

PERFORMANCE INDICATORS OF DOT AT HOME FOR TUBERCULOSIS CONTROL IN A LARGE CITY, SP, BRAZIL¹

Roxana Isabel Cardozo Gonzáles²
Aline Aparecida Monroe³
Ricardo Alexandre Arcêncio³
Mayra Fernanda de Oliveira³
Antonio Ruffino Netto⁴
Tereza Cristina Scatena Villa⁵

Cardozo Gonzáles RI, Monroe AA, Arcêncio RA, Oliveira MF, Ruffino Netto A, Villa TCS. Performance indicators of DOT at home for tuberculosis control in a large city, SP, Brazil. Rev Latino-am Enfermagem 2008 janeiro-fevereiro; 16(1):95-100.

The study had the objective to analyze the performance of the health services that implement the Directly Observed Therapy at home for tuberculosis control. This study analyzed four Tuberculosis Control Programs, referred to as A, B, C, and D, using the following indicators: Resource use; Performance quickness; Monitoring medication administration; Time spent per home visit. Data were collected during visits to 47 patients receiving DOT at home. Resource use was higher in program B (91.3%); program A showed quicker performance (5.8) and more visits during which medication administration was monitored (77.4%); program C had the longest time spent per home visit (14.7 minutes) and program A the shortest (10.4 minutes). The best or worst performance numerically expresses how resources are being used and whether the observation of medication intake is being achieved.

DESCRIPTORS: health programs and plans/standards; directly observed therapy; tuberculosis/control & prevention

INDICADORES DE DESEMPEÑO DEL DOT EN DOMICILIO PARA EL CONTROL DE LA TUBERCULOSIS EN UN MUNICIPIO DE GRAN COMPLEJIDAD, SP, BRASIL

La finalidad del estudio fue analizar el desempeño de los servicios de salud que brindan Tratamientos por observación en domicilio para el control de la tuberculosis. Se estudiaron cuatro Programas de Controle da Tuberculosis identificados como A, B, C y D a partir de los indicadores de Aprovechamiento de recursos; Agilidad en el desempeño; Supervisión de la administración del medicamento y Tiempo utilizado por visita domiciliar. Los datos fueron recolectados durante la visita a 47 enfermos. Se observó que el aprovechamiento de recursos fue mayor en el programa B (91,3%); en el programa A fue observada mayor agilidad (5,8) y mayor porcentaje de visitas con supervisión en la administración del medicamento (77,4%); en el programa C fue mayor el tiempo utilizado por visita (14,7 minutos), siendo este menor para el programa A (10,4 minutos). El mayor o menor desempeño expresa numéricamente la forma cómo los recursos están siendo utilizados, así como el alcance de las metas al respecto de la observación durante la ingestión de medicamentos.

DESCRIPTORES: planes y programas de salud/normas; terapia por observación directa; tuberculosis/control & prevención

INDICADORES DE DESEMPENHO DO DOT NO DOMICÍLIO PARA O CONTROLE DA TUBERCULOSE EM MUNICÍPIO DE GRANDE PORTE, SP, BRASIL

O estudo teve como objetivo analisar o desempenho dos serviços de saúde que executam a Terapia Diretamente Observada (DOT) no domicílio para o controle da tuberculose. Foram estudados quatro Programas de Controle da Tuberculose nomeados como A, B, C e D a partir dos seguintes indicadores: aproveitamento dos recursos; agilidade do desempenho; monitoração da administração da medicação; tempo gasto por visita domiciliar. Os dados foram coletados durante a visita a 47 doentes em DOT no domicílio. Observou-se que o aproveitamento dos recursos foi maior no programa B (91,3%); maior agilidade (5,8) e maior porcentagem de visitas com monitoração da administração da medicação (77,4%) no programa A; maior tempo gasto por visita no programa C (14,7 minutos) e menor no programa A (10,4 minutos). O maior ou menor desempenho expressa numericamente a forma como os recursos estão sendo utilizados e se a observação da ingestão medicamentosa está sendo alcançada.

DESCRITORES: planos e programas de saúde/normas; terapia diretamente observada; tuberculose/prevenção & controle

¹ Paper extracted from the study funded by CAPES, Theme Project FAPESP (process No. 2003/08386-3), Integrated Project CNPq (process No. 500901/2003-1), Padct III millennium/Brazilian Tuberculosis Research Network - REDE-TB (process No. 62.005/01-4); ² Ph.D. in Nursing and Public Health, Researcher; ³ Doctoral Student, University of São Paulo at Ribeirão Preto College of Nursing - WHO Collaborating Centre for Nursing Research Development, Brazil; ⁴ Full Professor, University of São Paulo at Ribeirão Preto Medical School, Deputy coordinator of the Brazilian Tuberculosis Research Network (REDE-TB); ⁵ Full Professor, University of São Paulo at Ribeirão Preto College of Nursing - WHO Collaborating Centre for Nursing Research Development, Brazil; Operational Research Coordinator of the Brazilian Tuberculosis Research Network, e-mail: tite@eerp.usp.br

INTRODUCTION

The World Health Organization (WHO) has widely supported the implementation of the Directly Observed Treatment (DOT) as part of the DOTS strategy (Directly Observed Therapy - Short-course), which aims to favor patient compliance, and to guarantee treatment completion. These two aspects are still the greatest barriers to an effective tuberculosis (TB) management and the cause of increased multidrug resistance⁽¹⁾.

The DOT strategy in Brazil started in 1998 and has been successfully implemented in distinct situations⁽²⁻⁴⁾. The DOT is generally carried out at the patient's home or at the health service.

The DOT or supervised treatment (ST), as a technology to manage tuberculosis control, consists of a group of activities focused on planning the treatment of the patient with tuberculosis and his or her family, which is carried out by a health team. It comprises the following activities: evaluating the patient's sociocultural and economic profile and his or her participation in the therapeutic plan and treatment compliance, observation of medication intake by the health professional or the responsible person, psychological support to the patient and his or her family, search for respiratory symptoms, delivery of incentives, monitoring the patient's health condition through the data registered in the health information system, and other activities.

Choosing the location to carry out the DOT depends on the agreement *established between the health service and the patient and his or her family*; it can occur at home, at the health service, or in other locations.

It is important to state that it is impossible to provide DOT at home without a minimum health service structure that allows for the development of activities inherent to the treatment of the patient with tuberculosis.

Studies about the provision of DOT at home in different countries have shown that the strategy has contributed significantly to treatment compliance and completion,, This was observed in Botswana and Thailand, where cure rates increased with the TB supervision treatment at home⁽⁵⁾.

In Brazil, a study shows that TB treatment compliance depends on the connection and welcoming that health professionals offer to the patient during the ST⁽⁶⁾.

Some studies⁽⁷⁻⁸⁾ attribute that the TB patients' failure to comply with treatment is associated with the fact that the patients have to go to the health service to receive the medication.

It should be stressed that, in addition to its contribution to treatment compliance and completion, providing DOT at home also helps to re-organize the health service and introduces new ways of managing material and human resources, as well as the registration and information system.

OBJECTIVE

Due to the need to understand some aspects regarding the administration and organization of health services that use the DOT strategy for TB control, this study had the objective to:

- analyze health service performance in the TB control through indicators regarding coverage, resource use, performance quickness, monitoring medicine administration, and time spent per home visit in the Tuberculosis Control Programs that perform the DOTS/ST.

METHODOLOGY

This is an exploratory study carried out in a large city (505.012 inhabitants) in the State of São Paulo - Brazil, using indicators to evaluate the performance of the health services that perform the DOT at the patient's home. The Tuberculosis Control Program is managed by a specialized team in each district, and works in reference units. All programs that carry out DOT at home were studied. The city uses specific criteria to include patients in DOT. The health service establishes an agreement with the patient/family regarding the location where supervision will take place, and the choice is usually the patient's home. The frequency of supervision varies and occurs according to the patient's profile, availability of human and material resources, and even the proximity between patient's home and the health service.

With the objective of collecting and analyzing the data, the Tuberculosis Control Programs were named A, B, C, D and characterized according to population, availability of human/material resources, and patients under home DOT as follows.

Table 1 - Characterization of the Tuberculosis Control Programs in the city of Ribeir o Preto, SP

TCP	Population	Human Resources	Material Resource (car)*	Number of patients on home DOT
A	82.771 inh	Professional assigned to DOT	Assigned for DOT about 25 hours/week	11
B	136.906 inh	Professional assigned to DOT	Assigned for DOT about 20 hours/week	16
C	190.000 inh	Professional assigned to DOT	Assigned for DOT about 21 hours/week	15
D	96.761 inh	Professional assigned to DOT	Assigned for DOT about 5 hours/week	5

*The time available for the material resources varies according to the organization of the health service, therefore the average week time was calculated.

The basic focuses used to evaluate medical care quality - Structure-Process-Result⁽⁹⁻¹¹⁾ - were used as the methodological-theoretical approach.

Performance indicators were determined considering the optimization of material and human resources, and the effective observation of medicine intake in the studied programs. Thus, some indicators correspondent to the material and human resources were created to make it possible for the Tuberculosis Control Program of each District unit to execute the DOT. These include facilities, transportation (car), and human resources (driver and health care professional responsible for the DOT in the program), in addition to the essential DOT activity (home visit for Medicine Intake Observation).

The developed TCP performance indicators were: *Resource use* (resource time spent/resource available time); *Performance quickness* (number of home visits carried out per hour available for the DOT resources); *Monitoring medication administration* (number of home visits with Medicine Intake Observation (MIO)/number of home visits for MIO); and *Time spent per home visit* (Time spent for the DOT resources (min)/Total of home visits).

The time available was considered from the moment the car arrived with the driver at the health service to carry out the supervision home visits; and the resource time spent corresponded to the time from the moment the health care professional left the unit until returning to the service. The visits for Medicine Intake Observation (MIO) were those which had as the main objective the observation itself, and home visits with Medicine Intake Observation where those in which the patient ingested the medicine in the presence of the health care professional. It is

important to emphasize that the home visits in the DOT are generally carried out for MIO, however, some visits are carried out to complement patient/family care.

The time spent per home visit included the transportation time of the health care professional to the patient's home and the time used during the visit for treatment supervision.

The data collection was carried out during July 2003, using the Systematic Observation Technique through the follow up of the home visits carried out by the health care professional responsible for supervising the TB patient's home treatment in the four health districts.

This study followed 47 patients from the four health districts who received DOT at home. Of these, 28 were males and 19 were females; 91.49% were pulmonary and 74.47% received treatment for the first time.

In order to comply with the ethical and legal aspects of research involving human beings, determined by Resolution 196/96 of the National Health Council, this research was approved by the Ribeir o Preto College of Nursing Research Ethics Committee.

RESULTS AND DISCUSSION

The performance of the Tuberculosis Control Program in each district that provides DOT at home was analyzed through the indicators created in the study. Considering the importance of human (health care professional supervisor and driver) and material resources (car) to provide DOT at home, the results obtained regarding the indicator resource use in each program are presented.

Table 2 - Resource time utilization of DOT/ST at home by each Tuberculosis Control Program, 2003

Health Service /Programs	Resource time available/Resource time spent
(A)	88.5%
(B)	91.3%
(C)	75.0%
(D)	89.6%

Program **B** show the best utilization (91.3%), followed by **D** (89.6%), **A** (88.5%), and **C** (75.0%).

This means that program **B** had better utilization of the resource time available, both material and human, compared to the other programs.

The highest and lowest resource-use times by the Tuberculosis Control Programs are due to their availability of human and material resources. Programs **A**, **B**, and **C** have a health care professional assigned for the development of the DOT at home activities, while program **D** has only one professional who has the responsibility to carry out other activities inside and outside the health service in addition to the home supervisions. This demanded more time, and made it impossible to carry out visits to the patients at home within the programmed time. Besides, this program does not have a car and a driver assigned only for the execution of the DOT, hence the need for the professional to constantly negotiate the use of such resources with the managerial teams of other programs. It is worth stressing that the health care professionals assigned for the DOT are also responsible for some activities due to the health service needs. Furthermore, sometimes some programs take over the responsibility to carry out the DOT of patients who belong to the city area covered in situations such as vacations, employee leave, or patient's choice to carry out the treatment at a determined health service. This occurred in program **C**.

The internal service organization itself can also affect resource use, since it lacks a systematic planning of the number of patients to be supervised for daily MIO. Other factors affecting appropriate resource use includes delays in the professionals' departure from the health service or the car arriving to the service late, and the lack of a professional specifically assigned to carry out the DOT at the time planned. Carrying out the DOT demands reorganizing the service's internal activities, both due to the need of a minimum structure (car, driver and assigned health professional supervisor) to develop the activities related to TB patient home treatment, and to guarantee the continuation of activities performed within the health service. This reorganization takes place through the availability of human and material resources available in the health service and the patient's and family's needs.

Both the lack of resources to perform the DOT and the non-systematization of activities related to the DOT cause delays in the professional's departure from the health service to visit the patient's home. Therefore, there is a reduction in the time to carry out DOT activities, which can affect the quality of the care provided to the TB patient.

Regarding the indicator **performance quickness**, the study found that, of the four programs, program **A** presented a higher average number of home visits (5.8), as observed in the following table.

Table 3 - Average number of home visits per health unit according to DOT/ST resource hour spent

Health service	Average number of HV/DOT/ST at home resource hour spent
(A)	5.8
(B)	4.4
(C)	4.1
(D)	4.5

Program **C** had the smallest number of home visits (4.1). This is likely due to the large territory dimension of the health unit covered by the program. This situation demands more transportation time to supervise patients living in distant neighborhoods, and implies that the program's health team sometimes performs the supervision of patients belonging to other areas.

Program **A** covered the smallest territory. This explains the greater number of home visits observed in the program, compared to the other programs, since the houses were located in the same neighborhood or blocks, or patients lived in the same household (three families). Thus, it is observed that facilitators regarding the supervision of a greater number of patients could be the size of the territory and the proximity of the health service to the homes.

It is also important to state longer resource utilization times represent a longer period for the health professional to visit patient homes. Therefore, the lack of performance quickness in program **C** can also be attributed to the shorter time of resource utilization in this program.

Other factors affecting performance quickness can be related to DOT coverage and frequency. Therefore, the program with the greatest number of patients in DOT at home with daily supervision will also have the greatest number of visits.

Regarding the monitoring of medication administration, program **A** reached a greater percentage of visits with medicine intake observation (77.4%), as observed in the following chart:

Table 4 - Percentage of home visits with medicine intake observation by Tuberculosis Control Program in the city of Ribeirão Preto, SP, 2003

Health Service	Number of HV with MIO/number of HV for MIO
(A)	77.4%
(B)	54.8%
(C)	66.0%
(D)	64.1%

The low percentage of visits with MIO found is due to the *absence of the patient* at the moment of the home visit. In program **A**, 39.9% of patients were absent during the visit, in program **B**: 40.0%; **C**: 56.4%; **D**: 100.0%. It is important to note that it is considered a visit with MIO only when the professional effectively observed the patient ingesting the medicine.

The failures to find the patients at the moment of the visits can be related to the limited visiting time, the house supervision planning which does not take into account the preferences/needs of the patient and his or her social-cultural environment. Health care must consider the needs and preferences of the patients to facilitate the access and treatment compliance⁽¹²⁾.

A study carried out in a large city in the State of S o Paulo, regarding the patient's perception about the DOT at home, showed the dependence on the visiting schedule for MIO of the health professional as a weakness of DOT. This situation could be improved if other social entities were included in the therapeutic process (patient's family, cured patients, members of the community, and others⁽¹³⁾).

It is important to state that the *monitoring of medicine intake*, in the studied city, privileges the MIO. However, other complementary activities are carried (delivery of incentives, health surveillance, request of bacilloscopy control, contact evaluation, psychosocial support, and others). These activities are fundamental for the patient's compliance within the family context, once home supervision involves the interaction with a bio-psycho-social reality, including the cultural repertory and magical-religious beliefs of each family member⁽¹⁴⁾. This interaction usually determines and limits the degree of co-responsibility of the patient and his or her family with health care. It is necessary for health care professionals, administrators and educators to change their way of thinking and acting aiming to provide comprehensive and humanistic care.

It is fundamental to advance to an interdisciplinary approach and to explore psychological and social-cultural determinants of the disease. This would help to develop appropriate and effective interventions to detect cases and treatment, looking at the patient within the community's context and making them motivated to solve the health problems, instead of being concerned exclusively with the search for better ways to control medicine intake⁽¹⁵⁾.

The current health models for the control of infectious diseases, including TB, are specifically and vertically directed to the disease, focusing only on the short term results (cure rates) as opposed to health promotion. Disease control remains a priority exclusive to the health field. Other political and social sectors are not necessarily deemed relevant to the control of infectious diseases⁽¹⁶⁾.

Regarding the indicator time spent per home visit in the programs. It was observed that the time was longer in program **C** (14.7 minutes), and shorter in program **A** (10.4 minutes). The longer time spent per home visit in program **C** may have happened due to the longer resource time available in this program. The shorter time spent observed in program **A** can be explained by the smallest resource utilization time (88.5%) of this program.

Human and material resource time available is an important factor to perform the DOT at the patient's home, considering the need to establish a connection and co-responsibility between the health care professional and the patient/family. This allows for a different approach to other problems and/or needs that go beyond the therapeutic plan. It is important to state that the success of these activities can be related to the time within which they are operated. Having more time to carry out home visits can provide better conditions for the planning and development of activities in the DOT, including the patient's, family's and community's education itself. Thus, they can become multipliers of knowledge for an active participation in the development of health actions to control the disease.

CONCLUSIONS

The study enabled the creation and use of some specific indicators related to resource use, performance quickness, monitoring medication administration, and time spent per home visit. It enabled a closer analysis of the performance of the Tuberculosis Control Programs that carried out the DOT at home, as well as to understand some aspects of the management and organization of the health care services that use the DOT strategy in TB control.

The results show that program **B** had a better performance regarding resource use; program **A** achieved better performance in quickness and monitoring medicine intake. Regarding the time spent

per home visit, program **C** showed the longest time. Note that higher and lower performance do not necessarily mean better or worse quality in the service provided, rather it is the numerical expression of the way resources are being used and if home visits are reaching their goal.

The availability of human and material resources in the health service affected their optimization, as well as the effectiveness of the activities to follow the patient's treatment. As a result, the performance of the Tuberculosis Control Programs that use the DOT at home were also affected.

Supervision activities are still mainly focused on the observation of medicine intake. However, it is important to emphasize that during the development of this action (it was observed that other activities were carried out) it is possible to perform complementary interventions such as epidemic surveillance actions (search for contacts and individuals with respiratory symptoms), social support activities, and others.

Therefore, it is considered relevant to review the health care practice in the development of this

strategy in order to promote comprehensive care, emphasizing not only MIO, but also preventive actions and health protection.

Providing DOT at home requires permanent qualification and supervision of the professionals involved in TB patient and family care. In addition, new knowledge should be obtained for planning and executing health actions and articulating health care between the health service and the patient and family.

It is necessary to review the resource management and health care action plans to provide DOT at home with the objective of using the available resources in a rational fashion, and assure access to different levels and services of the health system that meet the social, cultural and economic needs of the TB patient/family.

Finally, the adoption of the DOT at home must consider the location of the service, the work organization of the team responsible for the treatment, planning, systemizing supervision activities, and administrating the service needed to assure the optimization of human and material resources in the program as well as the fulfillment of the supervision activities.

REFERENCES

1. Davies PD. The role of DOTS in tuberculosis treatment and control. *Am J Respir Med* 2003; 2(3):203-9.
2. Morrone N, Solha MS, Cruvinel MC, Morrone N Junior, Freire J AS, Barbosa ZLM. Tuberculose: tratamento supervisionado "versus" tratamento auto-administrado. *J Pneumol* 1999; 25(4):198-206.
3. Muniz JN, Villa TCS. O impacto epidemiol gico do tratamento supervisionado no controle da tuberculose em Ribeir o Preto (1998-2000). *Bol Pneumol Sanit* 2002; 10(1):49-54.
4. Hino P, Santos CB, Villa TCS, Muniz JN, Monroe AA. Tuberculosis patients submitted to supervised supervised treatment. *Rev Latino-am Enferm* 2005 janeiro-fevereiro; 13(1):27-31.
5. Kamolratanakul P, Sawert H, Lertmaharit S, Kasetjaroen Y, Akksilp S, Tulaporn C, et al. Randomized controlled trial of directly observed treatment (DOT) for patients with pulmonary tuberculosis in Thailand. *Trans R Soc Trop Med Hyg* 1999 September-October; 93(5):552-7.
6. Bertollozi MR. A ades o ao tratamento da tuberculose na perspectiva da estrat gia do tratamento diretamente observado (DOTS) no munic pio de S o Paulo-SP. Tese (livre doc ncia). S o Paulo: Escola de Enfermagem/USP; 2005.
7. Kaona FAD, Tuba M, Siziya S, Sikaona L. An assessment of factor contributing to treatment adherence and knowledge of TB transmission among patients on TB treatment. *BMC Public Health* 2004 December; 4:68.
8. Singh V, Jaiswal A, Porter JDH, Ogden JA, Sarin R, Sharma PP, et al. TB control, poverty, and vulnerability in Delhi, India. *Trop Med Int Health* 2002 August; 7(8):693-700.
9. Donabedian A. The definition of quality and approaches to its assessment. Michigan: Health Administration Press; 1980.
10. Tanaka O, Melo C. Avalia o de Programas de Sa de do Adolescente: um modo de fazer. S o Paulo(SP): Edusp; 2001.
11. Starfield B. Aten o Prim ria: equil brio entre necessidades de sa de, servi os e tecnologia. Bras lia: Minist rio da Sa de, Unesco; 2002.
12. Volmink J, Matchaba P, Gamer P. Directly observed therapy and treatment adherence. *Lancet* 2000 April; 355(9212):1345-50.
13. Vendramini SHF, Villa TCS, Palha PF, Monroe AA. Tratamento supervisionado no controle da tuberculose em uma unidade de sa de de Ribeir o Preto: a percep o do doente. *Bol Pneumol Sanit* 2002 janeiro-junho; 10(1):5-12.
14. Monroe AA, Cardozo-Gonzales RI, Sasaki CM, Ruffino-Netto A, Villa TCS. Gerenciamento de caso ao doente/fam lia com tuberculose: uma estrat gia de sistematiza o do cuidado no domic lio. *J Bras Pneumol* 2005 janeiro-fevereiro; 31(1):91-2.
15. Lienhardt C, Ogden JA. Tuberculosis control in resource - poor countries: have we reached the limits of the universal paradigm? *Trop Med Int Health* 2004 July; 9(7):833-41.
16. Porter J, Ogden J, Pronyk P. Infectious disease policy: towards the production of health. *Health Policy Plan* 1999 December; 14(4):322-8.