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Factors associated with delay in the diagnosis of pulmonary tuberculosis in Belém/PA

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***Abstract*—*Introduction: Tuberculosis control tools are a challenge to primary health care, due to the delay of people from the appearance of the first symptoms to the search for the first health-care service, and health-care services leading to difficulties and delay in establishing the diagnosis and initiation of treatment. Objective: to analyze the factors associated with the time from the identification of symptoms to the beginning of treatment for pulmonary tuberculosis and to measure the related time. Materials and Method: Quantitative, cross-sectional and analytical study, with 101 patients being treated for pulmonary tuberculosis, in five Basic Health Units. They were interviewed using an adapted and validated questionnaire. Data were analyzed using the G Test, in the BioEstat 5.3 Program. Results: 53.27% of patients were late to seek health-care services. The diagnosis was classified as "no delay" (50.5%). Male sex, complete high school education are factors related to delay in the diagnosis of tuberculosis, as well as the frequency of seeking health-care services for diagnosis showed statistical significance (p=0.0264). Discussion: Men are the most affected by the disease, due to risk factors. There is a need to invest in the training of teams to carry out early diagnosis and rapid suspicion of the disease. Conclusion: There are important actors in disease control: the health-care service and the patient. The delay is related to the tuberculosis patient, with the need to speed up the diagnosis of the disease, so that the patient does not have to return to the service several times.*

I. INTRODUCTION

The main tool for controlling tuberculosis (TB) is the early diagnosis and initiation of treatment for people affected by the disease. For this, early detection of respiratory symptoms (RS) is necessary, those people who have persistent cough for two or three weeks [1]. The active search in the community then becomes an essential tool, strengthening the decentralization of TB control actions to primary health care (PHC) [2]; [3].

The scope of TB control tools is a challenge for the PHC health team, due to the delay of people from the onset of the first symptoms to the search for the first health-care service (HCS), caused by factors related to the patient's knowledge, perception, beliefs and coping with the disease. Aspects related to health services are also highlighted, such as: barriers to access; failures related to low resolution; and, fragmentation of care with referrals to specialized services, leading to difficulties and delay in establishing the diagnosis [4]; [5]; [6].

In Brazil, in 2021, 68,271 new cases of TB were diagnosed, which corresponded to an incidence coefficient of 32.0 cases/100,000 habitants. In the same year, the northern region of the country had the highest TB incidence coefficient among Brazilian regions (45.3/100,000 hab.), confirming the disease situation in the state of Pará, the sixth state in terms of incidence of the disease (42, 6/100,000 hab.) and the capital Belém the seventh capital in incidence in Brazil (67.5/100,000 hab.) [2]; [7]; [8].

The National Plan for the End of Tuberculosis as a Public Health Problem favors the decentralization of TB detection, diagnosis and monitoring actions for PHC, expanding the population's access, due to its proximity to the user and the hierarchy of the complexity of health care, speeding up the diagnosis and treatment of TB [9]; [10].

In this context, the behavior of the patient in the healing process must be valued by the health team, aiming at delaying the suspicion of the disease, with the intention of performing the treatment immediately and completely. Thus, the performance of nursing stands out in concentrating efforts around individuals or the community in order to protect, promote and preserve it, in order to allow users to perceive the meaning of the disease, developing self-care and, therefore, control. effective treatment of TB [11]; [12].

The study had as objective to analyze the factors associated with the time from the identification of symptoms to the beginning of treatment for pulmonary tuberculosis and to measure the time related to this.

II. MATERIALS AND METHODS

Quantitative, cross-sectional and analytical study, carried out with 101 pulmonary TB patients undergoing treatment in five Primary health Care in the city of Belém of Pará, with the highest number of cases of the disease. The research comes from a master's dissertation, so the data were collected between November 2016 and March 2017.

New TB cases undergoing treatment for Pulmonary TB enrolled in the elected units were included in this research, regardless of gender, age and municipalities/ neighborhoods of residence. Patients undergoing treatment for extrapulmonary TB in the isolated form, cases of recurrence and re-admission after abandonment were excluded. The sample complied with the sample calculation performed in the Epi Info 7.0 program, considering the population of 251 new cases for the year 2015, a frequency expectation of 50% and a confidence level of 99.99%, resulting in a representative sample of 101 patients.

To obtain data, a form adapted by the researchers was used, based on the “Questionnaire for the Evaluation of the Performance of Primary Care Services in TB Control in Brazil”, validated by Brazilian studies [13]; [14]. Thus, the time elapsed between the identification of symptoms by users and the beginning of treatment for pulmonary TB was calculated and the factors associated with them were analyzed.

The independent variables were: sex, age group, marital status, education, occupation, income; and the dependent variables were divided into, related to the patient: the time elapsed between the patient's identification of the first symptoms of tuberculosis and; related to the HCS: the time elapsed for the diagnosis and the beginning of the treatment.

The data were organized in a spreadsheet in Microsoft Excel 2016. In the univariate analysis, the frequency distribution of the variables was carried out and the G Test was later applied using the BioEstat 5.3 program, considering a significance level of 0.05 ($p < 0.05$) and 95% confidence interval (CI= 95).

Time analysis was performed in three strata: patient's time to seek HCS from the first symptoms; time required by the HCS to establish the TB diagnosis since the first consultation; and the time taken to start treatment after diagnosis. This study followed the recommendations of Resolution No. 466/12 of the National Health Council, being approved under opinion No. 1.715.457.

III. RESULTS

The patient's time to seek health services from the first symptoms was classified as delay, as in 101 participants, it was observed that 57 (53.27%) had > 15 days to seek health services (Fig. 1).

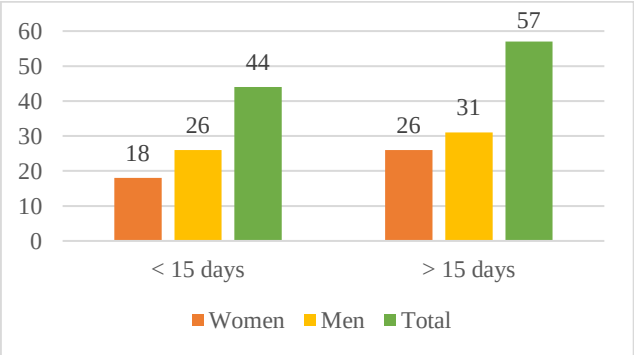

Fig. 1 - Time taken for patients to identify TB symptoms in UBS. Belém, PA, Brazil, 2017

There was no delay in diagnosing the disease. However, the results were practically similar, when compared to cases in which there were delays, 50 (49.5%) (Fig. 2). The time elapsed from the diagnosis of TB to the beginning of the specific treatment was between one and five days in 84 cases (83.16%).

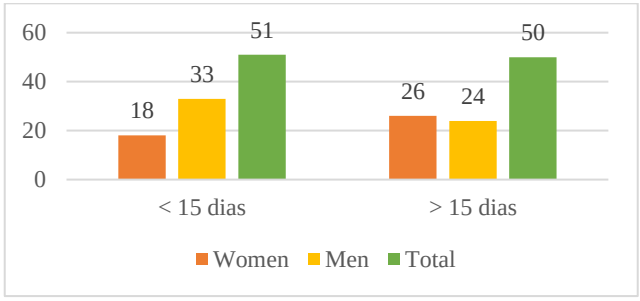

Fig. 2 - Time to TB diagnosis of patients in UBS. Belém, PA, Brazil, 2017

Table 1 - Sociodemographic and economic factors associated with the time for the identification of symptoms by the TB patient in the UBS. Belém, PA, Brazil, 2017

Variables	**< 15 days**		**> 15 days**		**Total**		
Sociodemographic and economic	**N**	**%**	**N**	**%**	**N**	**%**	**p-value (G test)**
Gender							
Masculine	26	45.6	31	54,4	57	100.0	0,8244
Feminine	18	40.9	26	59,1	44	100.0	
Age range (Years old)							
< 18	3	60.0	2	40.0	5	100.0	
18 a 29	11	39.3	17	60.7	28	100.0	
30 a 39	8	50.0	8	50.0	16	100.0	
40 a 49	10	50.0	10	50.0	20	100.0	0,8691
50 a 59	7	43.8	9	56.2	16	100.0	
> 60	4	28.6	10	71.4	14	100.0	
Not inform	1	50.0	1	50.0	2	100.0	
Marital status							
Married/stable union	13	44.8	16	55.2	29	100.0	
Widow/widower	2	28.6	5	71.4	7	100.0	
Sinle	24	44.4	30	55.6	54	100.0	0,7710
Separated/divorced	1	33.3	2	66.7	3	100.0	
Others	3	50.0	3	50.0	6	100.0	
Not inform	1	50.0	1	50.0	2	100.0	
Educations							
No schooling	1	100.0	0	0.0	1	100.0	0,8029

Incomp. Elementary School	10	37.0	17	63.0	27	100.0	
Comp. elementary school	5	35.7	9	64.3	14	100.0	
Incomp. high school	9	60.0	6	40.0	15	100.0	
Incomp. high school	1	33.3	2	66.7	3	100.0	
Comp.high school	15	44.1	19	55.9	34	100.0	
Comp. university education	3	42.9	4	57.1	7	100.0	
Occupation							
Unemployed	3	27.3	8	72.7	11	100.0	
Employee	12	44.4	15	55.6	27	100.0	
Housewife	4	40.0	6	60.0	10	100.0	
Autonomous	13	50.0	13	50.0	26	100.0	0,2522
Student	6	60.0	4	40.0	10	100.0	
Retiree	2	18.2	9	81.8	11	100.0	
Others	4	66.7	2	33.3	6	100.0	
Income MW (1MW = R$880,00)							
< 1 MW	8	32.0	17	68	25	100.0	
1-2 MW	25	47.2	28	52.8	53	100.0	
3-4 MW	6	42.9	8	57.1	14	100.0	0,5128
> 5 MW	1	20.0	4	80.0	5	100.0	
Not inform	3	100.0	0	00.0	3	100.0	
No fixed income	1	100.0	0	00.0	1	100.0	

Source: By the author

Among the variables related to the HCS to perform the diagnosis, one presented a statistical association, corresponding to the frequency of looking for the health service to find out that he had TB (p=0.0264), as shown in Table 2. In this way, it was identified that TB patients who took more than 15 days to be diagnosed with TB were those who sought health services five times or more.

Table 2 - Factors associated with the time for the diagnosis of TB in UBS. Belém, PA, Brazil, 2017

	≤ 15 days		**> 15 days**		**Total**		
	N	**%**	**N**	**%**	**N**	**%**	**p-value (G test)**
Service that diagnosed TB							
Primary Health Care–Family	0	0.0	1	100.0	1	100.0	
Public hospital	6	50.0	6	50.00	12	100.0	
Private hospital	6	55.0	5	45.5	11	100.0	0,9921
Private office	3	50.0	3	50.0	6	100.0	
Urgency	6	60.0	4	40.0	10	100.0	
Primary health Care	30	49.0	31	51.0	61	100.0	
Time to get service							

5 days	5	55.5	4	44,5	9	100.0	
4 days	2	40.0	3	60.0	5	100.0	
3 days	1	20.0	4	80.0	5	100.0	0,8524
2 days	17	61.0	11	39.0	28	100.0	
1 days	24	46.0	28	54.0	52	100.0	
Not know	1	100.0	0	00.0	1	100.0	
Not answers	1	100.0	0	00.0	1	100.0	
Frequency of looking for the health Care to find out he had TB							
5 or more times	1	8.5	11	91.5	12	100.0	
4 times	3	50.0	3	50.0	6	100.0	
3 times	7	63.5	4	36,5	11	100.0	0,0264
2 times	25	54.5	21	45.5	46	100.0	
1 time	15	57.5	11	42.5	26	100.0	
Were diagnostic tests performed at the Primary health Care?							
Yes	33	50.0	33	50.0	66	100.0	
No	4	33.5	8	66.5	12	100.0	
In part	1	50.0	1	50.0	2	100.0	
Smear microscopy	4	66.5	2	33.5	6	100.0	0,5568
Culture	2	66.5	1	33.5	3	100.0	
X-ray	5	55.5	4	44.5	9	100.0	
Not answers	2	66.5	1	33.5	3	100.0	
Did you receive guidance on the proper way to collect the material?							
Never	2	100.0	0	00.0	2	100.0	
Sometimes	2	100.0	0	0	2	100.0	
Ever	45	48.5	48	51.5	93	100.0	0,595
Not answers	2	50.0	2	50.0	4	100.0	

Source: By the author

IV. DISCUSSION

The literature reveals that there is no consensual definition of what constitutes "acceptable" delay and it depends on the characteristics of the population, HCS, the local epidemiological situation and the study scenario, with a longer delay being expected when the incidence of the disease is high [15]; [16]. Thus, the study considered a delay of time > 15 days, both for the patient to seek the HCS after the symptoms, and for the service to establish the diagnosis, these criteria were established based on the time to consider a SR user and other research [11]; [17].

Among TB patients, time was classified as delay. This result is corroborated by other studies [15]; [18]; [19]; [20], which justify it due to financial difficulties, psychosocial problems, cultural characteristics of the patients and for not recognizing the symptoms of TB, attributing it to other diseases with similar clinical conditions.

It is evident that patient delay has an influence on early diagnosis and disease control, showing that despite the decentralization of services to PHC, it is still partially effective. In this sense, it is shown that it is necessary to invest in PHC and in health education for the population, so that they identify the signs and symptoms of TB and seek HCS early.

Health professionals should approach TB patients and the community, seeking to recognize the factors that hinder self-care and adherence to treatment. Because the user's perception of the disease, that is, what he thinks about and his role in the face of it, configure essential

aspects for the development of self-care [12], as well as enabling a better and faster search for services.

Regarding HCS, there was no delay in making the diagnosis for TB, as most patients had a diagnosis with <15 days. However, the results are very similar to those with delay (49.5%), showing that there is still a need to invest in the training of health teams to carry out an early diagnosis, allowing the chain of transmission to be broken, since although the diagnoses were made at the UBS, the patients had to go to the services five times or more to find out that they were sick.

Despite the simplicity of the laboratory methods available to diagnose TB, delays in detecting the disease are still observed. The difficulties in performing an early diagnosis are related to the delay of the patient in the search for the HCS, the barriers in the functioning of the HCS, the passive search of the RS, as well as the lack of qualification of the health professionals(4,10) ,16).

It is noteworthy that delays in the diagnosis of the disease >15 days were identified in other studies, which increases the probability of TB transmission in the community, as well as the morbidity and mortality rate [16]; [21]; [22]; [23].

PHC is the key component of the health system and its organization takes place through the Primary Health Care–Family, which should prioritize actions to promote, protect and restore the health of individuals, especially in the TB program. However, these units have some difficulties due to the lack of professional qualifications for suspecting TB and providing care to the patient, because some symptoms are unspecific, preventing both the process of early diagnosis of the disease and the identification of the real needs of users [16]; [23]; [24].

There was no delay in starting treatment, as it took <5 days to start treatment with anti-TB drugs. Studies indicate that the median time to start treatment is 3 days [25]; [26].

However, there is still evidence that shows a delay >5 days to start the anti-TB therapeutic regimen [19]; [21]; [27]; [28], which is one of the main challenges for the prevention and control of TB in Brazil and in the world, since the beginning late treatment leads to increased morbidity and mortality and disease progression to severe and complicated forms, as well as increased TB transmissibility [21]; [28].

Despite the sociodemographic and economic variables not being associated with the identification of symptoms by the TB patient, the male sex is still the most affected, as men do not adequately take care of their health and are still more exposed to risk factors for the disease when compared women, due to the time devoted to work, going out with friends, nighttime pleasures to poor diet, abusive use of alcohol, smoking and other drugs that with frequent use result in a decrease in immunity and, therefore, in the development of the disease [4]; [29].

Similarly, in a survey carried out in Zimbabwe, most of the study population had schooled up to secondary school, referring to high school in Brazil. The low education level of TB patients manifests a relationship with unstable socioeconomic determinants, which increase vulnerability to the disease and is responsible for the increase in its incidence and treatment dropouts [18]; [30], being a counterpoint of the study, in view of the evidence that most of the sample has completed high school.

The importance of searching for RS, of suspected cases, in addition to surveillance of contacts by the PHC, is highlighted, so that there is early detection of positive cases for TB and immediate initiation of treatment, as well as the need for a link between professionals of health teams and individuals for greater adherence to the care plan. These are the main TB control strategies, as they promote the breaking of the disease transmission chain and the consequent decrease in the incidence rate [19]; [21]; [28].

V. CONCLUSION

There are two important actors in disease control: the health professional and the patient. The delay is related to the TB patient, corroborating the idea of the need to sensitize society about the disease and participation in PHC, allowing the blocking of TB transmissibility. However, the need to speed up the diagnosis of the disease is identified, so that the patient does not have to return to the service several times for the action to be effective. Thus, the importance of the multiprofessional team is seen in carrying out educational actions in the community so that they can become empowered about TB and seek health services early, thus allowing rapid diagnosis and immediate initiation of treatment, breaking the chain. of TB transmission.

PHC need to provide means to better understand and change the population's attitudes towards TB. For this, a reorientation of health services is recommended, with regard to the qualification and permanent and systematic training of these professionals, in order to collaborate to guarantee the knowledge, skills and competences of professionals and improve the suspicion and diagnosis of TB, as well as for the increase in the active search and decentralization of these services, in the sense of promoting greater access to health, increasing the number of individuals examined and reducing the time between the identification of RS and the beginning of TB treatment.

The present study has as limitations the memory bias regarding the dates of the first search for the health service; not assessing the degree of knowledge and beliefs about the disease; use of data from secondary sources. The study design also does not allow the assessment of patients who do not have access to the health service and the diagnosis of the disease.

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