PREVALENCE OF PULMONARY TUBERCULOSIS AND RESPIRATORY SYMPTOMATIC SUBJECTS IN A REFERRAL PSYCHIATRIC HOSPITAL IN ALAGOAS STATE

Prevalência de tuberculose pulmonar e sintomáticos respiratórios em um hospital psiquiátrico de referência em Alagoas

Prevalencia de tuberculosis pulmonar y sintomáticos respiratorios de un hospital psiquiátrico de referencia de Alagoas

Original Article

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ABSTRACT

Objective: To evaluate the prevalence of bacilliferous pulmonary tuberculosis (PTB) and respiratory symptomatic (RS) subjects in a referral public psychiatric hospital in Alagoas, Brazil. **Methods:** Quantitative cross-sectional research conducted in the hospital wards of Portugal Ramalho Teaching Hospital by means of questionnaire forms addressing demographic, epidemiological and social data, from March to April 2013. Groups established: RS, which underwent sputum collections for bacilloscopy, and asymptomatic subjects (RA). **Results:** The study included 143 participants, with 61.5% (n=88) males, 51.7% (n=74) young adults, 30.8% (n=44) illiterate and 41.3% (n=59) presenting some debilitating comorbid condition. The prevalence of bacilliferous PTB was found at 0.69% (n=1). RS represented 14.7% (n=21) of the sample and were associated with the group of patients hospitalized for over two years and without prospect of discharge (p=0.01), and to smoking (p=0.02). **Conclusion:** A high prevalence of bacilliferous PTB was found in this group, compared to that found in the Brazilian population, and RS subjects were associated with longer hospitalization length and smoking.

Descriptors: Pulmonary Tuberculosis; Psychiatric Hospitals; Smoking.

RESUMO

Objetivo: *Avaliar a prevalência de tuberculose pulmonar (TBP) bacilífera e sintomáticos respiratórios (SR) em um hospital psiquiátrico público de referência em Alagoas, Brasil.* **Métodos:** *Pesquisa transversal quantitativa conduzida nas alas de internação do Hospital Escola Portugal Ramalho por meio de questionários contendo dados demográficos, epidemiológicos e sociais, de março a abril de 2013. Grupos estabelecidos: SR, submetidos às coletas para baciloscopia, e assintomáticos (AR).* **Resultados:** *Participaram do estudo 143 pacientes, sendo 61,5% (n=88) homens, 51,7% (n=74) adultos jovens, 30,8% (n=44) analfabetos e 41,3% (n=59) com alguma condição debilitante associada. A prevalência de TBP bacilífera encontrada foi de 0,69% (n=1). Os SR representaram 14,7% (n=21) da amostra e foram associados ao grupo de pacientes internados há mais de dois anos e sem perspectiva de alta (p=0,01), e ao hábito de fumar (p=0,02).* **Conclusão:** *Encontrou-se nesse grupo uma alta prevalência de TBP bacilífera, se comparada à da população brasileira, sendo os SR associados ao maior tempo de internação hospitalar e ao hábito de fumar.*

Descritores: *Tuberculose Pulmonar; Hospital Psiquiátrico; Hábito de Fumar.*

Received on: *07/12/2015*
Revised on: *10/10/2015*
Accepted on: *11/07/2015*

RESUMEN

Objetivo: *Evaluar la prevalencia de la tuberculosis pulmonar (TBP) bacilífera y de los sintomáticos respiratorios de un hospital público psiquiátrico de referencia en Alagoas, Brasil.* **Métodos:** *Investigación transversal cuantitativa realizada en las alas de internación del Hospital Escuela Portugal Ramalho a través de cuestionarios con datos demográficos, epidemiológicos y sociales entre marzo y abril de 2013. Grupos establecidos: los Sintomáticos Respiratorios (SR), conducidos a realizar la baciloscopia y los asintomáticos respiratorios (AR).* **Resultados:** *Participaron del estudio 143 pacientes, el 61,5% (n=88) hombres, el 51,7% (n=74) adultos jóvenes, el 30,8% (n=44) analfabetos y el 41,3% (n=59) con alguna debilidad asociada. La prevalencia de TBP bacilífera encontrada fue del 0,69% (n=1). Los SR representaron el 14,7% (n=21) de la muestra y estuvieron asociados al grupo de pacientes ingresados hacía más de dos años y sin perspectiva de alta hospitalaria (p=0,01) y el hábito de fumar (p=0,02).* **Conclusión:** *En este grupo se encontró elevada prevalencia de TBP bacilífera al comparar a la población brasileña y los SR estuvieron asociados al mayor tiempo de ingreso hospitalario y al habito de fumar.*

Descriptores: *Tuberculosis Pulmonar; Hospitales Psiquiátricos; Hábito de Fumar.*

INTRODUCTION

Tuberculosis (TB) is a chronic infectious disease caused by *Mycobacterium tuberculosis* (Mtb). Aerosol transmission is the predominant mode of spread, which accounts for eighty percent (80%) of the patients suffering from Pulmonary Tuberculosis (PTB), the form of greatest clinic-epidemiological relevance[1-3].

A major health problem, TB is the second most deadliest infectious disease in the world[4-9]. Both intensification of migration flows and the Acquired Immune Deficiency Syndrome (AIDS) pandemic play an important role on TB incidences worldwide, once HIV-positive individuals are ten times more susceptible to Mtb; therefore, they represent high risk of transmission to contacts[3-5,10-12].

According to the World Health Organization (WHO) and other authors, approximately two billion people live with latent Mtb infection and nearly seven million people suffer from active TB in the world. In 2012, 8.6 million people fell ill with TB resulting in 1.3 million deaths, particularly in non-developed or developing countries[2,6,13-15]. The prevalence of infected people in Brazil is estimated around 110,000, with approximately 70,000 new cases and 5,000 deaths reported annually. With such rates, the country ranks in 17th position among the 22 high TB burden countries, responsible for 80% of all TB cases detected globally[15].

TB prevalence among subjects who are confined or work in psychiatric hospitals, prisons and shelters is about sixteen times greater than that in the general population, which represents high risk of outbreaks and multidrug-resistant strains spread[16]. Although TB is considered a serious public health issue, the literature review carried out during this research detected no active Tuberculosis case-finding study conducted in psychiatric institutions of Alagoas prior to this initiative. Only one work conducted in a psychiatric hospital was found at the national level.

In view of this, the present study aims at evaluating the prevalence of bacilliferous pulmonary tuberculosis (PTB) and respiratory symptoms (SR) in a public referral psychiatric hospital of Alagoas state.

METHODS

Cross-sectional study with quantitative approach, conducted at the Portugal Ramalho Teaching Hospital (*Hospital Escola Portugal Ramalho - HEPR*), in Alagoas State, through active case finding, screening for patients with respiratory symptoms and bacilliferous PTB cases, from March to April 2013. The overall hospital bed capacity is 160, with 95 in the male ward, which includes a 27-bed drug addiction unit, and 65 for women. At the time of this study, 146 beds were occupied, including 18 "resident patients" (those living in the institution for more than two years, without expectation of discharge due to the lack of social support or family reference). One patient refused participation and two were excluded for data insufficiency. A fixed sample was thus composed of 143 inpatients.

The subjects hospitalized at HEPR were included in the study only after registration of a legal tutor's signature – either a relative or the hospital director – on Informed Consent forms. Exclusion criteria were the consent withdrawal and data insufficiency.

A specific questionnaire was designed for data collection. Based on reviews of the inpatients records and clinical assessments, questionnaires were filled out, containing the variables "age", "length of stay", "sex", "skin color", "education level", "previous housing condition" (except for the resident patients – see previous definition), "number of contacts prior to hospitalization", "comorbidities" (HIV, alcoholism, smoking, illicit drug addiction, infectious diseases), "respiratory symptoms" (presence of one of the listed/none), "current TB" (yes/no), and "current use of medicines". Two study groups were then established: SR (with patients who present respiratory symptoms) and AR (with patients who did not)[17,18].

The inclusion criteria adopted for SR (having at least one classical PTB symptom) – cough for 2 weeks or longer, dyspnea or chest pain (accompanied or not by

expectoration, hemoptysis and/or wheezing) – were based on the Practical Approach to Lung Health (PAL), promoted by the World Health Organization – and on the Brazilian Thoracic Association (BTA) guidelines on Tuberculosis[8,14]. SR patients underwent sputum collection. Two independent specimens per patient (the second one mandatorily after fasting) were collected within a 24- to 48-hour interval, in a wide open space, and stored in portable refrigerators which kept them at +4 °C until processing was performed at the Central Laboratory of Public Health of Alagoas (*Laboratório Central de Saúde Pública de Alagoas - LACEN/AL*). There, sputum-smear tests (bacilloscopies) searched for acid-alcohol resistant bacilli (AARB) using Ziehl-Neelsen staining[8,18]. In this research, PTB cases were confirmed by two AARB-positive bacilloscopies, according to guidelines from the Pan American Health Organization (PAHO) and the BTA, which include recommendations for early detection of bacilliferous subjects[8,13].

The softwares SPSS Statistics 18 and Epi Info 3.4.2™ were used for statistical analyses. Pearson's chi-square, Yates's correction and Prevalence ratio (PR) tests were used for group comparison in terms of risk factors presented. A "$p<0.05$" value was taken as statistical level of significance.

The project complies with all the guidelines of the Declaration of Helsinki and Resolution no. 466, of 12 December 2012, of the National Health Council[19]. The study was submitted to the Local Research Ethics Committee, and approved under opinion no. 1543/12, issued in January 2013[20,21].

RESULTS

Most of the 143 participants were male (61.5%, n=88), 51.7% (n=74) of which were young adults (20-39 years old) and 79.7% (n=114), brown-skinned. The average age was 36.4 (SD= ±14.2) years.

With regard to previous housing conditions, 70.6% (n=101) of the inpatients had lived in brick houses prior to hospitalization; 12.6% (n=18) were resident patients, 9.1% (n=13) lived in precarious dwellings or did not own one (7 lived on the streets, 5 in wattle houses and 1, in a canvas hut); in 7% (n=10) of the patients records analysed, such information was not found.

As for the education level, the low level was found predominant, since 46.8% (n=67) of the assessed patients had not completed the elementary school and 30.8% (n=44) were illiterate. Only 7.7% (n=11) concluded either the whole or part of their high school education (Table 1).

With respect to debilitating conditions and comorbidities, a high number of smokers (23.8%; n=34) was identified in the sample. Also, alcoholism (20.3%; n=29), illicit drug addiction (14.7%; n=21), HIV seropositivity (1.4%; n=2) and Syphilis (0.7%; n=1) cases were reported. Yet, the simultaneous occurrence of two or three comorbidities was confirmed, respectively, in 9.8% (n=14) and 4.9% (n=7) of the participants (Table II).

Twenty-one patients (14.7%) – 9 women and 12 men – composed group SR, whose average age and length of stay were, respectively, 41.8 years and 1,456 days (around

Table I - Sociodemographic profile of patients hospitalized in the Portugal Ramalho Teaching Hospital (*Hospital Escola Portugal Ramalho* - HEPR). Alagoas, 2013.

Variables	Total – n (%)	SR – n (%)	AR – n (%)
Sex			
Female	55 (38.5)	9 (16.4)	46 (83.6)
Male	88 (61.5)	12 (13.6)	76 (86.4)
Skin color			
White	16 (11.2)	4 (25)	12 (75)
Black	13 (9.1)	2 (15.38)	11 (84.62)
Brown	114 (79.7)	15 (13.15)	99 (86.85)
Age range			
10-19 years	15 (10.5)	2 (13.33)	13 (86.67)
20-39 years	74 (51.7)	7 (9.46)	67 (90.54)
40-59 years	40 (28.0)	10 (25)	30 (75)
≥60 years	13 (9.1)	2 (15.38)	11 (84.62)
Unknown	1 (0.7)	-	1 (100)

SR=with respiratory symptoms; AR=assymptomatic.

Table II - Distribution of debilitating conditions found in patients in the groups "with respiratory symptoms" (SR) and "asymptomatic" (AR), assisted in the Portugal Ramalho Teaching Hospital (*Hospital Escola Portugual Ramalho* - HEPR). Alagoas, 2013.

Conditions	SR Cases		AR Cases		PR	χ2 Test
	n	%	n	%		
Alcoholism						
Yes	2	6.9	27	93.1	0.37	1.76 (p=0.18)
No	19	16.6	95	83.4		
Smoking habit						
Yes	9	26.5	25	73.5	2.91	4.945 (p=0.02)
No	12	11.0	97	89.0		
Use of illicit drugs ilícitas						
Yes	4	19.0	17	81.0	1.62	0.37 (p=0.54)
No	17	14.0	105	86.0		
HIV/AIDS						
Yes	1	50.0	1	50.0	6.05	2.02 (p=0.15)
No	20	14.2	121	85.8		
Syphilis**						
Yes	1	100.0	0	0	not valid	----------
No	20	14.1	122	85.9		

SR: with respiratory symptoms; AR: assymptomatic. *RP: prevalence ratio. ** Pearson's chi-square test: 5.85 ($p<0.05$), but it is not valid because two cells (50%) present expected value below 5.

Table III - Comparative chart of living conditions prior to hospitalization of patients in the groups "with respiratory symptoms" (SR) and "asymptomatic" (AR), assisted in the Portugal Ramalho Teaching Hospital (*Hospital Escola Portugual Ramalho* - HEPR). Alagoas, 2013.

Used to live in brick house	Groups				PR	χ^2 Teste (Yates)
	AR		SR			
	n	%	n	%		
Yes	90	89.1	11	10.9	3.719	6.121 (p=0.013)
No	22	68.7	10	31.3		
Total*	112	84.2	21	15.8		

SR: with respiratory symptoms; AR: assymptomatic. *RP: prevalence ratio. *133 is the total after removal of unknown/blank field.

48.5 months). Individuals from AR had been hospitalized for, on average, 357.5 days (approximately 12 months). The average hospital stay of resident patients was 4475 days (about 12 years and 3 months).

Comparison between groups SR and AR evidenced association between smoking and group SR (PR=2.91; p=0.026) (Table II). Statistically significant association was also detected between good housing condition (brick house) and AR (PR=3.719; p=0.013) (Table III). Furthermore, it was observed that residents were significantly more symptomatic that non-resident patients (PR=4.59; p=0.01) (Table IV).

The prevalence of bacilliferous PTB found in the studied group was 0.69% (n=1). The sick individual, hospitalized for the third time in the institution due to the exacerbation of his mental disorder (paranoid schizophrenia), was diagnosed by positive sputum smear obtained 53 days after the last admission. The patient was in the fourth month of treatment (maintenance phase) at the time of this study[8] and was discharged on April 9, 2013, after improvement of psychotic symptoms and by request of his sister, what happened, however, before the end of treatment for TBP.

Table IV - Distribution of resident patients in the Portugal Ramalho Teaching Hospital (*Hospital Escola Portugual Ramalho* - HEPR), in the groups "with respiratory symptoms" (SR) and "asymptomatic" (AR). Alagoas, 2013.

Resident* in HEPR	Groups				PR	χ^2 Test (Yates)
	SR		AR			
	n	%	n	%		
Yes	7	38.9	11	61.1	4.590	6.465 (p=0.01)
No	14	12.2	101	87.8		
Total**	21	15.8	112	84.2		

SR: with respiratory symptoms; AR: assymptomatic. *RP: prevalence ratio. * Patients hospitalized in the institution for at least two years without expectation of discharge due to lack of social support and family reference. **133 is the total after removal of unknown/ blank fields.

DISCUSSION

The prevalence of bacilliferous PTB in the referral psychiatric hospital of Alagoas, is more than 12 times greater than the prevalence of TB – in all its forms – estimated in the country. This finding corroborates the results of other studies, which point out higher prevalence of the disease in scenarios of freedom deprivation compared to that in the general population[16]. The value found is almost 33 times higher than average incidence rates of bacilliferous PTB in Brazil (21.37/100,000) and in the Northeast (21.27/100,000), from 2009 to 2012, according to data tabulated from the Notifiable Diseases Information System (*Sistema de Informação de Agravos de Notificação* - *SINAN*). In Alagoas, in the same period, 2,420 new cases of bacilliferous PTB were recorded – 63.2% in men, most in the age range of 20-39 years – with decreasing rates during the period (19.61; 19.52 ; 18.96; 18.83/100,000, from 2009 to 2012, respectively)[13,22]. The occurrence described in this paper is slightly higher (36.3 times) than the average incidence of bacilliferous PTB in Alagoas (19.23/100,000). Nevertheless, it can be overestimated as a result of possible underreporting in the state[22]. That is a very worrying result, especially considering that the hospital population was monitored for a short period. Attention is drawn to the epidemiological value of such high-risk environment, which can be a source of perpetuation of tuberculosis in the community[17,23].

As regards the PTB case identified in the sample, this study agrees with the national trend with respect to gender and age[8]. On the education level, however, the patient diverged from the national profile, as he graduated from high school, whereas the great majority of these cases are either illiterate or have an incomplete primary education.

Although already in the 4th month of the therapeutic scheme, the patient was still occasionally coughing. Therefore, in order to detect possible treatment failure, he was included in the SR group. Even though his sputum specimen was negative at the bacilloscopy, many risk factors, such as alcoholism, loneliness at home (lack of supervision), compromised cognition and previous reports of medication rejection, malnutrition, limitation of preventive/therapeutic measures and poor hygiene, are strongly favorable to treatment withdrawal and relapse[24,25].

The lengthy deprivation of liberty taking place in the psychiatric hospital may represent higher risk of transmission, as confirmed cases may eventually suffer treatment failure, and cases may result from reactivation of a latent infection, after exposure to debilitating factors related to the environment, e.g., overcrowding, precarious hygiene conditions and unsuitable ventilation[16,18,26]. The association described between residents – hospitalized for 12 years and 3 months, on average – and group SR reinforces the existence of risk attributed to collective confinement environment and the fact that this is increased by long stays[16,18,26].

In 2002, Brazilian researchers conducted a cross-sectional study in a psychiatric hospital of Goiás, which revealed higher rates of tuberculin skin test positivity among health professionals who worked for a longer period (30 months and 18 months, respectively, for tuberculin-positive and tuberculin-negative groups)[16].

The high occurrence of debilitating conditions – smoking (23.8%), alcoholism (20.3%), illicit drug addiction (14.7%) and AIDS (1.4%) – would increase susceptibility among these subjects, which appears to be due to an immunosuppressant effect, directly caused by chronic exposure to these substances and conditions, or due to malnutrition related to an odd behavior, resulting from mental disorders or drug craving[17].

Among the described conditions, this study evidenced statistically significant association only between smoking and SR. Indeed, smoking is a well-known risk factor for

PTB, related to higher infectivity, morbidity, mortality and relapsing rates in both active and passive smokers and, therefore, it is targeted by anti-TB therapeutic strategies[8,27].

This research has also shown statistically significant association between proper housing condition (brick houses) and SR. From that, one can infer that unfavorable socioeconomic backgrounds increases the risk for developing respiratory symptoms, as stated by many studies[4,5,11,27]. Such association suggests vulnerability to respiratory infections, including PTB.

Sputum smear test was the diagnostic choice of this work because it is non-invasive, safe, fast and inexpensive. Besides, the authors' main objective was to identify bacilliferous patients, who account for 60-80% of PTB cases and are diagnosed by the test[25]. Nonbacilliferous cases represent very low risk of transmission, therefore, are unlikely to start an outbreak. Both PAHO and BTA recommend conduction of active TB case-finding studies in health services or communities of regions with high TB prevalence, thus contributing to early detection of bacilliferous cases, which diminishes community exposure time. Such strategy consists in performing sputum smear tests following the identification of symptomatic individuals[8,25,28,29].

It is essential to register the limitations in the conduction of this quantitative study. The researchers have dealt with patients whose judgment capacity and cognition are frequently compromised, thus delaying some sputum collections. Furthermore, only half of PTB patients are positive at smear test and up to 30% do not even present spontaneous expectoration during the initial phase of the disease, which may have contributed to some false-negative results[17].

Active search for contacts of TB patients, through PPD test, radiography and bacilloscopies, are formally recommended by the Brazilian Ministry of Health and the BTA, in order to evaluate whether or not to treat latent TB among contacts[8]. Such conduct was not necessary in this research, as the only identified case lived alone prior to hospital admission and was kept in isolation during the first 30 days of treatment.

CONCLUSION

The prevalence of bacilliferous PTB found in HEPR was 33 times higher than that in the Brazilian population and 12 times higher than the prevalence of all forms of TB in the country. Thus, risk environments such as the one addressed by this work are of extreme epidemiological importance and should constitute strategic targets in controlling the disease in the community. The survey also points out that the burden of TB continues to be significant in Alagoas and in the country. Additional research is needed not only to better understand the disease's behavior in similar scenarios, but also to point solutions that support public health strategies to address this serious problem.

ACKNOWLEDGEMENTS

The authors are grateful to the Portugal Ramalho Teaching Hospital (HEPR) staff for their support, to the Central Public Health Laboratory of Alagoas (LACEN/AL) for technical and material sponsoring (with specimen analyses and collection kits, respectively) and to researcher June Penman, PhD, for revising this work.

CONFLICTS OF INTEREST

The authors of this study have no conflicts of interest of any kind to declare.

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