Tuberculosis and gender in a priority city in the state of Rio de Janeiro, Brazil*, **

Tuberculose e gênero em um município prioritário no estado do Rio de Janeiro

Márcia Teresa Carreira Teixeira Belo, Ronir Ragio Luiz, Christy Hanson, Lia Selig, Eleny Guimarães Teixeira, Thiago Chalfoun, Anete Trajman

Abstract

The objective of this study was to compare gender differences among tuberculosis patients in a city with a high incidence of tuberculosis. This was a cross-sectional questionnaire-based study involving 560 tuberculosis patients (373 males and 187 females). Sociodemographic and clinical data, as well as data related to diagnostic criteria and treatment outcome, were collected (from the questionnaires and medical records) and subsequently compared between the genders. The median time from symptom onset to diagnosis was 90 days. There were no differences between the genders regarding the clinical presentation, diagnostic criteria, previous noncompliance with treatment, time from symptom onset, number of medical appointments prior to diagnosis, or treatment outcome. Gender-specific approaches are not a priority in Brazil. However, regardless of patient gender, the delay in diagnosis is a major concern.

Keywords: Poverty; Tuberculosis; Income.

Resumo

O objetivo deste estudo foi comparar diferenças entre os gêneros nos pacientes com tuberculose em uma cidade com alta incidência da doença. Este foi um estudo transversal com base em questionário envolvendo 560 pacientes com tuberculose (373 homens e 187 mulheres). Características sociodemográficas e clínicas, assim como critérios diagnósticos e desfecho do tratamento, foram coletados dos questionários e fichas médicas e posteriormente comparados entre os gêneros. A mediana do tempo do surgimento de sintomas até o diagnóstico foi de 90 dias. Não foram encontradas diferenças entre os gêneros relativas à apresentação clínica, critério diagnóstico, abandono prévio de tratamento, tempo do surgimento de sintomas, número de consultas antes do diagnóstico ou desfecho do tratamento. A abordagem diferenciada para os gêneros não é uma prioridade no Brasil. A demora no diagnóstico, no entanto, é um problema maior a despeito do gênero.

Descritores: Tuberculose; Pobreza; Renda.

Gender differences in the incidence, clinical presentation, outcome, and pathogenesis of certain diseases, including pulmonary diseases, have been reported worldwide.[1] In Thailand, although the prevalence of malaria is the same in both genders, more men than women seek treatment at malaria clinics.[2] A study carried out in Puerto Rico and in New York City evaluated the utilization of health care and drug treatment by drug users. In both locations, women sought health care and drug treatment less often than did men.[3]

Worldwide, tuberculosis is more prevalent in men than in women and is one of the leading causes of death among adults, corresponding to 2.8% of all-cause mortality in 2002. The incidence of tuberculosis has been increasing, especially in poor countries and among disadvantaged groups within countries.[4] Gender differences might be caused by economical, cultural, and social

* Study carried out at the Duque de Caxias Municipal Health Center, Duque de Caxias, Brazil.
Correspondence to: Márcia Teresa Carreira Teixeira Belo. Rua Fonte da Saudade, 132/503, Lagoa, CEP 22471-210, Rio de Janeiro, RJ, Brazil.
Tel 55 21 2226-0150. Fax: 55 21 2532-1661. E-mail: mtbelo@uol.com.br
Financial support: The study received financial support from the World Bank Reaching the Poor Program and from the International Clinical Operational and Health Services Research and Training Award, ICOHRTA AIDS/TB grant no. 5 U2R TW006883-02.
Submitted: 7 February 2010. Accepted, after review: 17 May 2010.
** A versão completa em português deste artigo está disponível em www.jornaldepneumologia.com.br

factors related to exposure. In many societies, men are the sole family providers, which could result in greater exposure to *Mycobacterium tuberculosis* outside the home. Men also seem to be better informed about the disease.[5] However, some evidence suggests that women are more susceptible to the progression of the disease, from infection to active disease, and differences in immunological response have been implicated in that.[6]

Gender inequalities can lead to poor access to health care and delay in the diagnosis and treatment of tuberculosis.[7,8] In Vietnam, women tend to seek lower-quality health care clinics, take longer to seek a physician, and self-medicate more often.[9] In addition, men more readily provide sputum samples for examination.[10] It has also been suggested that women neglect their illness, face more barriers to obtaining health care, and abandon treatment more often, which would lead to a bias in the statistics on the incidence of tuberculosis in some countries.[9]

Distinct attitudes of physicians towards male vs. female patients might also play a role in the diagnosis and management of the disease.[11] One study, conducted in Bangladesh, India, Malawi, and Colombia, showed that, compared with men, women experienced longer delays in receiving treatment for tuberculosis, delays that are caused by the patients themselves or by the health care system.[11] The recognition of such differences in a specific cultural context suggests the need for specific gender-targeted interventions for tuberculosis planning and control.

The objective of the present study was to identify gender differences regarding socioeconomic status, clinical form of tuberculosis, and outcome, as well as patient- and health care system-related delay to diagnosis and treatment, in a city with one of the highest numbers of new tuberculosis cases in the state of Rio de Janeiro, Brazil.

A cross-sectional questionnaire-based study was conducted at a primary health care facility in Duque de Caxias, a densely populated city with one of the lowest average incomes in the state of Rio de Janeiro, with 864 new cases of tuberculosis reported in 2006, corresponding to an incidence rate of 101/100,000 inhabitants. Of the patients who started treatment, 67.2% were successfully treated, and another 16.6% abandoned treatment.[12] Duque de Caxias has five public health care facilities affiliated with the local tuberculosis control program. One of those facilities, the *Centro Municipal de Saúde de Duque de Caxias*, reported 85% of all new tuberculosis cases and was therefore selected as the site for the study. Patients at any stage of the tuberculosis treatment were considered eligible and were included if they expressed their wish to participate by giving written informed consent. An anonymous and voluntary questionnaire was proposed to patients aged 18 years or older undergoing outpatient treatment between 2004 and 2007. During that period, 2,283 tuberculosis patients were treated, and 560 were invited to complete the questionnaire during one of their visits. All of the patients who were invited agreed to participate. Information on age, gender, schooling, marital status (living alone or with a partner, regardless of the legal status), family income, elapsed time from the onset of symptoms (cough, fever, weight loss, and hemoptysis) to diagnosis, and number of visits to a health care professional prior to diagnosis was obtained from all patients. In addition, information on the clinical form of tuberculosis, diagnostic criteria, history of treatment noncompliance, and outcome was collected from the medical records of the patients. The number of patients living below the poverty line (in accordance with the definition of the World Bank, the poverty line is a per capita income of US$ 1.25/day) was also compared. The data were recorded and analyzed with the Statistical Package for the Social Sciences, version 10 (SPSS Inc., Chicago, IL, USA). The distributions of numerical variables were compared between the genders using the Mann-Whitney test, and the proportions were compared using the chi-square test. Values of $p \leq 0.05$ were considered statistically significant. The study was approved by the Research Ethics Committee of the *Santa Casa da Misericórdia do Rio de Janeiro* General Hospital.

A total of 560 patients completed the questionnaire; 373 were males (66.6%) with a median age of 38.5 years (range: 18-98 years), and 187 were females (33.4%) with a median age of 36 years (range: 18-82; $p = 0.006$). Both groups had a median of 6 years of schooling (range: 0-15 years). The median monthly family income for males and females was, respectively, US$ 94.08 (range: US$ 0.00-1007.52) and

US$ 80.64 (range: 0.00-860.21; p = 0.219). There were 59 males (15.8%) and 32 females (17.1%) living below the poverty line (p = 0.716), whereas 174 males (46.6%) and 99 females (52.9%) lived alone (p = 0.179).

There were no differences between the genders regarding the clinical form of tuberculosis, diagnostic criteria, history of treatment noncompliance, median number of days since the onset of symptoms, number of medical appointments prior to the diagnosis of tuberculosis, or outcome (Table 1).

Brazil is one of the 22 countries with the highest tuberculosis burdens. In 2007, 81,660 new and recurrent tuberculosis cases (39 cases per 100,000 inhabitants) were reported, and the mortality rate was 4.4/100,000 inhabitants.[4] The state of Rio de Janeiro has the second highest incidence of tuberculosis in the country. In 2008, 12,851 tuberculosis cases were notified. In 2006, the mortality rate was 5.9/100,000 inhabitants.[13] Although the proportion of tuberculosis cases and mortality, as well as case-fatality rates, are higher in men, over half a million women die from tuberculosis every year, a disease that kills more women than does breast cancer or maternity-related conditions.[14]

In the present study, we confirmed that tuberculosis is more often diagnosed in men. This could correspond to a selection bias due to gender health care inequality. It has been speculated that gender differences in the reported prevalence of tuberculosis worldwide might actually reflect differences in gender-related behavior, including earlier and easier access of men to health care facilities of good quality, as opposed to the lower-quality health care facilities available to women. In Nepal, the percentage of women with tuberculosis identified through active case finding was higher than that of women diagnosed with the disease among patients seeking treatment.[15] Our study was not designed to evaluate access to health care facilities, since it was a health care facility-based study. However, a selection bias is unlikely, since women account for 67% of the overall appointments at the health care facility where the study was carried out. This is in accordance with the trend in Brazil, where the number of medical appointments at public health care facilities is higher among women.[16] In Brazil, with the increase in the number of medical appointments per year, the proportion of women also increases.[16] However, since our study was not community-based, differences in the health

Table 1 - Clinical presentation, diagnosis, and outcomes of tuberculosis patients, by gender. Duque de Caxias, Rio de Janeiro, 2005-2007.

Variable	Males	Females	p
	n = 373	n = 187	
Clinical form of tuberculosis			
Pulmonary	330 (87.7)	167 (89.3)	0.644
Extrapulmonary	25 (6.6)	14 (7.4)	
Pulmonary + extrapulmonary	18 (4.8)	6 (3.2)	
Diagnostic criteria			
Bacteriological	282 (75)	140 (74.9)	0.635
Histopathological	19 (5)	10 (5.3)	
Clinical	73 (19.4)	37 (19.7)	
History of noncompliance with the treatment	40 (10.6)	10 (5.3)	0.178
Time elapsed from the onset of symptoms to first consultation, days[a]	90 (0-2,190)	90 (0-1,085)	0.972
Medical appointments prior to diagnosis, n[a]	2 (0-45)	3 (0-30)	0.343
Outcome			
Cure	235 (62.5)	136 (72.7)	0.906
Noncompliance	69 (18.3)	32 (17.1)	
Death	6 (1.6)	2 (1.1)	
Referral to another facility	5 (1.3)	1 (0.5)	
Failed	6 (1.6)	3 (1.6)	
Missing data	52 (13.9)	13 (6.9)	

Values expressed as n (%), except where otherwise noted. [a]Values expressed as median (range).

care attitudes of the patients with tuberculosis, as well as their access to health care facilities, could not be evaluated. A relevant finding was the long time elapsed from the onset of symptoms to the first medical appointment, regardless of patient gender. In contrast, the median number of medical appointments prior to the diagnosis was acceptable, taking into account that sputum smear examination was not readily available at the facility. The clinical presentation and the medical care provided to patients were also similar in both genders. Pulmonary tuberculosis is reported to be less common in women than in men.[17] Although the prevalence of pulmonary tuberculosis in the present study was slightly higher in the women, the bacteriological confirmation was similar in both genders. These results are in contrast with the findings of a study conducted in Vietnam. The authors of that study reported that, although the prevalence of prolonged cough was similar in both genders, more men than women provided sputum for examination.[8] This could be explained by the embarrassment that women have in producing a quality sputum sample.

Regarding the socioeconomic aspects of our study population, both genders had similar incomes and levels of education. This is in contrast with the general population of Brazil. According to a recent survey, the income of males is 1.7 higher than is that of females, although the percentage of individuals living below the poverty line is similar for both genders. In our sample, the proportion of patients living below the poverty line was more than twice the average in Brazil (7%), irrespective of gender.[18] In a previous study, we demonstrated that the population seeking treatment at this same health care facility, regardless of their disease in question, was poorer than was the general population. Patients with tuberculosis had the same income and socioeconomic status as did patients with other diseases.[19]

A study carried out in the city of Cuiabá, Brazil, reported a higher risk for noncompliance with tuberculosis treatment among men.[20] In our study, the outcomes were similar in both genders, although this information was lacking in a higher proportion of males. The lack of these data might mask unfavorable outcomes, such as noncompliance and death.

In summary, we found no significant differences between the genders regarding the clinical presentation of and the medical assistance provided to tuberculosis patients. Distinctive medical approaches for women at health care facilities are not a priority in our country, as is recommended in other cultures, where gender inequality affects medical care. However, regardless of patient gender, the delay in diagnosis is a major concern and should be a target of tuberculosis control strategies in Brazil, since undiagnosed cases of smear-positive tuberculosis are a major source of tuberculosis transmission. Community-based studies are needed in order to evaluate gender equity in the access to health care.

References

1. Caracta CF. Gender differences in pulmonary disease. Mt Sinai J Med. 2003;70(4):215-24.
2. Ettling MB, Thimasarn K, Krachaiklin S, Bualombai P. Evaluation of malaria clinics in Maesot, Thailand: use of serology to assess coverage. Trans R Soc Trop Med Hyg. 1989;83(3):325-30.
3. Robles RR, Matos TD, Deren S, Colón HM, Sahai H, Marrero CA, et al. Drug treatment disparities among Hispanic drug-using women in Puerto Rico and New York City. Health Policy. 2006;75(2):159-69.
4. World Health Organization. Global Tuberculosis Control: epidemiology, strategy, financing. Geneve: World Health Organization; 2009.
5. Long NH, Johansson E, Diwan VK, Winkvist A. Different tuberculosis in men and women: beliefs from focus groups in Vietnam. Soc Sci Med. 1999;49(6):815-22.
6. Holmes CB, Hausler H, Nunn P. A review of sex differences in the epidemiology of tuberculosis. Int J Tuberc Lung Dis. 1998;2(2):96-104.
7. Dolin P. Tuberculosis epidemiology from a gender perspective. In: Diwan VK, Thorson A, Winkvist A, editors. Gender and Tuberculosis: An International Research Workshop: Report from the Workshop at the Nordic School of Public Health, Göteborg, May 24-26, 1998. Göteborg: Nordic School of Public Health; 1998. p. 3.
8. World Health Organization [homepage on the Internet]. Geneva: World Health Organization [cited 2009 Nov 10]. Weiss MG, Auer C, Somma DB, Abouihia A, Kemp J, Shaheed Jawahar M, et al. Gender and tuberculosis: cross-site analysis and implications of a multi-country study in Bangladesh, India, Malawi and Colombia. [Adobe Acrobat document, 100p.] Available from: http://apps.who.int/tdr/publications/tdr-research-publications/gender-tb-multicountry-study/pdf/sebrep3.pdf
9. Thorson A, Hoa NP, Long NH. Health-seeking behaviour of individuals with a cough of more than 3 weeks. Lancet. 2000;356(9244):1823-4.
10. Long NH, Johansson E, Lönnroth K, Eriksson B, Winkvist A, Diwan VK. Longer delays in tuberculosis diagnosis among women in Vietnam. Int J Tuberc Lung Dis. 1999;3(5):388-93.

11. Gosoniu GD, Ganapathy S, Kemp J, Auer C, Somma D, Karim F, et al. Gender and socio-cultural determinants of delay to diagnosis of TB in Bangladesh, India and Malawi. Int J Tuberc Lung Dis. 2008;12(7):848-55.
12. Secretaria de Estado de Saúde e Defesa Civil [homepage on the Internet]. Rio de Janeiro: Secretaria de Estado de Saúde e Defesa Civil [cited 2009 Jul 25]. Plano Estratégico Para Controle da Tuberculose do Estado do Rio de Janeiro, 2003 a 2005. [Adobe Acrobat document, 30p.] Available from: http://portal.saude.rj.gov.br/tuberculose/Artigos/plano%20estrat%E9gico%202003-2005.pdf
13. Ministério da Saúde. Secretaria de Vigilância em Saúde [homepage on the Internet]. Avaliação Epidemiológica e Operacional da Tuberculose. Região Sudeste, novembro de 2007 [cited 2009 Nov 10]. Available from http://www.saude.rj.gov.br/tuberculose/artigos/planos
14. World Health Organization [homepage on the Internet]. Geneva: World Health Organization [cited 2009 Nov 18]. Ahlburg DA. The economic impacts of tuberculosis. [Adobe Acrobat document, 34p.] Available from: http://whqlibdoc.who.int/hq/2000/WHO_CDS_STB_2000.5.pdf
15. Cassels A, Heineman E, LeClerq S, Gurung PK, Rahut CB. Tuberculosis case-finding in Eastern Nepal. Tubercle. 1982;63(3):175-85.
16. Instituto Brasileiro de Geografia e Estatística – IBGE [homepage on the Internet]. Brasília: Ministério do Planejamento, Orçamento e Gestão. [updated 2006 May 30; cited 2009 Nov 5]. Brasil em Síntese. Available from: http://www.ibge.gov.br/brasil_em_sintese/trabalho.htm
17. Somma D. Gender in Tuberculosis research. Geneva: World Health Organization; 2005.
18. Fundação Getúlio Vargas [homepage on the Internet]. São Paulo: Fundação Getúlio Vargas [cited 2009 Nov 30]. Panorama da Miséria. Available from: http://www3.fgv.br/ibrecps/miseria/Brasil.htm
19. Belo MT, Selig L, Luiz RR, Hanson C, Luna AL, Teixeira EG, et al. Choosing incentives to stimulate tuberculosis treatment compliance in a poor county in Rio de Janeiro state, Brazil. Med Sci Monit. 2006;12(5):PH1-5.
20. Ferreira SM, Silva AM, Botelho C. Abandono do tratamento da tuberculose pulmonar em Cuiabá - MT - Brasil. J Bras Pneumol. 2005;31(5):427-35.

About the authors

Márcia Teresa Carreira Teixeira Belo
Assistant Professor of Clinical Medicine. Gama Filho University and Souza Marques Techno-Educational Foundation, Rio de Janeiro, Brazil. Doctoral Student in Clinical Medicine. Federal University of Rio de Janeiro, Rio de Janeiro, Brazil.

Ronir Ragio Luiz
Associate Professor. Collective Health Institute, Federal University of Rio de Janeiro, Rio de Janeiro, Brazil.

Christy Hanson
Tuberculosis Research Advisor, U.S. Agency for International Development, Washington, DC, USA.

Lia Selig
Professor of Collective Health, Serra dos Órgãos Educational Foundation, Rio de Janeiro, Brazil. Doctoral Student in Clinical Medicine. Federal University of Rio de Janeiro, Rio de Janeiro, Brazil.

Eleny Guimarães Teixeira
Assistant Professor. Department of Clinical Medicine, Gama Filho University and Souza Marques Techno-Educational Foundation, Rio de Janeiro, Brazil.

Thiago Chalfoun
Medical Student. Gama Filho University, Rio de Janeiro, Brazil.

Anete Trajman
Associate Professor. Gama Filho University, Rio de Janeiro, Brazil.