Rev Saúde Pública 2009;43(6)

Márcia São Pedro Leal Souza[I]

Susan Martins Pereira[II]

Jamocyr Moura Marinho[II]

Maurício L Barreto[II]

Characteristics of healthcare services associated with adherence to tuberculosis treatment

ABSTRACT

OBJECTIVE: To analyze characteristics related to adherence to tuberculosis treatment in tuberculosis outpatient clinics.

METHODS: An ecological study was conducted in outpatient clinics for the treatment of tuberculosis cases in the sanitary districts of Salvador, Northeastern Brazil, in 2006. The sample was composed of the municipal health units that assisted 67.2% of the 2,283 tuberculosis cases that were reported during the year. The following variables were analyzed: cure, dropout, tests, health team and benefits offered to the patients. Chi-square test or Fisher's exact test was used to verify the association between variables, and associations with $p<0.05$ were considered to be statistically significant.

RESULTS: Of the studied cases, 78.4% resulted in cure, 8.6% in dropout, 2.2% in death and 8.1% in transference. Adherence rates per health unit varied between 66.7% and 98.1%. The variables cure and dropout showed a statistically significant association with adherence in the comparison of proportions. All the units with high adherence rates had complete health teams.

CONCLUSIONS: Adherence was an important factor for the outcomes cure and dropout, but the index of units that achieved the cure goals was low. The presence of a complete multidisciplinary team in the tuberculosis program may help the patient understand his/her illness and contribute to adherence to treatment.

DESCRIPTORS: Tuberculosis, prevention & control. Patient Dropouts. Medication Adherence. Health Services. Ecological Studies.

[I] Programa de Pós-Graduação em Saúde Coletiva. Instituto de Saúde Coletiva (ISC). Universidade Federal da Bahia (UFBA). Salvador, BA, Brasil

[II] ISC-UFBA. Salvador, BA, Brasil

[II] Escola Bahiana de Medicina e Saúde Pública. Salvador, BA, Brasil

Correspondence:
Márcia São Pedro Leal Souza
R. Basílio da Gama s/n
Campus Universitário do Canela UFBA
40110-040 Salvador, BA, Brasil
E-mail: marciaspls@yahoo.com.br

Received: 10/1/2008
Revised: 4/13/2009
Approved: 5/21/2009

INTRODUCTION

Tuberculosis (TB) is an infectious contagious disease with evolution in slow cycles and higher incidence in urban agglomerations. In Brazil, approximately 85 thousand new cases are reported on an annual basis, corresponding to an incidence of 47/100,000 inhabitants. Approximately 6 thousand deaths occur due to the disease (SINAN/MS).[a] In 2003, TB was included in the priorities agenda of Brazil's public policies.[12] In 2005, the country reached the intermediate goals established by the World Health Organization (WHO), with 73.5% of detection of the estimated cases and 69.3% of cure.

In Brazil, the strategy of the Directly Observed Treatment, Short-course (DOTS) has been implemented in some services connected with *Sistema Único de Saúde* (SUS – National Health System). However, the scarcity of human and financial resources in the public health system represents an operational difficulty concerning the follow-up of patients who are undergoing TB treatment.[2] The first two to three months of treatment are the periods in which the majority of dropouts occurs, indicating the need for measures that reduce this rate since the beginning of the treatment.[7]

Health professionals have discussed non-adherence to pharmacological treatment. It is understood that adherence depends on the success of the proposed therapy, on the cure of a given illness and on the control of a chronic process. Taking the people who live with HIV/AIDS as an example, WHO defines adherence as a dynamic, multifactorial process that involves behavioral, psychical and social aspects and which requires shared decisions and co-responsibilities between service user, health team and the social support network, with an approach that meets sociocultural and subjective singularities, aiming at better quality of life for people.[14,15]

Thus, treatment adherence can be based on individual approaches related to the patient[8] or environmental factors that are external to the patient. The former have been well described in the literature – for example, being male, having low level of schooling, smoking, using alcohol or drugs.[2,11] However, few studies have investigated the characteristics of the healthcare services and their relationship to adherence to TB treatment.

The city of Salvador (Northeastern Brazil) is considered a priority in TB control by *Ministério da Saúde* (MS - Ministry of Health) because it is the third capital in the country in number of reported cases. It presents an average of three thousand cases per year and the incidence was 92.4/100,000 inhabitants in 2006, almost twice the national incidence of 48/100,000 inhabitants (COAPS/SMS/2007[b]). To face this problem, the Municipal Plan for Tuberculosis Control was developed, aiming to implement TB control measures, like detection of new cases, treatment and cure.

The aim of the present study was to analyze characteristics related to adherence to TB treatment in reference services for TB.

METHODS

It is an ecological, cross-sectional, descriptive study conducted in the reference units for the treatment of TB cases of the sanitary districts in the municipality of Salvador, in 2006.

The estimate of the population in Salvador in 2005 was 2,711,372 inhabitants.[c] In this municipality, there are 12 sanitary districts, 86 municipal primary healthcare units, 63 municipal healthcare units with PCT (Tuberculosis Control Program) and 41 family health units. In 2006, 2,283 TB cases were reported. Eleven sanitary districts were assessed, represented by one healthcare unit per district, and these units are considered reference centers in TB control. The included units assisted 67.2% of the total number of cases that occurred in Salvador.

Initially, the number of TB cases in each sanitary district was listed and the healthcare units responsible for the highest number of assisted cases in each district were identified and included in the study.

A standardized and previously tested questionnaire was developed to be administered to the coordinators of the TB control program in the services.

This instrument included questions about identification of the sanitary district, health assistance offer and quality, and organizational conditions of the human resources of the healthcare unit.

A team composed of four university students was trained for data collection, which lasted eight weeks. Secondary data were extracted from the book of TB cases treatment register and control, available in the primary healthcare unit, in order to obtain the general indicators of the control actions for TB cases in the healthcare units and the respective outcomes in 2006.

[a] Ministry of Health. Sistema de Informação de Agravos de Notificação (SINAN – Accident and Disease Report Information System). [cited 2007 Oct 05] Available from: http/www.saude.ba.gov.br

[b] Secretaria Municipal de Saúde (SMS - Municipal Health Department). Coordenadoria de Atenção e Promoção a Saúde (COAPS - Health Care and Promotion Coordination). Data updated on 11/12/2007. Available from DEF=C:/SinanNet/BaseDBF/TuberculNET.def (Document provided by the sector itself).

[c] Instituto Brasileiro de Geografia e Estatística (Brazilian Institute of Geography and Statistics). IBGE Cidades@. [cited 2009 Oct 22] Available from: http://www.ibge.gov.br/cidadesat/topwindow.htm

Adherence to the TB treatment program was considered the outcome, expressed by adherence percentage. The co-variables were obtained from the aspects related to the characteristics of the healthcare services and of the TB control program.

To calculate the adherence rate, the numerator was composed of the sum of the number of cases of confirmed cure, non-confirmed cure and failure, and the denominator considered the population enrolled in the TB control program (sum of the number of incident cases and retreatment cases in each unit). The transfer cases were discarded, since it would not be possible to obtain data about the patient's permanence in the program. The failure cases remained in the calculation of the adherence rate, as the MS defines failure cases as administration to the patient of the three recommended schemes without response to treatment. In data analysis, adherence rate percentages were categorized into two groups: adherence below 85.0% and adherence equal to or higher than 85.0%. This cut-off point was based on the cure parameter acceptable by the National Tuberculosis Program,[a] as there is no parameter for this indicator in the literature.

A score was developed to classify the primary health-care units, based on characteristics of the service and of the actions offered by the program. Value 0 was considered when the characteristics were not present in the unit; value 1 was attributed when the radiological examination was performed at the unit; value 2 when the benefits (meal card, *Programa Bem Nutrir*,[b] bus fare card) and surveillance actions (active search, search for absent patients and vehicle at the unit) were present at the unit and when there was no shortage of medicines; value 3 was attributed when bacillus testing was performed at the unit and when there was the presence of all the professionals in the composition of the health team. The values used for the variables' score were attributed based on the relevance to the development of the aims of the National Tuberculosis Program, according to the norms established by the Brazilian Ministry of Health, such as complete health teams and performance of bacillus testing at the unit. The variables were grouped according to the aspects diagnoses, team, benefits, surveillance and medicine, to verify their association in relation to adherence. The obtained score ranged from 0 to 33 points.

For the analysis, the variables were grouped in relation to: performance of diagnostic tests, team, benefits, surveillance actions and offer of medicines. The first was composed of radiology service functioning at the unit and performance of bacillus testing at the unit. The variable "team" was considered as presence of doctor, nurse, nursing assistant, social worker and the program's visiting professional. Units that presented all the professionals were considered as complete team and the units that lacked one of the professionals were considered as incomplete team. The variable "benefits" was composed of the offer of meal card, Good Nutrition Program and bus fare card, being complete when all the benefits were present and incomplete when at least one of the items was absent. The variable "surveillance" was composed of active search, search for absent patients and presence of vehicle at the unit, and the performance of the actions was considered. The variable "medicine" was determined by shortage or not of the specific medicine in the last six months.

Data were analyzed by means of the software Epi Info version 6.04 and Stata 7.0. Descriptive analysis was carried out, continuous variables were analyzed using measure of central tendency and dispersion and the categorical variables as proportion. To analyze the association between nominal variables, the chi-square test or Fisher's exact test was used. Associations with $p<0.05$ were considered statistically significant.

The study was approved by the Ethics Committee of Santa Casa de Misericórdia da Bahia. The participants signed a consent document and their right to voluntary

Table 1. Proportion of discharge due to cure, dropout, death and transfer of patients in the municipality and in the reference units. Salvador, Northeastern Brazil, 2006.

Place	TB Cases (n)	Cure %	Dropout %	Death %	Transfer %
Salvador[a]	2.283	69.90	6.53	0.04	13.32
Reference units[b]	1.534	78.42	8.60	2.15	8.08

[a] Source: Sistema de Informação de Agravos de Notificação; Coordenadoria de Atenção e Promoção à Saúde/Secretaria Municipal de Saúde.

[b] Reference unit of each sanitary district
$p < 0.05$

[a] Technical-Scientific Committee for Advice on Tuberculosis and Advisory Committee for HIV-Tuberculosis Co-infection. Tuberculose: guia de vigilância epidemiológica. Brasília: Ministério da Saúde/Fundação Nacional de Saúde, 2002.
[b] Programa Bem Nutrir (Good Nutrition Program), implemented in 1999, aims to provide dietary supplement to fight tuberculosis by means of the supply of bread and soy milk to social entities.

Table 2. Adherence rate, proportion of cure and dropout according to the population of the healthcare units, without the transfer cases, enrolled in the tuberculosis treatment program. Salvador, Northeastern Brazil, 2006.

Health unit[a]	Enrolled population (n)[b]	Adherence	Cure	Dropout
UBS 1	72	66.7	66.7	33.3
UBS 2	138	87.7	87.2	4.5
UBS 3	136	80.9	80.5	17.3
UBS 4	349	89.7	89.6	4.3
UBS 5	100	83.0	83.0	15.0
UBS 6	155	98.1	98.1	1.3
UBS 7	61	77.1	77.1	19.7
UBS 8	77	92.2	92.2	6.5
UBS 9	42	81.0	81.0	16.7
UBS 10	165	91.5	91.5	7.9
UBS 11	100	86.0	85.9	10.1

[a] Reference unit of each sanitary district of the municipality for the Tuberculosis Control Program.

[b] For the calculation of the percentages of cure and dropout, the failure cases were removed from the enrolled population.

participation, refusal and confidentiality of information was ensured, according to Resolution 196/96 of the National Health Council.

RESULTS

Considering the total number of units with PCT in Salvador, there was 69.9% of cure, while the reference units presented 78.4%. Concerning dropout, Salvador presented 6.5% and the reference units, 8.60%. In relation to death, 0.04% occurred in Salvador and 2.2% in the units. In the transfer outcome, the city of Salvador presented 13.3% and the reference units, 8.08%. The differences found between the total number of units in Salvador and the reference units in all outcomes were statistically significant (Table 1).

Analyzing adherence in each healthcare unit, there was variability in the rates: the lowest was 66.7% at the Primary Healthcare Unit (UBS) 1, followed by UBS 7, with 77.1%. The highest adherence rate was found at UBS 6, with 98.1%, followed by UBS 8, with 92.2%.

In relation to the cure outcome, UBS 1 presented the lowest percentage (66.7%), followed by UBS 7, with 77.1%. UBS 6 had the highest cure percentage, 98.1%, followed by UBS 8, with 92.2%. In the dropout outcome, UBS 6 obtained the lowest rate (1.3%). The highest rates were present in UBS 1, with 33.3%, and in UBS 7, with 19.7% (Table 2).

The following units were classified as low adherence: UBS 1, 3, 5, 7, 9, with a total of 442 cases of ongoing TB treatment, obtaining 72.2% of cure and 18.3% of dropout. The units UBS 2, 4, 6, 8, 10 and 11 were classified as high adherence, with 1,092 cases of ongoing TB treatment, 81.0% of cure and 4.7% of dropout. A statistically significant association was observed between adherence and proportions of cure and dropout (Table 3).

Radiology service was present in only three units (UBS 5, 6 and 9). Performance of bacillus testing at the unit occurred with higher frequency (UBS 2, 4, 5, 6, 7, 9 and 10). The complete health team was present at UBS 2, 4, 6, 8 and 11. Complete benefits were present at UBS 5 and UBS 11. Regarding the surveillance variable, only UBS 1 did not have vehicle at the unit.

There was shortage of medicine in four units (UBS 1, 4, 10 and 11).

In the classification of units per score, UBS 2, 5 and 6 presented the highest scores (30 and 31 points) and UBS 2 and 6 obtained high adherence (87.7% and

Table 3. Percentage of cure and dropout outcomes according to the reference units classified as high and low adherence to tuberculosis treatment. Salvador, Northeastern Brazil, 2006.

Adherence	No. of units	TB cases[a]	Cure	Dropout
< 85.0%	5	442	72.2	18.3
≥ 85.0%	6	1092	81.0	4.7

[a] Total of tuberculosis cases in the reference units of each district
p = 0.001

Table 4. Classification scores of the primary healthcare units, based on the aspects of diagnoses, team, benefits, surveillance and medicine supply. Salvador, Northeastern Brazil, 2006.

Variable	UBS1	UBS2	UBS3	UBS4	UBS5	UBS6	UBS7	UBS8	UBS9	UBS10	UBS11
Adherence (%)	66.7	87.7	80.9	89.7	83.0	98.1	77.1	92.2	81.0	91.5	86.00
Diagnosis											
Radiology service	0	0	0	0	1	1	0	0	1	0	0
Bacillus testing at the unit	0	3	0	3	3	3	3	0	3	3	0
Team											
Nurse	3	3	3	3	3	3	3	3	3	3	3
Doctor	3	3	3	3	3	3	3	3	3	3	3
Nursing assistant	0	3	0	3	3	3	0	3	0	0	3
Social worker	3	3	3	3	3	3	3	3	3	3	3
Program's visiting professional	0	3	3	3	0	3	3	3	3	3	3
Benefits											
Meal card	2	2	2	2	2	2	2	2	2	2	2
Nutrition program	0	0	0	0	2	0	0	0	0	0	2
Bus fare card	2	2	2	2	2	2	2	2	2	2	2
Surveillance											
Active search of cases	2	2	2	2	2	2	2	2	2	2	2
Search of absent patients	2	2	2	2	2	2	2	2	2	2	2
Vehicle in the unit	0	2	2	2	2	2	2	2	2	2	2
Medicine	0	2	2	0	2	2	2	2	2	0	0
Score	17	30	24	28	30	31	27	27	28	25	27

98.16%, respectively). These units had, in common, the presence of the program's visiting professional in the health team. This professional was not present in the team of UBS 5, which achieved a lower adherence percentage (83.0%), although it belonged to the group with high score.

Analyzing the two units that obtained a score of 28 points, it was observed that UBS 4 presented 89.7% of adherence, while UBS 9 presented 81.0%. In the first one, the nursing assistant was present in the health team, which did not occur in UBS 9. The score of 27 was observed in UBS 7, 8 and 11. Of these, UBS 8 and 11 presented adherence above 85.0%. UBS 7 presented a lower percentage (77.05%), and it was observed that this unit did not have the nursing assistant in the health team. UBS 10 presented a score of 25, followed by UBS 3, with 24 points (Table 4).

Of the seven units that performed bacillus testing and had a radiology service in operation, 42.9% presented low adherence. The proportion of units with high adherence that performed these tests was higher (57.1%), but this difference was not statistically significant (Table 5).

Concerning the complete health team, it was observed that 100% of the units with high adherence had this characteristic, with the team being formed by a doctor, nurse, nursing assistant, social worker and visiting professional. Of the units with low adherence, the majority (83.3%) did not meet this requisite, and this difference was statistically significant. As for the benefits offered by the service, 50.0% of the units with high and low adherence offered complete benefits, and there were no differences between groups. Also, no statistically significant differences were found between presence of surveillance and medicines (Table 5).

DISCUSSION

The present study identified low percentage of cure (69.9%) and high percentage of dropout (6.5%) in the municipality of Salvador in the year of 2006. The studied units of analysis are representative of the healthcare services of the municipality that develop TB control actions. These results of higher percentage of cure, dropout and death and lower percentage of transfer found in the units were expected, as the data were collected *in loco* in the reference units, and there was no possibility of duplicity of cases, because of official or spontaneous transfers among the healthcare units during the treatment, or in treatments due to recurrence after cure or dropout.

The high percentage of cure in the reference units is expected, also, due to the fact that the units concentrate

Table 5. Characteristics of the healthcare services according to adherence to the tuberculosis control program in the reference units. Salvador, Northeastern Brazil, 2006.

Characteristic of the service	n	Adherence < 85.0%	Adherence ≥ 85.0%	p <0.05
Diagnostic tests[a]				
Performed at the unit	7	42.7	57.1	
Not performed at the unit	4	50.0	50.0	1.00
Team[b]				
Complete	5	-	100.0	
Incomplete	6	83.3	16.7	0.01
Benefits[c]				
Complete	2	50.0	50.0	
Incomplete	9	44.4	55.6	1.00
Surveillance[d]				
Performed at the unit	10	40.0	60.0	
Not performed at the unit	1	100.0	-	
Medicine				
Shortage	4	25.0	75.0	
Adequate supply	7	57.1	42.7	0.54

[a] Diagnostic tests: radiology service and bacillus testing performed at the unit.

[b] Team: presence of doctor, nurse, nursing assistant, social worker and the program's visiting professional.

[c] Benefits: meal card, Good Nutrition Program and bus fare card.

[d] Surveillance: active search of cases, search of absent patients and vehicle at the unit.

the highest amount of diagnosis and therapy services, have complete teams of professionals and because the shortage of medicines is rare.

The results show that, generally speaking, the Tuberculosis Control Program did not reach the specified cure goals in 2006. Concerning dropout, a high percentage was observed, since up to 5.0% of this outcome is accepted.[10] This indicates the fragility of the healthcare services and of PCT regarding patient's adherence to treatment. The Brazilian Ministry of Health ratifies the priority of the actions against TB, putting into practice a national plan that prioritizes qualification of human resources, social mobilization, qualification of the network of laboratories, and monitoring and assessment, hoping that the actions are strengthened in order to reduce the number of TB cases in the population and in vulnerable groups.

In relation to the transfer outcome, the data collected in the UBS of the study show a lower proportion (8.1%) compared to the one observed in the city of Salvador (13.3%). The high percentage of transfer contributes to improve the dropout outcome and to worsen the cure outcome.

As for deaths, it was observed that the UBS, which are reference centers in TB treatment, presented a higher proportion compared to the data from Salvador, probably as a result of the *in loco* collection. Although all the Brazilian municipalities send their reports to SINAN, the real input of computerized data occurs in approximately 70% only.[3] A study on epidemiological surveillance and SINAN showed that in 2003, one out of every four Brazilian municipalities presented deficiency in capturing new TB cases or adequately registering the report and follow-up data.[4]

One of the main findings of the present study refers to the reach of the adherence percentage in the units that had complete health teams. Even in the units with high score, the presence of the program's visiting professional or of the nursing assistant seems to contribute to high adherence. Santos[12] considers the presence of the complete health team as extremely relevant in the service, since the PNCT strategies should, preferably, be developed by multiprofessional teams aiming at the patient's social inclusion, without forgetting the importance of the service's organization under the strategy of supervised treatment. In relation to medication, the access has been guaranteed through acquisition and distribution according to the necessary amounts – 100,000 patients/year, including cases of multiresistant TB.[12]

A study carried out in Southern Ethiopia found that 26.0% of the absent patients mentioned "feeling well" as the main reason to interrupt treatment.[6,13] In this moment, the presence of the health team in the unit is necessary, a team that is trained and organized to adopt

measures that can increase adherence. Information is considered as a relevant factor to treatment adherence, since lack of knowledge regarding the possibility of cure may influence dropout. [9,10]

The presence of the complete health team enhances the service's quality and organization, and it can be a factor that influences the reduction in treatment dropout.[2,5,10]

Deheinzelin et al[5] describe as relevant factors to adherence the close relationship between doctor and patient and a better organization of assistance which, in turn, produce a reduction in the waiting time for the medical consultation and doctors' training in TB assessment and diagnosis.

In the present study, it was observed that all the reference units provide the bus fare card for the patient who is enrolled in the program, so that he/she can go to the healthcare center. However, Paixão & Gontijo[10] argue that the distance to the healthcare service is not a relevant factor to non-adherence, since it was observed that some individuals prefer to be treated far away from their homes, because they feel more comfortable in view of the disease's stigma.

The decrease in the adherence rate reduces the percentage of cure and, consequently, increases the percentage of treatment dropout, presenting a direct relationship not only with the dissemination of the disease, but also with the emergence of multiresistant strains.[1,14]

High treatment adherence, which consequently produces high percentages of cure, functions as a bench mark for the quality of the service provided at the unit, which reveals compliance with the protocol and the level of competence of the health team.

It was expected, in the present study, that the reference UBS in TB treatment would have all the investigated characteristics and would obtain maximum score. Nevertheless, the UBS achieved scores that ranged from 17 to 31 points, revealing some weaknesses in the development of the actions.

We consider that the occurrence of a selection bias due to the inclusion of the 11 UBS is not very probable in view of the fact that these are the most representative units of the municipality, concentrating the assistance to the highest number of TB cases. These UBS were references of each sanitary district of the municipality of Salvador in 2006, representing 67.2% of the TB cases. Although some information bias may have occurred due to the fact that the interviews were conducted with the PNCT supervisors, the findings show variation across the several units, in a consistent way with the presented outcomes.

In conclusion, adherence is an important factor for the cure and dropout outcomes. The results show that 54.6% of the units of the municipality of Salvador in the evaluated year achieved the goals established for the cure outcome, an index that is considered low. The presence of the complete multidisciplinary team in the PCT can contribute to the patient's understanding of his/her illness and to his/her comprehension regarding the importance of treatment adherence for cure.

REFERENCES

1. Alvarez-Gordillo GC, Alvarez-Gordillo JF, Dorantes-Jiménez JE, Halperin-Frisch D. Percepciones y práticas relacionadas com la tuberculosis y la adherencia al tratamiento em Chiapas, México. *Salud Publica Mexico*. 2000;42(6):520-8. DOI:10.1590/S0036-36342000000600008
2. Bergel FS, Gouveia N. Retornos freqüentes como nova estratégia para a adesão ao tratamento de tuberculose. *Rev Saude Publica*. 2005;39(6):898-905.DOI:10.1590/S0034-89102005000600005
3. Bierrenbach AL, Stevens AP, Gomes ABF, Noronha EF, Glatt R, Carvalho CN, et al. Efeito da remoção de notificações repetidas sobre a incidência da tuberculose no Brasil. *Rev Saude Publica*. 2007;41(Supl 1):67-76. DOI:10.1590/S0034-89102007000800010
4. Braga JU. Vigilância epidemiológica e o sistema de informação da tuberculose no Brasil, 2001-2003. *Rev Saude Publica*. 2007;41(Supl 1):77-88. DOI:10.1590/S0034-89102007000800011
5. Deheinzelin D, Takagaki TY, Sartori AMC, Leite OHM, Amato Neto V, Carvalho CRR. Fatores preditivos de abandono de tratamento por pacientes com tuberculose. *Rev Hosp Clin Fac Med Sao Paulo*. 1996;51(4):131-5.
6. Kaona FAD, Tuba M, Siziya S, Sikaona L. An assessment of factors contributing to treatment adherence and knowledge of TB transmission among patients on TB treatment. *BMC Public Health*. 2004;4:68. DOI:10.1186/1471-2458-4-68
7. Menzies R, Rocher J, Vissandjee B. Factors associated with compliance in treatment of tuberculosis. *Tuber Lung Dis*. 1993;74(1):32-7. DOI:10.1016/0962-8479(93)90066-7
8. Munro AS, Lewin SA, Smith HJ, Engel ME, Fretheim A, Volmink J. Patient Adherence to Tuberculosis Treatment: a systematic review of qualitative research. *Plos Med*. 2007;4(7):238. DOI:10.1371/journal.pmed.0040238
9. Oliveira HB, Moreira Filho DC. Abandono de tratamento e recidiva da tuberculose: aspectos de episódios prévios, Campinas, SP, Brasil, 1993-1994. *Rev Saude Publica*. 2000;34(5):437-43. DOI:10.1590/S0034-89102000000500002
10. Paixão LMM, Gontijo ED. Perfil de casos de tuberculose notificados e fatores associados ao abandono, Belo Horizonte, MG. *Rev Saude Publica*. 2007;41(2):205-13. DOI:10.1590/S0034-89102007000200006
11. Rosemberg J. Tuberculose, aspectos históricos, realidades, seu romanticismo e transculturação. *Bol Pneum Sanit*. 1999;7(2):5-29.
12. Santos J. Resposta brasileira ao controle da tuberculose. *Rev Saude Publica*. 2007;41(Supl 1):89-94. DOI:10.1590/S0034-89102007000800012
13. Shargie EB, Lindtjorn B. Determinants of treatment adherence among smear-positive pulmonary tuberculosis patients in Southern Ethiopia. *Plos Med*. 2007;4(2):37. DOI:10.1371/journal.pmed.0040037
14. World Health Organization. Adherence to long-term therapies: evidence for action. Tuberculosis. Geneva; 2003.
15. World Health Organization. Implementing the WHO Stop TB Strategy: a handbook for national tuberculosis control programmes. Geneva; 2008. (WHO/HTM/TB/2008.401).

Article based on the Master's thesis authored by Souza MSP, submitted to the Postgraduate Program in Health of the Public Health Institute, Universidade Federal da Bahia, in 2008.
Research financed by the National Council for Scientific and Technological Development (CNPq – process no. 478052/2004-9).