RESEARCH

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Gateway to the diagnosis of tuberculosis among elders in Brazilian municipalities

Porta de entrada para diagnóstico da tuberculose em idosos em municípios brasileiros

Puerta de entrada al diagnóstico de la tuberculosis en ancianos en municipios brasileños

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ABSTRACT

Objective: to analyze the factors associated with the gateway of the health systems of Brazilian municipalities for the diagnosis of tuberculosis in older people. **Method:** survey study type, with a sample of 91 elders, in a population with 706 cases of tuberculosis. Data were collected by means of an instrument based on the Primary Care Assessment Tool (PCAT) adapted for tuberculosis care, emphasizing the gateway variable. Variables were categorized and compared between primary health care (PHC) and specialized care (SC) services. Bivariate analysis and the Chi-square association test were used. **Results:** a statistically significant association ($p = 0.0001$) was found between the first health service sought and the unit that diagnosed tuberculosis, showing better performance of specialized care services in the diagnosis. **Conclusion:** it is necessary to improve primary health care services to tackle delayed diagnosis of tuberculosis in older people.
Key words: Tuberculosis; Health of the Elderly; Primary Health Care.

RESUMO

Objetivo: analisar os fatores associados à *porta de entrada* de sistemas de saúde de municípios brasileiros para o diagnóstico da tuberculose em pessoas idosas. **Método:** estudo tipo inquérito, cuja amostra foi de 91 idosos, em uma população de 706 casos de tuberculose. Coleta de dados feita por meio de instrumento baseado no *Primary Care Assessment Tool* (PCAT) adaptado para a atenção à tuberculose, com ênfase na variável *porta de entrada*. As variáveis foram categorizadas e comparadas entre os serviços de atenção primária à saúde (APS) e assistência especializada (AE). Utilizou-se análise bivariada e teste de associação do Qui-quadrado. **Resultados:** encontrou-se associação estatisticamente significante ($p=0,0001$) entre o primeiro serviço de saúde procurado e unidade que diagnosticou a tuberculose, mostrando melhor desempenho dos serviços de atenção especializada para o diagnóstico. **Conclusão:** é necessário melhorar os serviços da atenção primária à saúde para combater o retardo do diagnóstico da tuberculose em pessoas idosas.
Descritores: Tuberculose; Saúde do Idoso; Atenção Primária à Saúde.

RESUMEN

Objetivo: analizar los factores asociados a la "puerta de entrada" de sistemas de salud de municipios brasileños para el diagnóstico de la tuberculosis en personas ancianas. **Método:** estudio del survey type, en el cual fue la muestra 91 ancianos en población of 706 cases of tuberculosis. Recopilación de datos hecha por medio de instrumento basado en el *Primary Care Assessment Tool* (PCAT) adaptado para la atención a la tuberculosis con énfasis en la variable "puerta de entrada". Las variables fueron categorizadas y comparadas entre los servicios de la atención primaria de la salud (APS) y asistencia especializada (AE). Se utilizó análisis bivariado y test de asociación del Chi-cuadrado. **Resultados**: se encontró asociación estadísticamente significante (p=0,0001) entre el primer servicio de salud buscado y la unidad que diagnosticó la TB, mostrando mejor desempeño de los servicios de asistencia especializada para el diagnóstico. **Conclusión**: es necesario mejorar los servicios de atención primaria de la salud para combatir el diagnóstico tardío de la tuberculosis en las personas ancianas.

Palabras clave: Tuberculosis; Salud del Anciano; Atención Primaria a la Salud.

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INTRODUCTION

Tuberculosis (TB) affects mainly young adults. However, in countries where the disease has shown a downward trend as a result of the global implementation of effective control programs, such as the adoption of the DOTS strategy (Directly Observed Short Course Treatment), there has been a transition in the age dynamics and a progressive shift of morbidity and mortality to older ages[1-3].

In Canada, in 2008, the age group of 75 years and older had the highest specific rate by age, recording an incidence of 9.4 cases per 100,000 inhabitants. In the U.S., 21.3% of cases reported in 2011 were in the age group of 65 years or older, with an incidence of 5.4 cases per 100,000 inhabitants[4].

In Brazil, people over 60 years of age account for 10% of all reported cases. In 2010, the incidence rate in the age group of 65 years and older was approximately 70/100 thousand male inhabitants and 30/100 thousand female inhabitants[5]. In this same group, the mortality rate was 9.4 cases per 100,000 inhabitants, much higher than when analyzing the overall mortality rate of TB-related deaths (2.4 cases per 100,000 inhabitants).

The correlation between age and mortality from TB stresses the importance of early diagnosis in individuals over 60 years. Brazil has been considered an aging country. Between 1960 and 2008, the elderly population increased from 3 to 20 million, which is an increase of almost 700% in less than 50 years. As a consequence, aging morbidities became more significant in society[6].

The phenomenon of aging populations has brought concern to nurses[7] and other health professionals, with respect to the planning and implementation of care aimed at improving the quality of life of the elderly. This unrest has driven the development of studies to better characterize this group and discuss interventions that apply to medical conditions and problems of life in this population[7].

Regarding TB, it is noteworthy that the time between disease onset and diagnosis is also longer in older people. In this population, scarce and non-specific symptoms, limitations on the implementation and interpretation of additional tests, as well as the presence of comorbidities often hinder and delay diagnosis of the disease [8].

The context in which the problematic relationship between the elderly and the increased incidence of TB appears, shows that there is a complex web of interrelated factors. Demographic and epidemiological changes, associated with the different demands and needs of the population, require health-care network response and overcoming of the fragmented and specialized focus of care.

The increasing frequency of multimorbidity, at older ages, is a challenge for Primary Health Care (PHC) teams in Brazil, in order to maximize opportunities for access to care. As a gateway, PHC units should be services that are sought out regularly and serve as a filter for the starting point of the care network flow in search of the best coordinated care option available for each type of need[9].

Given the importance that population aging has today, the scientific literature on the subject is becoming increasingly significant. In the specific case of the relationship between aging and TB, despite being a subject of interest for health policy in Brazil, there are few articles published about it [3,10-13]. Attention is brought to the expressive production by nurses, a fact that reveals that the role of this professional in TB care goes beyond the actions of clinical care and reaches the field of health management.

The aim of this study was to analyze the factors associated with the gateway of the health systems of Brazilian municipalities for the diagnosis of tuberculosis in older people. In particular, attention is brought to its relevance to the literature, since, despite the health of the elderly and TB control being considered priority areas in PHC, there is not, to date, any scientific article that discusses the diagnosis of the disease in the elderly at this level of the health care network.

METHOD

Descriptive epidemiological survey study, conducted in seven municipalities, three located in the Southeast, two from South and two in the Northeast of Brazil. The municipalities were intentionally selected for being imperative in TB control and having different organizational forms of TB care (centralized and decentralized). In the Southeast they were: Ribeirão Preto (RP), São José do Rio Preto (SJRP), and Vitória (VI). In the South: Foz do Iguaçu (FI), and Pelotas (PE). In the Northeast: João Pessoa (JP), and Feira de Santana (FS). The organizational characteristics of the municipalities studied are presented in Chart 1.

Box 1 - Organizational characteristics of the studied municipalities

Characteristics	João Pessoa	Feira de Santana	Vitória	São José do Rio Preto	Ribeirão Preto	Foz do Iguaçu	Pelotas
Country region	NE	NE	SE	SE	SE	S	S
Municipal population estimated for 2009	674,762	571,997	317,817	319,189	558,136	319,189	339,934
Number of Family Health Strategies	180	83	20	14	21	31	28
Coverage of the Family Health Program	89%	49%	74%	20%	13%	33%	28%
Number of primary health care units	139	14	28	24	41	33	50
TB control actions	D	D	C	D	C	C	C

** Legend: NE – Northeast, SE – Southeast, S – South, D – Decentralized, C - Centralized.*

Source: Municipal Health Department of the municipalities included in the survey.

The study population consisted of all TB cases in people aged over 60 years (n = 91), identified within a total of 706 cases of TB in people of all ages and coming from seven municipalities: 10 from RP, 17 from SJRP, 7 from VI, 16 from PE, 7 from FI, 13 from JP and 21 from FS.

The health services mentioned were grouped according to the organization of the work process, hours of operation, type of professional training of health staff, density and technological complexity for service to users, classified as: Primary Health Care (PHC), Emergency Department (ED), Specialized Care (SC) and Tuberculosis Control Program Outpatient Clinic (TBC)[14], detailed as follows:

- Primary Health Care (PHC): Primary Health Units (PHU) and Family Health Units (FHU) are included in this modality. The services are characterized by the support provided to the spontaneous and programmed demand, operation during business hours, and a staff made up of generalists and resources of low technological density.
- Emergency Department (ED): composed of the emergency units that provide care to the general demand, operating 24 hours a day, with emergency staff, medium-tech features, local diagnosis support through the use of x-ray and laboratory tests.
- Specialized Care (SC): composed of private practices and hospitals, with resources averaging high technological density, specialized teams and diagnosis support.
- Tuberculosis Control Program Outpatient Clinic (TBC): reference clinic for TB case monitoring with medium-tech resources, specialized teams and diagnostic support(14).

The interviews were conducted from July to December 2010. Data were collected from primary sources (patient interview) using an instrument based on the Primary Care Assessment Tool (PCAT)[15], adapted for TB care[16], emphasizing the dimensions of Primary Health Care.

For the study, nine variables were selected related to the gateway component: the first health service sought by the older user when suggestive signs of the disease became evident; time needed to schedule an appointment; health professional who suspected TB at first consultation; first service to request sputum examination; first service to request x-ray; referral to another service; how many times the subject had to go to the service to be diagnosed with TB; how many days it took the user to be diagnosed with TB; health service that made the diagnosis.

The interviewee answered each question according to different rating scales as dichotomous, multiple choice with single answer and sums (Likert scale). Data were entered and stored on a Microsoft Office Excel® 2003 spreadsheet, for later transfer to the Data EntryTable Software Statistica 9.0, Statsoft.

The variables were categorized according to their specificities, and compared among the different health services. The following were considered as PHC services: Primary Health Units (PHU), primary health units with Community Health Agents Program (CHAP) and primary units with the Family Health Program (FHP). Specialized care models (SC) included emergency care sectors, hospitals, clinics, units with tuberculosis control programs (TBC), reference clinics, polyclinics, among others. The raised indicators were analyzed statistically using bivariate analysis and a chi-square association test (χ^2).

Statistical analysis to calculate the time elapsed in days to schedule an appointment, the number of times needed to attend the service and time in days for the completion of the diagnosis was based on a measure of central tendency: the median. The non-parametric Mann-Whitney test was applied to detect a statistically significant association between the mean values and these variables.

The research project was approved by the Ethics Committee of the Ribeirão Preto College of Nursing at University of São Paulo, under protocol number 0984/2008.

RESULTS

Of all TB cases among the elderly (n = 91), 37 (40.6%) subjects sought PHC services when they began to feel the signs and symptoms of the disease, but 54 (59.4%) chose to reach SS units for their first visit. For 37.4%, the clinical suspicion of TB was made during the first contact, with no statistically significant difference in relation to modalities of the

services investigated (*p value* = 0.6039). Regarding the tests for diagnostic confirmation, radiological evaluation was prioritized in 68.1% of cases. Bacteriological examination, the priority method for diagnosis, was requested in only 39.6% (Table 1).

The association between the first health service sought by the elders and their referral to other services for diagnostic investigation showed no evidence of statistical significance (p> 0.05).

Regarding the gateway in municipal health systems, among older users who accessed PHC services, 20 (54.1%) were diagnosed with TB. In relation to the 54 users who opted for SS, 83.3% had diagnostic confirmation in these services. A statistically significant association was found (p = 0.0001) between the first health service sought and the unit that diagnosed TB, showing better performance of SS in the diagnosis of older people. (Table 1).

Table 2 - Median and quartiles of time in days to the first visit, number of times the health service was attended and time in days for the diagnosis, according to types of services, 2010

Primeiro SS procurado	Time in days to the first visit			
	n (%)	Median	Quartiles 25 and 75	p value
Primary Health Care	37 (40.7)	1.0	[0.0; 7.0]	0.0214
Specialized Care	54 (59.3)	0.0	[0.0; 1.0]	
Service that made the diagnosis	Number of times at the HS to discover TB			
	n (%)	Median	Quartiles 25 and 75	p value
Primary Health Care	29(31.9)	3.0	[2.0; 6.0]	0.9763
Specialized Care	62 (68.1)	3.0	[2.0; 4.0]	
Service that made the diagnosis	Time in days to discover TB			
	n (%)	Median	Quartiles 25 and 75	p value
Primary Health Care	29(31.9)	15.0	[6.0; 30.0]	0.5885
Specialized Care	62 (68.1)	15.0	[4.0; 40.0]	

Legend: HS - Health Service

Table 1 - Association between the first health service sought by the elderly and behaviors of health professionals in the signs and symptoms of TB, 2010

Variáveis	First health service sought			*p value*
	PHC n (%)	SC n (%)	TOTAL n (%)	
TB suspicion at first consultation				
No	22 (59.5)	35 (64.8)	57 (62.6)	0.6039
Yes	15 (40.5)	19 (35.2)	34 (37.4)	
TOTAL	37 (100.0)	54 (100.0)	91 (100.0)	
First HS requested Sputum Smear Test				
No	20 (54.1)	35 (64.8)	55 (60.4)	0.4445
Yes	17 (45.9)	19 (35.2)	36 (39.6)	
TOTAL	37 (100.0)	54 (100.0)	91 (100.0)	
First HS requested X-ray				
No	11 (29.7)	18 (33.3)	29 (31.9)	0.6876
Yes	26 (70.3)	36 (66.7)	62 (68.1)	
TOTAL	37 (100.0)	54 (100.0)	91 (100.0)	
Referred to other services				
No	14 (37.8)	25 (46.3)	39 (42.9)	0.5516
Yes	23 (62.2)	29 (53.7)	52 (57.1)	
TOTAL	37 (100.0)	54 (100.0)	91 (100.0)	
Unit that diagnosed TB				
PHC	20 (54.1)	9 (16.7)	29 (31.9)	0.0001
SC	17 (45.9)	45 (83.3)	62 (68.1)	
TOTAL	37 (100.0)	54 (100.0)	91 (100.0)	

Legend: PHC - Primary Health Care Services, SC - Specialized Care Services, HS – Health Service.

By analyzing the time elapsed in days to schedule an appointment at the first health service sought (Table 2), a statistically significant difference in median values of service modalities investigated is identified (p = 0.0214). In PHC services, the values found between quartiles 25 and 75 had a higher dispersion. The interquartile range was seven days. (Table 2).

As for the number of times the elders had to attend the health service to discover the disease, it appears that there was no statistically significant difference between the types of services (p> 0.05), resulting in equivalent median values (M_d = 3). The median time for TB diagnosis was 15 days with an observed variation ranging from 6 to 30 days in the PHC service, and 4 to 40 days in SC services.

DISCUSSION

The discussion of the results obtained was held according to the study objective, that is, the analysis of factor associated with the health system gateways of Brazilian municipalities for the diagnosis of TB in older people.

A study developed, covering 41 municipalities, found that the Family Health Strategy (FHS) promoted greater access of older people to health services[17]. In this study, 40.6% of TB senior patients opted for services offered by the PHC network

as a gateway into the local health systems. It was observed, however, that only 22.0% received the diagnosis in these services, at the first contact. Thus, this study confirms results of other studies[18-19], showing that PHC services are not the first sought by TB patients nor the first in effectiveness for diagnostic confirmation. This fact highlights the incipient performance of these services in controlling the disease, which in this case extends to the older population.

A study on access barriers related to health services that favor the delay of diagnosis in aging people points out the following problems in the Family Health Strategy: inadequate operation hours of the Family Health Units (FHU), transfer of responsibilities to users in confirming the diagnosis, lack of professional competence to assign diagnoses and lack of specific actions to identify older patients with respiratory symptoms in the territory assigned to the FHU[13]. The problems cited probably contribute to the diagnosis of TB being made by specialist services, which contradicts the Brazilian health policy that states that disease control is the responsibility of PHC services, including FHUs.

The fact that more than half of the elders assisted were referred to another health service suggests that health workers in the consultation do not suspect TB, especially in the early stages of the disease, an aspect that has already been evidenced by studies in Northeastern Brazil[13] and in Spain. In the latter country, the condition of the patient being more than 60 years old was associated with the fact that there was no suspicion of TB upon admission[20].

Health professionals working in the context of PHC must be sensitive to the health care needs of older adults[21], especially due to the recognition of TB as a notable disease in the health history of Brazil and the performance of measures in the care that the FHS provides, which should be known by the relationships that show embracement and bonding[21-22].

Faced with the facts, it is imperative to recall the responsibility of the FHU team regarding the diagnosis of TB[13]. Although the literature shows evidence of weaknesses with regard to the performance of PHC workers in TB control actions, a study highlights the involvement of nursing professionals, especially in treatment surveillance activities and follow-up of absent patients[22].

As for the type of examination for diagnosis clarification, it is noted that X-rays were more requested than smear. It is considered that the individual characteristics of the elders tend to justify the application of X-rays due to the decrease in functional capacity that contributes to the reduction of episodes of coughing, which hinders the production of mucogenic material for the collection of sputum. A study held with older people with TB, in a Northeastern capital in Brazil, showed that 75% of these patients also underwent X-rays rather than smear[8].

Regarding the time for diagnosis, 50% of seniors took more than 15 days to confirm TB. Low capacity of diagnostic suspicion from professionals favors delaying the diagnosis of the disease, characterizing delay related to the performance of the health service. The delay of the health system is understood as the time elapsed between the first consultation in any healthcare facility, and the date of diagnosis[23].

A case-control study conducted in the city of Recife, Pernambuco, analyzed access to health services and found no difference between older and non-older patients with TB in relation to the delay in starting treatment. Both had to look for more than two health services and time elapsed until the diagnosis of the disease was more than two months[11]. In the state of Rio de Janeiro, the median time from onset of symptoms to diagnosis was 60 days for the general population[24].

A study conducted in Maryland, United States, showed that 45% of all 158 TB patients remained undiagnosed for 30 days after the first contact with the health service and 16% for 90 days after the first medical appointment. Of all respondents, the average of visits to health services for obtaining diagnosis was 2.6 times. It should be noted that of the total 398 health visits for symptomatic patients in this cohort, only 40% resulted in the diagnosis of TB, signaling the need to improve procedures for the diagnosis[25].

In Nazimabad, Pakistan, a study showed that the total delay time, taking into consideration the period between onset of symptoms and start of treatment was 120 days, or four months. It is evident that in cases where a late diagnosis was recorded, health services accounted for 64% and patients for 27% of this delay. The same study states that late diagnosis and treatment resulted in complications for the patient, such as weight loss in 40%, hemoptysis in 21%, anorexia in 17% and inability to perform work routines in 12% of cases[26].

Late diagnosis and the delay in starting treatment, therefore, have been important to assess the quality and timeliness of patient access to health care. A study conducted in Brazil, which analyzed trends in mortality from TB in the period from 1980 to 2004, showed that there was an increase in the number of TB deaths among groups aged 60 years or older. In 2004, among the total numbers of TB deaths with known age, 56.1% occurred in individuals aged 50 years or older, compared with 45.1% in 1980[1].

Evidence suggests that the Respiratory Symptomatic Search (RSS) in the general population has not been prioritized to identify and diagnose TB patients[19], mainly among individuals over 60 years of age. Early detection of TB cases, one of the tasks of PHC teams, is a prerogative to meet the guidelines of the national policy of health care humanization and for ensuring comprehensive care[17]. This disease control action should be aimed at obtaining a decrease in the time of diagnosis, and reducing the suffering of patients[27].

In addition to professional competence in the management of TB control actions, it is important to consider the organization of these actions in local health systems. A study carried out in Brazilian municipalities revealed that the form of TB care organization (FHS or outpatient) was not a factor that increased access to diagnosis[18-19].

A study on the strengthening of PHC, using four capitals of Brazil, showed that TB care was considered one of the toughest actions of decentralization[28]. It stated that municipalities face problems that compromise PHC as the preferred gateway system. It additionally cites problems related to restricted hours of operation, the difficulties in handling spontaneous demand and low rate of solutions, besides the fact that users

did not know the operation site of the FHU[28]. These problems undoubtedly make the challenge to control TB a complex one, particularly in the aging population.

Considering what has been developed here as for the perspective of PHC as the gateway for elders with TB in health system, this study comes to endorse observations already made in another survey involving this disturbing relationship. There is a pressing need for restructuring the services rendered by PHC in order to offer comprehensive and decisive care to older people with TB[13]. It is stressed, once again, that the diagnosis of TB is the responsibility of FHU professionals and, if there is clinical suspicion, a sputum collection should be performed in the first contact with the user, promoting early diagnosis[13].

In particular, there is respected understanding of authors that, under the PHC, nursing should be sensitive to the healthcare needs of older people through nurse-user interaction[21], an attitude needed to develop care in accordance to the singularities involving people who are aging and vulnerable to TB.

CONCLUSION

The results in the seven studied municipalities indicate that PHC services have limitations to act as a gateway into the health system, especially with regard to the suspicion of TB cases among older people and for early diagnosing disease. The fact that most TB diagnoses in older patients have been conferred by SC services contradicts health policy guidelines in Brazil, since it places TB as a strategic area of PHC.

The organization of the healthcare system in the municipalities studied does not have effective mechanisms to meet the demands and diverse needs of the older population, which requires definition of management strategies and communication mechanisms among the different services for access to TB diagnosis, considering habits and the context where people live in order to overcome the fragmented care approach.

The reorganization of health services is recommended in order to strengthen PHC services as the gateway for the population aged over 60 years, which is a vulnerable group to TB. It is worth emphasizing the importance of qualified health professionals for the suspicion and early diagnosis of the disease with the intention of preventing cases and promoting the health of people belonging to this age group and the community at large.

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