

COMORBIDITIES AND LIFESTYLE OF THE ELDERLY WITH TUBERCULOSIS

Comorbidades e estilo de vida de idosos com tuberculose

Comorbidades y estilo de vida en mayores con tuberculosis

Original Article

ABSTRACT

Objective: To analyse the comorbidities and lifestyle of elderly people with tuberculosis. **Methods:** A case-control study was performed with 48 elderly patients who have had tuberculosis (TB) and 96 neighbours as controls, in the years 2008/2009, in Teresina, Piauí. Information on demographics, comorbidities, lifestyle, and clinical data were collected through the Notifiable Diseases Information System (SINAN) in the city. The odds ratio (OR) was used as a measure of association, in SPSS software. **Results:** The average age of cases was 74 (\pm 8.0) years, and 73 (\pm 9.0) years among controls. There was a higher occurrence of males (52%; n=25) among cases ($p=0.039$). As for housing, 92% (n=44) of TB cases and 90% (n=86) of the controls lived in their own home, while 75% (n=36) of cases, and 71% (n=68) of controls lived with two to five people ($p>0.05$). Among cases, it was found that 52% (n=25) were current smokers, and 58% (n=28) were alcoholics. However, no association was found between the groups. Although 50% (n=24) of patients were hypertensive and 15% (n=7) had diabetes mellitus or heart disease, there was no association between the groups. An association ($p=0.003$) was observed between the occurrence of new cases and close contact with people with TB. **Conclusion:** The study observed that factors like comorbidities, lifestyle (smoking and alcoholism), and housing conditions did not present significant difference between the elderly with tuberculosis and the neighbour controls in the same age range.

Descriptors: Tuberculosis; Elderly; Case-Control Studies.

RESUMO

Objetivo: Analisar as comorbidades e o estilo de vida de idosos com tuberculose. **Métodos:** Realizou-se um estudo caso-controle com 48 idosos que tiveram tuberculose (TB) e 96 controles vizinhos, nos anos 2008/2009, em Teresina-PI. Coletaram-se informações demográficas, sobre comorbidades, hábitos de vida e dados clínicos através do Sistema de Informação de Agravos de Notificação (SINAN) do município. Utilizou-se o odds ratio (OR) como medida de associação, pelo programa SPSS. **Resultados:** A média de idade dos casos era de 74 (\pm 8,0) anos e dos controles, de 73 (\pm 9,0) anos. Houve maior ocorrência do sexo masculino (52%; n=25) entre os casos ($p=0,039$). Com relação à moradia, 92% (n=44) dos casos de TB e 90% (n=86) dos controles moravam em casa própria, enquanto 75% (n=36) dos casos e 71% (n=68) dos controles residiam com duas a cinco pessoas ($p>0,05$). Nos casos, verificou-se que 52% (n=25) eram fumantes e 58% (n=28), etilistas. Entretanto, não houve associação entre os grupos. Apesar de 50% (n=24) dos casos serem hipertensos e 15% (n=7) terem diabetes mellitus ou doença cardíaca, não houve associação entre os grupos. Observou-se associação ($p=0,003$) entre a ocorrência de novos casos e o contato próximo com portadores de TB. Entre esses casos anteriores, 85,4% (n=41) tinham a mesma faixa de idade dos casos. **Conclusão:** Observou-se que fatores como comorbidades, hábitos de vida (tabagismo e alcoolismo) e condições de moradia não apresentaram diferença significativa entre os idosos que tiveram tuberculose e os controles vizinhos na mesma faixa etária.

Descritores: Tuberculose; Idoso; Estudos de Casos e Controles.

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RESUMEN

Objetivo: Analizar las comorbidades y el estilo de vida en mayores con tuberculosis. **Métodos:** Se realizó un estudio caso-control con 48 mayores que tuvieron tuberculosis (TB) en 2008/2009 y 96 controles vecinos en Teresina-PI. Se recogieron informaciones demográficas, de las comorbidades, hábitos de vida y datos clínicos a través del Sistema de Información de Agravos de Notificación (SINAN) del municipio. Se utilizó el odds ratio (OR) como medida de asociación en el programa SPSS. **Resultados:** La media de edad de los casos fue de 74 (\pm 8,0) años y de los controles de 73 (\pm 9,0) años. Hubo mayor ocurrencia del sexo masculino (52%; $n=25$) entre los casos ($p=0,039$). Respecto a la vivienda el 92% ($n=44$) de los casos de TB y el 90% ($n=86$) de los controles vivían en casa propia mientras el 75% ($n=36$) de los casos y el 71% ($n=68$) de los controles vivían entre dos y cinco personas ($p>0,05$). En los casos se verificó que el 52% ($n=25$) eran fumadores y el 58% ($n=28$), eran alcohólicos. Sin embargo, no hubo asociación entre grupos. A pesar de que el 50% ($n=24$) de los casos eran hipertensos y el 15% ($n=7$) tenían diabetes mellitus o enfermedad cardíaca, no hubo asociación entre grupos. Se observó asociación ($p=0,003$) entre la ocurrencia de casos nuevos y el contacto próximo con portadores de TB. De los casos anteriores, el 85,4% ($n=41$) tenían la misma franja de edad de los casos. **Conclusión:** Se observó que factores como comorbidades, hábitos de vida (tabaco y alcoholismo) y las condiciones de vivienda no presentaron diferencia significativa entre los mayores que tuvieron tuberculosis y los controles vecinos con la misma franja de edad.

Descriptor: Tuberculosis; Anciano; Estudios de Casos y Controles.

INTRODUCTION

Caused by the bacillus *Mycobacterium tuberculosis*, the tuberculosis (TB) is considered a major public health problem influenced by social inequalities, population ageing, limited number of studies aimed at the development of new treatments and vaccines, migration movements, health care system failures and the high prevalence of cases of multidrug-resistant tuberculosis^(1,2).

Brazil currently ranks 16th among the 22 burden countries that account for circa 80% of cases of tuberculosis worldwide in absolute numbers. In 2013, the country reported 71,123 new cases corresponding to an incidence coefficient of 35.4/100,000 inhabitants. Considering this coefficient, the country ranks 22nd among these countries. The Ministry of Health (MH) has set TB as a priority in its public policies, and the *Programa Nacional de Controle da Tuberculose – PNCT* (National Tuberculosis Control Program), following the World Health Organization

guidelines has established the goal to diagnose 70% of expected cases and cure 85% of them⁽²⁻⁴⁾.

Meeting what is suggested by the literature, according to which the capitals have the highest incidences of tuberculosis due to a high population density and poverty pockets, the city of Teresina presented, in 2005, an incidence rate above the national average, with 50.2 cases/100,000 inhabitants, while the State presented an incidence of circa 36.2/100,000 inhabitants⁽⁵⁻⁸⁾.

Added to these factors, TB is part of a global epidemiological context of demographic transition characterized by a rapid population aging. This can be observed in Brazil, where the incidence starts to move towards older age groups^(9,10). According to statistical projections of WHO, the elderly population will probably have increased by 15 times during the period from 1950 to 2025⁽¹¹⁾.

Among the factors favoring tuberculosis infection in elders, comorbidities, immunosuppression, alcoholism, smoking, drugs and poor nutrition stand out. Age-related diseases among the elderly in Latin America stand out because of the economic situation and the difficulty to access health care services⁽¹⁰⁾.

In light of the foregoing, the present study aimed to analyze the comorbidities and lifestyle of elders with tuberculosis.

METHODS

A case-control study has been conducted to analyze the comorbidities and lifestyle of new cases of TB in the elderly reported in the years 2008 and 2009.

The study was conducted in Teresina, capital of the State of Piauí, located in the North Central region of the State and in the Middle-north of Northeastern Brazil. In 2006, Teresina had 801,972 inhabitants; 49,816 (6.2%) of whom were aged 60 and older. In 2009, its population was 802,565 inhabitants; 54,349 (6.8%) of whom were elders^(12,13).

In 2008 and 2009, there were 61 and 64 (respectively) new TB cases in elders living in Teresina reported out of a total of 125 cases. In all, 77 of which were excluded from the research because 7 had died from TB, 25 had died from other causes, 35 could not be found, 5 were duplicates, 2 did not agree to participate in the interview and 3 were part of the pilot study. Thus, the research included 48 TB cases, 23 of which were reported in the *Sistema de Informação de Agravos de Notificação – SINAN* (Notifiable Diseases Information System) in 2008 and 25 in 2009.

Cases were identified from the SINAN 4.0 database through tables created by the TABWIN 3.2 program

containing the patient's name, SINAN number, Health Unit reporting to SINAN, address, mother's name and date of birth.

For a total of 48 cases, there were 96 controls who were within the same age group and who lived near the cases (neighbors); therefore, there were two controls per case. In case of refusal, another control was chosen (a neighbor who lived in the same area of the case) for participating.

Selection of participants was followed by the application of a semi-structured form with open and closed-ended questions on demographics (age, sex, housing, and family income), comorbidities (diabetes mellitus, systemic hypertension, heart disease, kidney disease, cancer, rheumatism, asthma, AIDS and silicosis), lifestyle (alcoholism and smoking and use of illicit drugs) and clinical data (history of previous TB contact and treatment).

Alcoholism is hereby understood as the act of drinking alcoholic beverages and is categorized into social (on weekends and/or in celebrations) or excess (drinking every day or start drinking without knowing when to stop) alcoholism; smoking refers to tobacco smoking. The two habits, together with the use of illicit drugs, were assessed as being present (at least six months from the application of the formulary) or past (more than six months).

A pilot study was conducted to test the viability of the formularies by checking the terms, form, order and clarity of questions and time needed to apply the formularies, making any adjustments needed for the collection of data.

In case of patients with mental illnesses who could not answer the formulary, the legal representative/caregiver of the participant answered it.

Data were tabulated using population bases according to year, sex and age group, obtained from the Datasus – Ministry of Health website⁽¹²⁾. Quantitative variables were described by their mean values and respective standard deviations. Categorical variables were described by their frequency values.

In order to check the significance of mean differences found, independent-samples t-test was conducted. Chi-squared test was conducted to check for association between categorical variables. Odds ratio (OR) was used as a measure of association for the several exposures among cases and controls. Significance level was set at 5% ($p < 0.05$) and confidence interval at 95% (CI95%). All the statistical procedures were performed using the Statistical Package for the Social Sciences (SPSS), version 15.0 for Windows.

The research was approved by the Research Ethics Committee of the *Fundação Municipal de Saúde – FMS* (Municipal Health Foundation) under Opinion No. 458/2010 and by the Research Ethics Committee of the

Universidade Federal do Piauí (Federal University of Piauí) under Opinion No. 0439.0.045.000-10, in accordance with Resolution No. 466/12 of the National Health Council⁽¹⁴⁾.

RESULTS

In 2008 and 2009, 61 and 64 (respectively) new cases of TB in the elderly were reported. Of these, 48 were located, interviewed and compared to 96 controls, i.e., neighbors within the same age group who did not have the disease. The age of cases ranged from 61-91 years, with a mean of 74 (± 8.0) years; controls' age ranged from 60-93 years, with a mean of 73 (± 9.0) years. Regarding sex, the chi-squared test verified an association between gender and tuberculosis in the elderly ($p=0.039$). The distribution of males (52%; $n=25$) among cases of TB was higher than female's (48% / $n=23$).

With regard to socioeconomic conditions, concerning housing, 92% ($n=44$) of cases of TB lived in their own house, 94% ($n=45$) of the houses had cement-rendered brick walls and 80% ($n=38$) of the houses had tile floors. Similar percentages were found among controls as 90% ($n=86$) of them owned their houses, 97% ($n=93$) of houses had cement-rendered brick walls and 88% ($n=84$) of the houses had tile floors.

Still with regard to housing conditions, both cases and controls presented an average of 7 rooms and 4 windows per house, and most of TB cases (75%; $n=36$) and controls (71%; $n=68$) lived in a house with other 2-5 people, with an average of 4 people per house and 2 people sleeping in the same bedroom. There was no statistically significant difference between the aforementioned variables after t-test ($p > 0.05$).

Concerning family income, 41.7% ($n=20$) of the cases had an income of more than three minimum wages; among controls, this percentage was only 19.8% ($n=19$). When analyzing this variable among cases, it was verified that tuberculosis is associated with the increase in family income ($p=0.05$).

As for comorbidities among cases and controls, although 15% ($n=7$) of TB cases had diabetes mellitus (DM), 50% ($n=24$) had systemic hypertension (SH) and 15% ($n=7$) heart diseases, no association was found among cases and controls in relation to these comorbidities. Additionally, none of the TB cases investigated had Aids or silicosis and only 4% ($n=2$) presented kidney disease, 8% ($n=4$) had asthma, and 2% ($n=1$) had cancer and rheumatism (Table I).

Concerning lifestyle, although 52% ($n=25$) of TB cases had smoked in the past (more than 6 months) and 15% ($n=7$) are current smokers and regular social drinkers, with 58% of patients ($n=28$) having consumed alcoholic beverage in

Table I - Analysis of comorbidities and lifestyle between new cases of elderly with tuberculosis reported in 2008 and 2009 and controls. Teresina, PI, 2008-2009.

Comorbidities/ Lifestyle	Categories	Cases	Controls	Odds Ratio (CI 95%)
Hypertension	Yes	24	57	0.68
	No	24	39	(0.34-1.37)
Diabetes mellitus	Yes	7	14	1.00
	No	41	82	(0.38-2.67)
Heart disease	Yes	7	20	0.65
	No	41	76	(0.25-1.66)
Smoking	Yes	32	49	0.52
	No	16	47	(0.25-1.07)
Social drinking	Yes	28	46	0.66
	No	20	50	0.33-1.32

*CI 95% - 95% Confidence interval.

the past or being current drinkers, no association was found between the groups assessed (Table I).

Still with regard to comorbidities and lifestyle, by using odds ratio (OR) as a measure of association of the several exposures between case and control groups it was possible to observe that elderly participants did not present chances of getting tuberculosis in relation to hypertension, diabetes mellitus, heart disease, smoking and social drinking, as displayed in Table I.

When checking whether other family members or people who lived in the same house have ever gotten TB, 3 interviewees could not tell it. Among those who could tell it, 58.3% (n=28) of cases had contact with family members or people living in the same house who had tuberculosis and 73% (n=70) of controls did not have contact with other people who had the disease. There was an association (p=0.003) between the incidence of new cases and close contact with other people having TB. Among the previous cases, 85.4% (n=41) are in the same age group of the cases.

Only 6% (n=3) of cases have had TB in the past: one (n=1) had it 19 years ago, another one had it 37 years ago and the other had the disease 47 years ago. All of them reported completing treatment at that time.

DISCUSSION

Concerning the cases of TB in elderly people reported in 2008 and 2009 who were interviewed and compared to a control group comprising of neighbors within the same age group, it was observed, as to sex, that the high percentage of men has also been observed by another case-control study in Rio de Janeiro⁽¹⁵⁾.

Likewise, a study conducted in the State of Minas Gerais, seeking to analyze the profile of TB cases in the

State between 2002 and 2009 through SINAN, found a prevalence in elders over 65 years, mostly men in a 2:1 ratio⁽¹⁶⁾. The predominance of men may be associated with the greater exposure to the *Mycobacterium tuberculosis* as this cohort has had greater social circulation in the period when they were still young^(15,17).

No significant difference was found when comparing elderly cases and controls in relation to comorbidities. A study conducted in India revealed a higher prevalence of comorbidities such as diabetes mellitus, cardiovascular diseases and chronic obstructive pulmonary disease in elders with TB, which may be explained by the age-related physiological changes⁽¹⁸⁾. A study conducted with elders with tuberculosis in Rio de Janeiro⁽¹⁵⁾ points to the high rate of diseases associated with the elderly group in comparison to the group of young individuals with TB as a potential confusing finding since such diseases are often found in any elderly population. Thus, by comparing elders who had the disease to elders without TB, it could be observed that its development may not be associated with the presence of comorbidities, but with the fact that nearly 90% of the cases of tuberculosis in the elderly are caused by the reactivation of the primary infection⁽¹⁹⁾.

Although there was no statistically significant difference between cases and controls in terms of smoking and alcohol drinking, it is observed that these factors, among others, are singled out as responsible for a greater morbidity and lethality of tuberculosis in the elderly⁽¹⁰⁾.

Today's elderly belong to a cohort of individuals who were born in the 1940's who have been exposed to the Koch's bacillus during their childhood, when the disease presented a high prevalence and treatment schemes were less effective. Therefore, a high rate of elders may have been infected. This population, for harboring the *Mycobacterium*

tuberculosis and presenting age-related problems, may develop tuberculosis⁽¹⁹⁾.

Confirming the fact that TB in the elderly is associated with age-related problems in which individual's cellular immunity – considered the main responsible for fighting off the bacillus infection – is decreased, no significant differences have been found between cases and controls as to housing type and conditions and the number of people per house and bedroom, although high rates of the disease transmission in confined spaces have been highlighted in developing and developed countries^(21,20).

Concerning family income, it has also been observed that cases' income was higher than controls'; additionally, another case-control study has also verified that a lower education level is opposed to a higher family income⁽⁹⁾. A consideration about the context in which the study population is inserted suggests that this may be explained either by the fact that the elderly have children who have their own income and who help their parents or by the fact that the elderly have access to social welfare policies.

Approximately half of the cases interviewed had contact with people who have already had tuberculosis (people living in the same house or family members). However, it was observed that these people were in the same age group of the elderly interviewees and most of them had had the disease circa 24 years ago. This indicates that: the contact has not occurred recently, TB in the cases assessed is not a recent infection, and this may have contributed to the reactivation of an endogenous infection acquired in the past.

A study conducted in Serbia revealed that the most important risk factor for the development of tuberculosis infection in the elderly is considered to be the reactivation of the disease that had been acquired earlier⁽²²⁾. Another study conducted in Rio de Janeiro shows that the development of TB might be preferentially endogenous since 70% of the elderly had no history of the disease⁽¹⁵⁾.

Finally, the present study highlights the importance of specific strategies to prevent and control tuberculosis in the elderly who must be considered a vulnerable group and hence should be set as a priority of public policies.

CONCLUSION

It was observed that factors such as lifestyle (smoking and alcoholism), comorbidities and housing conditions did not present significant difference among the elderly who had tuberculosis and the controls (neighbors) who were in the same age group.

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