

The information system and tuberculosis control on priority cities of Paraíba - Brazil*

O SISTEMA DE INFORMAÇÃO E O CONTROLE DA TUBERCULOSE NOS MUNICÍPIOS PRIORITÁRIOS DA PARAÍBA - BRASIL

EL SISTEMA DE INFORMACIÓN Y CONTROL DE LA TUBERCULOSIS EN MUNICIPIOS PRIORITARIOS DEL ESTADO DE PARAÍBA EN BRASIL

Jordana de Almeida Nogueira¹, Lenilde Duarte de Sá², Uthania de Mello França³, Sandra Aparecida de Almeida⁴, Dinalva Soares Lima⁵, Tânia Maria Ribeiro Monteiro Figueiredo⁶, Teresa Cristina Scatena Villa⁷

ABSTRACT

This article had the purpose to understand the perception of the coordinators of the Tuberculosis Control Program regarding the use of the Notification Aggravation Information System - *Sistema de Informação de Agravos de Notificação* (SINAN) as an instrument of the DOTS (Directly Observed Treatment) Strategy. This qualitative study used semi-structured interviews, with eight coordinators of the Tuberculosis Control Program in six cities of the state of Paraíba. The results showed that the cities use the SINAN to evaluate actions to control tuberculosis, pointing to difficulties such as failure to fill out the tuberculosis notification sheets, precarious computer infrastructure, insufficient qualification of human resources, lack of integration between professionals from different sectors and deficiencies in the information flow between healthcare units and cities. Considering that the quality of the information can jeopardize the monitoring of the results of treatments for patients, and consequently the efficiency of the DOTS strategy, it is concluded that the political commitment of the administration is fundamental to overcome the identified weaknesses.

KEY WORDS

Information Systems.
Tuberculosis.
Health promotion.

RESUMO

Objetivou-se conhecer a percepção dos coordenadores do Programa de Controle da Tuberculose quanto à utilização do Sistema de Informação de Agravos de Notificação (SINAN) como instrumento da estratégia DOTS (Directly Observed Treatment). Estudo de natureza qualitativa utilizou a entrevista semi-estruturada com oito coordenadores do Programa de Controle da Tuberculose de seis municípios paraibanos. Os resultados evidenciaram que os municípios utilizam o SINAN para avaliação das ações de controle da tuberculose, apontando como dificuldades, deficiência do preenchimento das fichas de notificação de tuberculose; precária infra-estrutura de informática; qualificação insuficiente de recursos humanos; falta de integração entre profissionais de diferentes setores; deficiência do fluxo da informação entre unidades de saúde/municípios. Considerando que a qualidade da informação pode comprometer o monitoramento dos resultados de tratamento dos pacientes e consequentemente a eficácia da estratégia DOTS, conclui-se que é fundamental o compromisso político da gestão para superar as fragilidades identificadas.

DESCRIPTORIOS

Sistemas de Informação.
Tuberculose.
Promoção da saúde.

RESUMEN

El estudio tuvo como objetivo conocer la percepción de los coordinadores del Programa de Control de la Tuberculosis en lo que se refiere a la utilización del *Sistema de Información de Agravos de Notificación* (SINAN) como instrumento de la estrategia DOTS (Directly Observed Treatment). Se trata de un estudio de naturaleza cualitativa que utilizó la entrevista semi-estructurada con ocho coordinadores del Programa de Control de la Tuberculosis de seis municipios del estado de Paraíba. Los resultados evidenciaron que los municipios utilizan el SINAN para evaluar las acciones de control de la tuberculosis, apuntando como dificultades, la deficiencia del llenado de los registros de notificación de tuberculosis; la precaria infraestructura de informática; la calificación insuficiente de recursos humanos; la falta de integración entre profesionales de diferentes sectores; y, la deficiencia del flujo de la información entre las unidades de salud/municipios. Considerando que la calidad de la información puede comprometer el monitoreo de los resultados del tratamiento de los pacientes y consecuentemente la eficacia de la estrategia DOTS, se concluyó que es fundamental el compromiso político de la administración para superar las fragilidades identificadas.

DESCRIPTORIOS

Sistemas de Información.
Tuberculosis.
Promoción de la salud.

* Extracted from the project "Situação da implantação do DOTS para o controle da TB em algumas regiões do Brasil: histórico e peculiaridades de acordo com as características regionais", coordinated by the Group of Operational Research in Tuberculosis. ¹PhD. Professor of the Department of Medical-surgical Nursing, Nursing Graduate Program - Federal University of Paraíba. Campina Grande, PB, Brazil. jal_nogueira@yahoo.com.br ²PhD. Professor of the Public Health and Psychiatric Nursing Department, Nursing Graduate Program, Federal University of Paraíba. Campina Grande, PB, Brazil. lenilde_sa@yahoo.com.br ³Master in Nursing. Professor of the Department of Medical-surgical Nursing, Federal University of Paraíba. Campina Grande, PB, Brazil. uthania@gmail.com ⁴Professor, Specialist in Psychiatric Nursing - Faculdade Santa Maria and Faculdade de Enfermagem Nova Esperança. João Pessoa, PB, Brazil. sandra_almeida09@yahoo.com.br ⁵Advisor of UNESCO/SVS/MS Task Force to Combat Tuberculosis. dinalvalima_saude_pb@yahoo.com.br ⁶Professor. Master in Nursing, State University of Paraíba. Doctoral student at the Ribeirão Preto College of Nursing at University of São Paulo. Campina Grande, PB, Brazil. tania@eerp.usp.br ⁷PhD. Professor at Ribeirão Preto College of Nursing da University of São Paulo. Coordinator of the Operational Research area of the Brazilian Tuberculosis Research Network - REDE TB. Ribeirão Preto, SP, Brazil. tite@eerp.usp.br

INTRODUCTION

Tuberculosis (TB) is an enemy that has been present as a public healthcare problem in Brazil throughout the 20th century, known as *the neglected calamity*⁽¹⁾. The disease was under control until the mid-1980s, being subsequently forgotten by the public healthcare policies, reappearing at the end of that decade with a large number of cases. According to the WHO, it is estimated that TB registers eight million cases and two million deaths annually⁽²⁾.

Throughout the history of healthcare, programs and actions have been created and implemented with the purpose of controlling TB. Since 1993, it has been recommended that countries with high numbers of the disease, with Brazil among them, should adopt the DOTS (Directly Observed Treatment) strategy. This strategy proposes the integration of primary healthcare and continuous adaptation of reforms within the healthcare sector⁽³⁾, consisting of five pillars: bacilloscopic detection of cases among respiratory symptomatic patients seeking general healthcare services; short-length, standardized, directly observable and monitored treatment in the evolution of the disease; regular provision of drugs; a registry and information system that guarantees the evaluation of the treatment; governmental commitment, defining tuberculosis control as a priority among the healthcare policies.

This strategy was proposed in Brazil in 1998, in the National Plan for Tuberculosis Control – *Plano Nacional de Controle da Tuberculose (PNCT)*, aiming at incorporating actions for tuberculosis control within the scope of primary healthcare. This process imposed a reorganization of the actions for TB control in local levels, which, until that time, were organized and managed at national and state levels. The cities were attributed actions such as the planning and execution of most actions, such as qualifying human resources to diagnose and treat cases, organizing the reference and counter-reference mechanisms among the family healthcare units and specialized units, and finally management and monitoring of the information system.

It is worth mentioning that the efficacy of the DOTS strategy lies in observing the five pillars, since they are complementary among themselves. Among them, the WHO acknowledges that a standardized system for data registry and notification⁽³⁾ is an important tool to evaluate the efficacy, efficiency and influence that the services provided may have on the health of the population, being characterized as a powerful instrument to conduct decision-making process and changes in situations with room for improvement⁽⁴⁾.

Traditionally, in Brazil, the production and utilization of information about health, yielding reports about the sanitary situation in each city, was usually performed by the federal or state government, without local participation.

However, the Organic Health Law states that organization and coordination of the Health System Information are shared attributions of the Union, states and cities. The National Disease Notification System – *Sistema de Informação de Agravos de Notificação (SINAN)*, which integrates the Health Information System – *Sistema de Informação em Saúde (SIS)* in the Unified Health System – *Sistema Único de Saúde (SUS)* – is the main source of records of communicable diseases, with tuberculosis among them.

Periodic maintenance, updating, and evaluation of the SINAN databases are fundamental conditions to monitor the epidemiologic situation (morbimortality) of the TB cases. Its effective utilization allows for diagnosing the occurrence of this disease in the population, dynamically⁽⁵⁾. They also allow the healthcare managers and professionals to know the therapeutic results of the cases (cure, abandonment or death), the most incident clinical forms, the rates of pulmonary cases diagnosed by bacilloscopy and geographic distribution of the cases, fundamental pieces of information for the definition of intervention strategies.

It is worth mentioning that the efficacy of the DOTS strategy lies in observing the five pillars, since they are complementary among themselves.

The implantation of the DOTS strategy was initiated in 1999 in the state of Paraíba, and its expansion has occurred as the healthcare network was reorganized, since it is articulated with the Family Healthcare Strategy. Initially, ten cities and towns meeting the following criteria were selected: population over 50 thousand inhabitants, higher bacillary load and reference laboratory support. In 2001, after evaluation and decision by the Center for Endemic Diseases of the State Health Secretariat of Paraíba – *Núcleo de Doenças Endêmicas da Secretaria Estadual de Saúde da Paraíba (NDE-SES/PB)*, the DOTS strategy was implanted in another 20 cities, a result of the agreement between state and city spheres, as a measure to guarantee the implantation, implementation and decentralization of actions for TB control, along with the Family Healthcare Strategy and the Community Healthcare Agents Program⁽⁶⁻⁸⁾.

In a 2006 study evaluating the impact of the implantation of the DOTS strategy in Paraíba, it was evident that there were positive repercussions in the epidemiological indicators of TB. Between 1999 and 2004, the percentage of cure increased from 67.8% to 92%, and the rate of abandonment decreased from 16.6% to 2%, respectively⁽⁸⁾. In addition, limiting factors were identified that tend to weaken the sustainability of the DOTS strategy, such as high turnover in the healthcare staff, professionals that are not qualified to control the disease at the system's entry door, insufficient laboratory support and operational difficulties to handle the information system⁽⁹⁾.

Considering the importance and the complexity of the Health Information Systems, especially SINAN, to make the DOTS strategy feasible, it is important to analyze aspects related to the information system, since it is the main tool used

to subsidize planning, coordination and supervision of the actions for TB control in the scope of primary healthcare.

As such, the necessity of knowing the utilization of SINAN as a tool to evaluate and plan actions for TB control is justified, as well as the identification of the difficulties faced by the local coordinator of the Tuberculosis Control Program – *Programa de Controle da Tuberculose* (PCT) to handle and manage this information system.

Therefore, the purpose of this study was to appreciate the perception of the PCT coordinators in six cities in Paraíba regarding the use of SINAN as instrument for the DOTS strategy.

METHOD

This study is part of the project *Situação da implantação do DOTS para o controle da TB em algumas regiões do Brasil: histórico e peculiaridades de acordo com as características regionais* (Status of the DOTS implementation for TB control in some Brazilian regions: history and particularities according to the regional characteristics). The project involving Brazilian regions was started in 2005, with the state of Paraíba among them.

The field of this study is the state of Paraíba, or, more specifically, the six cities considered priorities by the Ministry of Health for tuberculosis control in this state: João Pessoa (state capital), Campina Grande, Bayeux, Santa Rita, Patos and Cajazeiras.

The qualitative approach was the chosen technical resource, with semi-structured interviews used for data collection. The guiding questions were centered in the use and conduction of the information generated by SINAN, especially those related to TB, as well as the difficulties found. The interviews were held in October and November, 2005, with professionals responsible for the coordination of the PCT in the state and the priority cities, resulting in eight interviews, identified as E1 (state coordination), E2A and E2B (João Pessoa), E3 (Bayeux), E4 (Santa Rita), E5 (Campina Grande), E6 (Patos) and E7 (Cajazeiras).

The interviews were scheduled and held in previously defined places, being recorded upon the respondents' agreement in order to be transcribed afterwards.

The data were analyzed according to the thematic content analysis technique⁽¹⁰⁾, consisting of three stages: pre-analysis, exploration of the material and treatment of the obtained results and its interpretation.

Pre-analysis was the organization stage, where the data were grouped and sorted for later analysis. In this stage, a floating reading was performed upon the interview material. After being sorted, the information became the *corpus* for the continuity of the analysis.

The second stage consisted of the transcription of the interviews and organization of data, after reading them

exhaustively to vertically and horizontally highlight registry units and the relevant themes, conformed by data recurrence. Next, convergent, divergent and repeated contents were articulated among the answers, using excerpts of the interviews in each of the meaning cores identified, which yielded the conformation of the thematic units.

The third stage was the analysis of the data itself. The results were treated, using inference and interpretation, which allowed for the validation of the information obtained previously. The reflection of the discourses and the theory was further analyzed, in an attempt to unveil their *latent contents* instead of focusing only on the *manifested content*, which would allow for the revelation of ideologies and tendencies of the social phenomenon characteristics⁽¹¹⁾.

The project was approved by the Ethics Committee of University of São Paulo at Ribeirão Preto College of Nursing, file #0584/2005.

RESULTS

The obtained results yielded the following thematic units: *Thematic Unit I* – the utilization of SINAN as an instrument of evaluation and planning for actions of tuberculosis control: challenges for the healthcare services and *Thematic Unit II* – Difficulties in handling SINAN as a tool for tuberculosis control in the priority cities of Paraíba.

The utilization of SINAN as an instrument of evaluation and planning for actions of tuberculosis control: challenges for the healthcare services

Increased, qualified healthcare actions within the scope of Primary Care in Brazil, resulting from the implementation of the SUS and the growing decentralization of the services has spread the utilization of the information systems as planning and management instruments⁽¹²⁾. Its systematic, decentralized use contributes for the democratization of information, allowing all healthcare professionals to have access to indicators and making said indicators available to the community. Therefore, it is a relevant instrument to help healthcare planning and define intervention priorities, in addition to allowing for the evaluation of the impact of the decisions⁽⁵⁾.

However, it is known that the data retrieved from SINAN should not be understood as originated from bureaucratic actions, but as something useful for healthcare managers and professionals in the services' routine, being used to monitor and evaluate actions. In this study, which analyzes the utilization of SINAN as an instrument of evaluation and planning for actions of tuberculosis control, it was evident that the information yielded by the system are acknowledged by the PCT coordinators in the studied cities, with the following testimonies being relevant:

... evaluating data about histories and medication, knowing whether the cure rate increased, knowing if the aban-

donment levels are tolerable, and knowing whether our cure rates are appreciable (E3).

... through it [SINAN], we can retrieve reports and have an epidemiologic view of the situation to evaluate the system, as in knowing what is the situation of your city regarding the TB cases, number of cases, abandonment, respiratory symptomatic patients, we have everything we may want (E4).

... evaluation of the situation of the services, the patients rates of cure (E6).

... that would be for the evaluation, for systems of cure, control (E7).

The discourses reveal that the respondents understand that SINAN is a source for evaluating actions of control, used to identify coefficients of morbidity, rates of abandonment and cure in tuberculosis treatment. They also acknowledge the importance of information as a guiding instrument to plan local actions.

... we have that comprehension based on this information, what was improved, what was lacking, and from there we'll outline strategies to revert this situation and improve treatment quality (E4).

... it's very noteworthy for us to define feasible goals, to define strategies to improve treatment quality, and to have a general overview of the whole epidemiologic situation of the city (E4).

... then we know that the information system is the support that we can use to asses, outline goals and schedule actions (E2A).

SINAN defines priorities for primary healthcare – *Atenção Primária à Saúde (APS)* – as information allows for outlining the sanitary situation and provides subsidies to improve technical results. However, prior to being a statistical or epidemiological issue, the choice of indicators or variables to be quantified must be defined by knowing the goals that the cities need to achieve⁽¹³⁾.

Although it is recognized that the data generated by SINAN must be used to monitor the cases of tuberculosis and evaluate the epidemiological situation of the disease at the local level, only two respondents mentioned that they evaluate the information generated by the system monthly.

... we make monthly requests to each unit, and they're already contributing with that (E4).

... now each patient is assessed monthly. The information person sends us a spreadsheet to inform how the control is being performed with that patient, and then there is the final assessment of the treatment, which is the patient's discharge (E6).

The monthly evaluation of the cases of tuberculosis, instituted by the healthcare services, is not a widespread procedure in the studied cities as of yet. It should be noted that this procedure, when adopted, allows for the diagnosis of the monitoring situation of the cases undergoing treat-

ment, with the early identification of problems related to the patients.

However, it is necessary to emphasize that the monthly evaluation depends on regular registries and updates of the databanks. The National Tuberculosis Control Program and the federal, state and city managers state that the local healthcare teams are responsible for recording data and keeping information up-to-date. In addition to filling the notification forms in diagnosed cases of tuberculosis, such notes should also be added to the *book of treatment control*, an instrument used to register the monitoring data (exam results, discharge criteria). This information must be sent to the first computerized level of SINAN every month⁽²⁾. Systematic additions to this databank will make the consolidation of data and emission of the reports possible, so that the city managers can know/publicize the epidemiologic situations, informing percentages of cure, abandonment, death, bankruptcy and transference. These indicators will allow for the assessment of the impact of the interventions, as well as guide the adoption of measures to be implemented.

Difficulties in handling SINAN as a tool for tuberculosis control in the priority cities of Paraíba.

Although the aforementioned legally-defined city attributions show complexity and comprehensiveness that surpass the current technical, administrative and institutional capacities in a large number of Brazilian cities by far, their involvement with the production, processing and analysis of information would tend to improve the reliability of data, in addition to improving the quality of the services provided and the capacity of self-evaluation at a local level⁽¹³⁾.

However, in this study, the interviewees identified weaknesses that jeopardize the stages of production and processing, consequently interfering in the analysis of information. Regarding information production, the testimonies point to the difficulties caused by failure to fill the tuberculosis notification forms:

... the notification form itself is not filled out completely, sometimes the data are inconsistent, incomplete, we know there are failures (E2A).

... we'd get incomplete forms, without the bacilloscopy results (E2B).

... these forms have to be reviewed before being sent to the typists, sometimes the forms are not reviewed, and when we get around to analyzing these data, we can't perform a good analysis, because of the incorrect way in which these forms were filled (E1).

... when we receive [the forms] and see blank fields, we send them back and request them to be filled out correctly (E3).

The lack of information in the notification forms may cause the under-notification of data, as well as generating an incorrect diagnosis of the health situation, interventions that are off the real necessities of the population, even to the point of altering the care to be provided. However, the

correct filling of the data collection instruments is not always perceived by the healthcare professionals as a relevant tool in their working process, seen instead as a bureaucratic activity. This view is not exclusive of the professionals at the local level, being also detected in the healthcare system management as well⁽¹⁴⁾.

Acknowledging TB control as one of the priority actions in APS implies in offering conditions so that the skills of these subjects will not be limited to direct care for patients, neither see the recording of information as a bureaucratic activity. The primary healthcare professionals are the coordinators of healthcare – therefore, the *main keepers of patient information*⁽¹⁵⁾.

One of the aspects that hinder the quality of the notification form filling could be related to professional qualification:

... the story of filling forms is a stumping problem for many cities, but when we qualify those people, the system improves (E5).

... there are weaknesses in every system... but we go to the unit, we talk to the professionals, show them how it's done, and then we try to eliminate these weaknesses (E4).

The testimonies express that improvements in the performance of the professionals in the recording of the information are attributed to the results of educational interventions, showing that the qualification of the team can promote better comprehension about the purpose of the information and a consequent adequacy of the form-filling routine. Quality primary healthcare assumes the presence of qualified professionals to perform their tasks, being capable of responding effectively to the tasks they are entrusted with.

As such, professional qualification and responsibility towards their professional field become extremely important aspects for the dynamic processing of the notification stages in each city, revealing the prevalent and relevant problems, providing actions that are coherent with the necessities of the population under the coverage of the service, avoiding inequities in the offer and access to the healthcare services.

In addition, it should be added that the educational process of the professionals must occur in an integrated way among the different points of the system of healthcare services, since information circulates among several sectors and involves professionals from different areas (family healthcare teams, epidemiological vigilance, and information technology department). Since everybody takes an active part in information construction procedures, it is essential that this process does not occur in a fragmented way.

Regarding the system information flow, some of the interviewees identified the lack of integration between professionals in the epidemiological vigilance and those who deal directly with the computer-processed data.

... there's no integration between vigilance and typists, I believe this is a great difficulty (E1).

It should also be added that some professionals lack the skills to deal with information technology, especially entering records in specific programs. These problems can cause inconsistencies in the databases and consequently put the epidemiological analysis at risk.

... I had difficulties, for example, we'd go there and notified the system about a given patient. When I went there again [to enter the data], the kid there [information technology specialist] said that the data had been erased (E6).

The verification of deficient conditions of infrastructure and information technology, regarding both equipment and qualification of technicians and professionals to operate them *pose an apparent paradox, present in the elucidation of the use of information in the decision-making process*⁽¹⁶⁾.

The search for solutions for problems that are inherent to the information systems must be prioritized by the cities, because the information contained therein can improve the access, adequacy of the social response, participation, quality, sustainability and equity in the healthcare area. The operational effectiveness of the information system can result in the transference of resources and authority to the different instances of the healthcare system, cause a positive impact in the management and different modalities of healthcare and offer opportunities for the reform processes to design and generate new healthcare models, qualification modalities and payment systems, as well as new ways for institutions, unions and academic sectors to participate. That analysis must consider the mission and functions of the state, the healthcare services and the users of the system, regarding the historical and institutional characteristics that are inherent to each national reality⁽¹⁷⁾.

However, it is known that processing and evaluation of the data at the national level by the Ministry of Health depend directly on the cities and state secretariats updating the SINAN databanks regularly. Therefore, if the information systems are not operating adequately, i.e., if there are problems in the configuration of the software or the communication between networks and providers, it may cause errors in the transmission of data, reflecting in the interpretation and analysis of the indicators, interfering in the process of political formulations and implementation of actions.

Problems affecting the conduction and handling of the information systems, especially the lack of qualified personnel and precarious information services, added to the low importance given to information as an essential element of the design and policies of the city, contribute for information to flow slowly through the levels of the system. As an example, delays in the transference of data related to tuberculosis patients were one of the problems observed in the studied cities.

... one of the problems of the city is transference, because [...] all the cases from João Pessoa, as well as from other

cities [...] cause problems in the information, because the causes go back to their home towns. Once there, the people at the computer centers close the cases in their system, but they do not inform us... so we have a transference rate of 36% [...] we can never attain a 85% rating in cure because we have no information (E2A).

... one of the difficulties would be the information of the unit regarding all the patients. The unit (...) registers the case as a cure, but it takes too long to send this information out (E7).

These statements point to causes that show the inconsistency of the case notification records, and, especially, the lack of communication regarding the socialization of information among the cities. This is a concerning issue, because it brings uncertainties about the aggravation of the disease and the health status of each patient, in addition to fragmenting information, making it impossible to achieve the proposed goals.

It should be noted that information about the monitoring of the tuberculosis cases must be updated regularly by the city monitoring the patients instead of the city where they actually reside. The latter will only update the data about the case when it is closed, in order to expose the epidemiologic situation of this aggravation according to the place of residence⁽²⁾.

These difficulties could be avoided with broader integration of the cities, thus overcoming deficiencies, such as records in duplicity and lack of knowledge of the final situation of the cases. For that, it would be necessary, overall, the political decision of triggering a process of change within the healthcare institutions, aiming at implementing administrative decentralization strategies, reorganization and redefinition of the content of the healthcare practices towards the healthcare model that will privilege promotion and vigilance of health⁽¹⁸⁾. Therefore, overcoming such weaknesses incurs on the necessity of increasing knowledge about the

role and function of the local management, which must be understood as an important instrument for the execution of policies⁽¹⁹⁾.

CONCLUSION

The study results show that the actors acknowledge the usefulness of SINAN as an instrument of evaluation and monitoring of actions for tuberculosis control.

The following difficulties were identified to handle and conduct the operations of the information systems: 1) Deficiencies in filling out the tuberculosis notification forms, 2) poor information technology infrastructure, 3) insufficient qualification of human resources; 4) lack of integration between professionals from different areas, 5) deficiencies in the information flow between healthcare units and cities, causing delays in the process of transference of patient data.

The inconsistency in recording information was observed to demonstrate the necessity of seeking more precision and faithfulness in the data, regarding both updates of technologic resources and training and qualifying the involved professionals.

It was also verified that the organization of different points in the implantation of SINAN in the cities causes the disarticulation of the information flow in cases of tuberculosis. This weakness interrupts the information cycle, producing inconsistencies in the results of the evaluation.

Therefore, regarding the *Information Systems* pillar, it is concluded that the commitment of the local managers is fundamental to overcome the identified weaknesses, because these can put the efficiency of the DOTS strategy at risk, since they do not have an adequate standardized system of registering and notification that allows for the safe monitoring of the results of the treatment for each patient.

REFERENCES

1. Ruffino-Netto A. Tuberculose: a calamidade negligenciada. Rev Soc Bras Med Trop. 2002; 35(1):51-8.
2. Brasil. Ministério da Saúde. Secretaria de Vigilância em Saúde. Área Técnica de Pneumologia Sanitária. Plano Nacional de Controle da Tuberculose. Brasília; 2004.
3. World Health Organization (WHO). An expanded DOTS framework for effective tuberculosis control: stop TB communicable disease. Geneva; 2002.
4. Medeiros K. O sistema de informação em saúde como instrumento da política de recursos humanos: um mecanismo importante na detecção das necessidades da força de trabalho para o SUS. Cienc Saúde Coletiva. 2005;10(2):433-40.
5. Ferreira VMB, Portela MC, Vasconcelos MTL. Fatores associados à subnotificação de pacientes com Aids, no Rio de Janeiro, RJ, 1996. Rev Saúde Pública. 2000;34(2):170-7.
6. Lima DS. Documento técnico contendo a implementação da rotina de registro, exames de contatos e acompanhamento das atividades de informação, educação e comunicação, com o desenvolvimento das ações de promoção e prevenção da tuberculose. [Projeto 914BRA1107 – SVS/MS Controle Unesco: 26126, Paraíba – Novembro de 2005]. Brasília: Ministério da Saúde, Secretaria de Vigilância em Saúde; 2005.
7. Paraíba. Secretaria de Estado da Saúde. Relatório de Gestão. João Pessoa; 2001.

8. Sá LD, Figueiredo TMRM, Lima DS, Andrade MN, Queiroga RP, Cardoso MAA, et al. A experiência da implantação da estratégia DOTS em seis municípios paraibanos. In: Ruffino Netto A, Villa TCS. Tuberculose: implantação do DOTS em algumas regiões do Brasil: histórico e peculiaridades regionais. Ribeirão Preto: FMRP; 2006. p.141-66.
9. Andrade MN. O envolvimento dos gestores de saúde na implantação e sustentabilidade da estratégia DOTS nos municípios prioritários para o controle da tuberculose na Paraíba [dissertação]. João Pessoa: Universidade Federal da Paraíba; 2006.
10. Minayo MCS. O desafio do conhecimento: pesquisa qualitativa em saúde. 2ª ed. São Paulo: Hucitec; 1993.
11. Triviños ANS. Introdução à pesquisa em ciências sociais: a pesquisa qualitativa em educação. São Paulo: Atlas; 1990.
12. Almeida MF, Alencar GP. Informações em saúde: necessidade de introdução de mecanismos de gerenciamento dos sistemas. *Inf Epidemiol SUS*. 2000;9(4):241-9.
13. Branco MAF. Sistema de Informação em Saúde no nível local. *Cad Saúde Pública*.1996; 12(2):267-70.
14. Laguardia J, Domingues CMA, Carvalho C, Lauerman CR, Macário E, Glatt R. Sistema de Informação de Agravos de Notificação (SINAN): desafios no desenvolvimento de um sistema de informação em saúde. *Epidemiol Serv Saúde*. 2004;13(3):135-46.
15. Starfield B. Atenção primária: equilíbrio entre necessidades de saúde, serviço e tecnologia. Brasília: UNESCO/Ministério da Saúde; 2002.
16. Cohn A, Westphal MF, Elias PE. Informação e decisão política em saúde. *Rev Saúde Pública*. 2005;39(1):114-21.
17. Hortale VA, Pedroza M., Rosa MLG. Operacionalizando as categorias acesso e descentralização na análise de sistemas de saúde. *Cad Saúde Pública*. 2000;16(1):231-39.
18. Teixeira CF. Epidemiologia e planejamento de saúde. *Cien Saúde Coletiva*.1999;4(2):208-303.
19. Passos JP, Ciosak SI. A concepção dos enfermeiros no processo gerencial em Unidade Básica de Saúde. *Rev Esc Enferm USP*. 2006;40(4):464-8.

Funding Institutions

Conselho Nacional de Desenvolvimento Científico e Tecnológico (Brazilian National Council for Scientific and Technological Development) - CNPq - Milenio II- File #420121/2005-6; Projeto Universal - CNPq - File #480208/04; Institutos do Milênio - File #62.0055/01-4, Padct III milênio - REDE-TB.