirem a melhora das estratégias de vigilância, prevenção e controle da doença, demandam ações intersetoriais de enfrentamento da TB.

DESCRITORES: Tuberculose; Epidemiologia; Saúde Pública; Controle de Doenças Transmissíveis.

ABSTRACT
Objective: To analyze the time trend of confirmed and reported cases of Tuberculosis (TB) in Brazil from 2011 to 2020, according to demographic, socioeconomic and regional characteristics. Method: This is a time series study with data from the Sistema de Informação de Agravos de Notificação (SINAN). Trend analysis was obtained using simple linear regression, with a 5% significance level. The Software for Statistics and Data Science (Stata) was used for data processing and statistical analysis. Results: A tendency toward stability of TB cases in Brazil was evident. There was a significant increase in cases among males, mixed race, persons over 55 years of age, residents of the northern region of the country, as well as a significant increase among alcoholics and diabetics. Conclusion: Despite suggesting the improvement of strategies for surveillance, prevention and control of the disease, they demand intersectoral actions to confront TB.

DESCRIPTORS: Tuberculosis; Epidemiology; Public Health; Communicable Disease Control.

RESUMEN
Objetivo: Analizar la tendencia temporal de los casos confirmados y notificados de Tuberculosis (TB) en Brasil de 2011 a 2020, según las características demográficas, socioeconómicas y regionales. Método: Se trata de un estudio de series temporales con datos del Sistema de Información de Agravos de Notificación (SINAN). El análisis de la tendencia se obtuvo mediante una regresión lineal simple con un nivel de significación del 5%. Para el tratamiento de los datos y el análisis estadístico se utilizó el programa informático de estadística y ciencia de los datos (Stata). Resultados: Se evidenció una tendencia a la estabilidad de los casos de TB en Brasil. Hubo un aumento significativo de casos entre los hombres, la raza mixta, las personas mayores de 55 años, los residentes de la región norte del país, así como un aumento significativo entre los alcohólicos y los diabéticos. Conclusión: Además de sugerir la mejora de las estrategias de vigilancia, prevención y control de la enfermedad, se requieren acciones interdisciplinarias para hacer frente a la TB.

Descriptores: Tuberculosis; Epidemiología; Salud Pública; Control de Enfermedades Transmisibles.

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INTRODUCTION

Tuberculosis (TB) is the humanitie’s most antique infectious disease and, even if treatable, it is considered a global public health problem and one of the diseases that leads to death most frequently.1,2

The vulnerability to TB is influenced by biological determinants that affects the immune response to the Mycobacterium tuberculosis, as occur in little children and patients with comorbidities, as living with HIV or diabetes. 3,4

The fragility to the TB is also influenced by social determinants fully bounded to poorness situation what generates a individual’s higher exposition of contact risk with M. tuberculosis and consequently illness due to precarious conditions of living, subnutrition, inadequate conditions of work and lack access of health services. Beyond that, the patients with TB face productivity loss at their jobs and high costs associated with TB diagnosis and treatment. 3,4

The years of 2015 has became a milestone at TB’s story, when the World’s Health Organization (WHO) has proposed a Global Strategy for the And of Tuberculosis.6 Moreover, other documents at the global ambit have stand out commitments related to a view of a world free from this disease, with emphasis at the Moscow Declaration (2017) and the High Level Reunion’s Declaration (2018).4

The global perspectives concerning to the TB politics are centered at the sustainability of the actions for the disease control, through adequate financing, high level political commitment and multisectorial engage.5 With the aim of contributing with the goal of 90% of reduction at incidence rate; reduction of 95% at the number of deaths related to the disease; and permit that no person with TB, as well as his family, face catastrophic costs due to the infection.3,4 Yet, stands out the importance of organization and health services dynamic at the actions of TB control, as well as in the form that the services organize themselves to detect and treat the cases.2

In 2020, WHO promoted a report about the progress monitoring related to the TB global goals and the implementation of the High Level Politics Declaration. The document calls attention to the actual status of the intermediary turning points of the goals of the Global Strategy for the end of Tuberculosis established from 2015 to 2020, that wasn’t reached.5

From this perspective, it aimed to analyse the temporal tendency of confirmed and notified cases of TB in Brazil from 2011 to 2020.

METHOD

It is a study of temporal series. The data were obtained through the Notification Worsening Information System (SINAN) and were exported of the Brazilian Public Health System Informatics Department (DATASUS), via TABNET, an app developed by DATASUS who disponibilize informations about public health. In that way, the data was collected on 8 september 2021, being those extracted from 2011 to 2020.

The TB indicator from the temporal series tendency analysis was stratified by Sex (masculine; feminine); Age-group (years: 0-14; 15-24; 25-34; 35-44; 45-54; 55-64; 65 or more); Schooling level (illiterate; 1º to 4º grade incomplete; 4º grade compete of EF; 5º to 8º grade incomplete; Basic schooling; High school incomplete; College education; College education complete); ethnicity/skin tone (white; black; yellow; brown; indigenous); Infection by Human Immunodeficiency Virus (HIV); acqui-
red Immunodeficiency syndrome (AIDS); mellitus diabetes; mental illness; tabagism; alcoholism; illicit drug use; notificated cases at Brazil and other regions.

To avoid temporal tendency it was applied a simple linear regression as the variable (Y_i) was the local and the independent variable (X_i) given by time (year of survey). The negative sign of the gradient (β) of the line adjusted by the template indicated that the relation between the indicator and the time was decreasing, while the value of the positive angular coefficient represented the medium annual increase.

As a measure of adequation of the template it was used a residue analysis and the R-squared that indicates the percentage of explaining the dependent variable of the values. It was adopted a significance level of 5%. For the data and statistic analysis processing, the Software for Statistics and Data Science (Stata) version 16 was used.

It was used exclusively secondary data, which do not allow the subjects identification, minimizing this way the potential risks to the participants. All of the data were analysed according to the ethical principles established at Resolutions n° 466/12, and 510/16 of the Health National Council.

RESULTS

A stabilization tendency of the TB cases in Brazil was evidenced, with 87,813 cases registered in 2011 and 86,166 in 2020. Between the registered cases, it was observed a significative increasing tendency (p < 0.05) between the masculine sex, ethnicity/skin tone brown, residents of the North region of the country, at the age-group between 15 to 24 years and above 55 years old (table 1).

It was verified, yet, a significative tendency (p < 0.05) of decrease of the cases between the lower schooling levels and a significant increase of cases between persons with the second grade complete (table 2). Furthermore, it was observed a significant tendency (p<0.05) of expressive increase of TB cases between alcoholic and diabetes carrier persons (table 3).

DISCUSSION

The resent study has evidenciate a higher incidence of TB cases between the masculine sex, ethnicity/skin tone brown, along, between persons of the age-group above 55 and above 65 years, what corroborates with the litterature.7,8,9,10 The high prevalence including TB mortality for the masculine sex is commonly related to a bigger contact with tubercule
### Tabela 2 – Tendência temporal dos casos confirmados e notificados de tuberculose segundo variáveis escolaridade e distribuição dos casos pelas regiões do país, Brasil, 2011-2020.

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Fonte: Ministério da Saúde/SVS – Sistema de Informação de Agravos de Notificação - Sinan Net
Notas: Os dados foram coletados no dia 8 de setembro de 2021.
Foram considerados, como estaticamente significativos, os casos em que p-valor < 0.05.
* Indica o coeficiente de variação angular.
bacillus in laboral activities and higher frequency of nocive habits for health between men.11,8 Even existing evidences that women are more susceptibles to the disease progression, the immunological response may be different according to the sex. However, women present bigger rates of health care if compared to the masculine sex.11

TB is shown as a neglected disease, which profile is associate to social aspect vulnerability, likewise poorness situation, precarious in health and education. In a country like Brazil, it must consider the magnitude of social inequalities that turns the individuals vulnerable to the disease manifestation.12 The TB vulnerability may be included to comorbidities as diabetes mellitus, infection by HIV, mental illnesses, silicosis and chronic immunosuppressive conditions, as well as subnutrition, gathered at alcohol, tobacco and other drugs abuse. Which are predictive factors for the non-adhering to the disease’ treatment and increase of health costs.4

It must emphasize that patients coinfected with HIV/AIDS present increased death risk and one third of the obits related to HIV are due from TB.8 Beyond that, the presence of diabetes increases the severity and the risk of outcomes unfavorable at the treatment influencing its gravity and causing severe symptoms of the disease as death by TB. Persons with diabetes and TB struggle more in controlling the glucose levels at the blood if compared to a person with diabetes without TB.13,12

The population with mental illness and in a state of social vulnerability present higher risks to develop infectious diseases, such as TB. Between the implications at TB diagnosis and treatment, in this population, struggling into adhering the treatments, higher chances of contracting TB, multidrug-resistant and low life quality is found.14 At the same way, tobacco use, illicit drugs and alcohol are shown as the associated factors to re entering to the treatment, what beyond prejudicing the immunological system contributes expressively for the irregular abandon and adoption to the chimioterapy.15,8

Furthermore, a tendency to increase the cases between persons with schooling from second grade complete has succeeded. Low scholar it’s a predictor by TB mortality, considered a reflex of an entire gathering of precarious circumstances, which increase the vulnerability to TB and are responsible for the bigger occurrence of the disease and low adoption to the treatment. On the other hand, the higher schooling level has been associated with the lowest prevalence of TB mortality.15,16

The cases stability of the disease, notified at Brazil, during ten years analyzed, suggests that the monitoring of TB cases has shown some progresses. Although, its control is a challenge for Brazil, what shows the need of bigger investments at public politics development, once all of the social problems are reflexes of the inefficient politics.16

Factors as restraint to investigate contacts; make a precoce diagnose and start the antituberculosis therapy at basic care; as well as late diagnosis and low efficacy at the antituberculosis therapy, that may be decurrent of sociocultural factors associate to the patient and the health system organization, favour the TB dissemination.17

The spatial analysis of a health problem may contribute to the comprehension of its insertion at the society, its facing potentials and by consequence, the health situation of individuals and specific groups of the population.7

CONCLUSION

The present study results shows that there was a tendency of stability of confirmed and notified TB cases at Brazil. Those results, despite of suggesting the increase at vigilance, prevention and control of the disease strategies, demand intersectorial actions of TB facing, regarding the increasing tendency seen between man, brown, persons above 55 years, from the North region of the country, as well as the expressive increase of cases between diabetical and alcholic persons.

REFERENCES

REFERENCES


