# Original Article

# Food baskets given to tuberculosis patients at a primary health care clinic in the city of Duque de Caxias, Brazil: effect on treatment outcomes*

## Efeito do incentivo alimentício sobre o desfecho do tratamento de pacientes com tuberculose em uma unidade primária de saúde no município de Duque de Caxias, Rio de Janeiro

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## Abstract

**Objective:** To evaluate the effect that the distribution of food baskets to tuberculosis (TB) patients has on treatment outcomes at a primary health care clinic. **Methods:** Retrospective comparative study of the medical and social aspects of 142 patients at a primary health care clinic in the city of Duque de Caxias, Brazil. The patients were divided into two groups: the first group included 68 patients treated with standard regimens (between September of 2001 and December of 2003); and the second group included 74 patients treated with the same regimens but also receiving food baskets on a monthly basis (between January of 2004 and July of 2006). **Results:** The statistical comparison between the two groups revealed that the cure rate was higher in the group receiving the food baskets (87.1% *vs.* 69.7%), whereas the rate of noncompliance was markedly lower (12.9% *vs.* 30.3%). **Conclusions:** The results indicate that the distribution of food baskets can be a useful strategy to improve compliance with TB treatment at primary health care clinics.

**Keywords:** Tuberculosis; Nutritional support; Treatment outcome; Ambulatory health services.

## Resumo

**Objetivo:** Avaliar os efeitos da distribuição de cestas básicas para pacientes com tuberculose (TB) no desfecho do tratamento em uma unidade primária de saúde. **Métodos:** Estudo retrospectivo, de caráter comparativo, incluindo aspectos médicos e sociais de 142 pacientes de uma unidade primária de saúde da cidade de Duque de Caxias, RJ, divididos em dois grupos: o primeiro incluiu 68 indivíduos tratados com regimes padrão (entre setembro de 2001 e dezembro de 2003), e o segundo incluiu 74 indivíduos tratados com os mesmos regimes e que adicionalmente receberam cestas básicas mensalmente (entre janeiro de 2004 e julho de 2006). **Resultados:** A comparação estatística entre os grupos revelou um aumento na taxa de cura (69,7% *vs.* 87,1%) e uma acentuada redução na taxa de abandono (30,3% *vs.* 12,9%) com o fornecimento de cestas básicas. **Conclusões:** Os resultados indicam que o fornecimento de cestas básicas pode ser útil como estratégia para aumentar a adesão ao tratamento da TB em unidades primárias de saúde.

**Descritores:** Tuberculose; Apoio nutricional; Resultado de tratamento; Serviços ambulatoriais de saúde.

## Introduction

In developing countries, such as Brazil, tuberculosis (TB) continues to be a problem for which there is no easy solution.[1] There being no short-term perspective of improvement in the living conditions of the population, the policy of prevention and control of the disease depends on early diagnosis and successful treatment as strategies to combat TB in endemic areas.

However, the deficiencies of the Brazilian Unified Health Care System have had a negative effect on the official statistics. In the state of Rio de Janeiro, Brazil, for instance, the incidence rate is 99/100,000 inhabitants; the percentage of cure is 65%, and treatment abandonment rates are as high as 30% in some cities.[2] With these numbers, this state stands out in the Brazilian scenario for accounting for approximately 20% of the cases in the country and detaining nine priority cities of the Brazilian National Ministry of Health (NMH), where the goals of disease control have not been reached.[3] Among the aforementioned goals, the reduction of the treatment abandonment rate is of great importance for the success of the governmental interventions. Therefore, the identification of mechanisms which increase the adherence to chemotherapy plays a decisive role in improving the TB epidemiology in Brazil.

The objective of the present study was to delineate a general profile of the sample and estimate the rates of cure and treatment abandonment in TB outpatients at a primary health care clinic in the city of Duque de Caxias—in the greater metropolitan region of the city of Rio de Janeiro. Patients treated during two distinct periods were observed in order to determine the effect, in terms of the efficacy of the treatment (rates of cure and treatment abandonment), of the food incentive offered in the latter period.

## Methods

Between September of 2001 and July of 2006, a retrospective comparative study involving TB patients under outpatient treatment was conducted at the Dr. Antônio Granja Municipal Health Care Center (DAG-MHCC) in the Parque Fluminense district of the city of Duque de Caxias, Brazil. The DAG-MHCC is a primary health care clinic at which the Tuberculosis Control Program, which employs the traditional method of self-administered treatment, was implemented in 2001.

All patients ≥ 15 years age and meeting the criteria for a confirmed diagnosis of TB[4] were included (n = 142). The sample was divided into two groups. The first group comprised 68 individuals treated between September of 2001 and December of 2003, consisting of those who received only the standard chemotherapy recommended by the NMH (treatment-only group).[4] The second group comprised 74 individuals treated between of 2004 and July of 2006, consisting of those who, in addition to the same chemotherapy regimen administered in the first group, received baskets of non-perishable food, distributed on a monthly basis through the DAG-MHCC, at a unit cost—in Brazilian reais (R$)—of R$30.00 (treatment+food baskets group).

In the observed period, there were no changes in the chemotherapeutic regimens,[4] in the physical aspect of the health care clinic or in the medical/nursing staff of the program. All data were obtained through research in the medical charts and the following variables were statistically compared: gender; age (in years); place of residence (Parque Fluminense or

**Table 1 –** Statistical analysis of the sociodemographic variables of the tuberculosis patients treated at the Dr. Antônio Granja Municipal Health Care Center, Parque Fluminense, Duque de Caxias, Brazil, divided into two study groups.

| Variable | Treatment-only | Treatment + food baskets | p |
|---|---|---|---|
| Gender | | | |
| Male | 36 (52.9) | 47 (63.5) | 0.20 |
| Female | 32 (47.1) | 27 (36.5) | |
| Residence | | | |
| Parque Fluminense | 17 (25.0) | 23 (31.1) | 0.42 |
| Other districts | 51 (75.0) | 51 (68.9) | |
| Marital status | | | |
| Single | 13 (44.8) | 19 (45.2) | |
| Married | 16 (55.2) | 23 (54.8) | |
| History of TB | | | |
| Yes | 12 (19.1) | 16 (23.9) | 0.50 |
| No | 51 (80.9) | 51 (76.1) | |
| Contact with TB | | | |
| Yes | 10 (32.3) | 7 (36.8) | 0.74 |
| No | 21 (67.7) | 12 (63.2) | |

TB: tuberculosis. Data presented as n (%).

another district); marital status (single, married, separated or widow/widower); TB history; history of contact with TB; place of diagnosis (at the DAG-MHCC or at another clinic); associated diseases; HIV serology; time since symptom onset (in days); sputum smear microscopy result; tuberculin skin test result (in mm); extent of TB on X-ray (bilateral, right unilateral, left unilateral or without alterations); treatment regimen (regimen 1, 1R or other); adverse effects of the chemotherapy (absent, mild or severe); and treatment outcome (cure, treatment abandonment, treatment failure or death).

The comparison of the categorical variables studied was demonstrated in percentages in the two groups, and the statistical analysis was carried out using the chi-square test. The level of statistical significance was set at 5%. The statistical analysis was carried out with the Statistical Analysis System program, version 6.04 (SAS Institute Inc., Cary, NC, USA).

The study was approved by the Research Ethics Committee of the Federal University of Rio de Janeiro Clementino Fraga Filho University Hospital.

## Results

There were 142 patients: 68 (47.9%) in the treatment-only group and 74 (52.1%) in the treatment+food baskets group; 83 (58.5%) patients were male, and 59 (41.5%) were female. The population presented homogeneous statistical distribution in the two groups, male patients accounting for approximately two thirds of the sample (Table 1). The mean age was 37.3 years (range, 15-82 years).

Of the 142 patients, 40 (28.2%) resided near the DAG-MHCC, and 102 (71.8%) resided in other districts. Table 1 shows that this distribution was uniform in both groups.

There was great loss of information in the variable "marital status". There were records for only 79 patients, among whom single (32/79; 40.5%) and married patients (39/79; 49.4%) predominated. Separated and widow/widower patients together accounted for approximately 10% of the sample. The statistical analysis showed that this distribution was similar in the two groups (Table 1).

Of the 130 reporting patients, 28 (21.5%) stated that they had a history of TB, and the distribution did not vary over time. Household

contact was only identified in 50 individuals, with 17 positive responses (34%).

Regarding the current aspects, Table 2 shows that there was great similarity between the studied groups. The DAG-MHCC predominated as the place of diagnosis, accounting for the diagnosis of 108 patients (76.1%), of whom 48 (70.6%) were in the treatment-only group and 60 (81.1%) were in the treatment+food baskets group.

Although the occurrence of the variable "associated diseases" was high in the general population (38%), its distribution was unequal. Half of the patients in the treatment-only group reported at least one pulmonary or systemic pathology. In the treatment+food baskets group, this percentage dropped to 27% (p = 0.005), a statistically significant difference (Table 2).

**Table 2 –** Statistical analysis of the variables related to diagnosis of the tuberculosis patients treated at the Dr. Antônio Granja Municipal Health Care Center, Parque Fluminense, Duque de Caxias, Brazil, divided into two study groups.

| Variable | Treatment-only | Treatment + food baskets | p |
|---|---|---|---|
| Place of diagnosis | | | |
| DAG-MHCC | 48 (70.6) | 60 (81.1) | 0.14 |
| Another health care clinic | 20 (29.4) | 14 (18.9) | |
| Associated diseases | | | |
| Yes | 34 (50.0) | 20 (27.0) | 0.005 |
| No | 34 (50.0) | 54 (73.0) | |
| HIV serology | | | |
| Positive | 1 (4.2) | 2 (4.4) | NR* |
| Negative | 23 (95.8) | 43 (95.6) | |
| Time since symptom onset | | | |
| ≤ 90 days | 35 (62.5) | 34 (61.8) | 0.94 |
| > 90 days | 21 (37.5) | 21 (38.2) | |
| Sputum smear microscopy | | | |
| Positive | 31 (47.7) | 30 (40.5) | 0.39 |
| Negative/NP | 34 (52.3) | 44 (59.5) | |
| Tuberculin skin testing[a] | | | |
| Nonreactor | 11 (33.3) | 7 (16.7) | 0.093 |
| Reactor | 22 (66.7) | 35 (83.3) | |
| Radiological extension | | | |
| Bilateral | 26 (41.3) | 34 (48.6) | 0.39 |
| Unilateral | 37 (58.7) | 36 (51.4) | |

DAG-MHCC: Dr. Antônio Granja municipal health care center; NP: not performed. Data presented as n (%). [a]Nonreactor: 0-4 mm; reactor: > 4 mm. *NP due to the small number of positive results.

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Sixty-nine patients were submitted to HIV serology, and there were only 3 (4.3%) positive results, which precluded the application of the statistical test.

Regarding the current disease, the time since symptom onset was reported in 111 patients; median time was 90 days (range, 7-720 days). There were no statistical differences between the groups, being inferior to 90 days in approximately 60% of the cases (Table 2). Our study also evaluated the principal diagnostic tests for TB in the outpatient population. Sputum smear microscopy was performed in 86 patients (61.9%) and was positive in 61 (70.9%) patients. There were no statistically significant differences in positivity between the studied groups (Table 2). The tuberculin skin test was performed in 75 patients, and the mean induration was 9.8 mm. When analyzed by reaction ranges, the tuberculin skin test results were strongly positive in nearly 60% of the patients, and there were no statistical differences among reactors and nonreactors in either group (Table 2). Chest X-rays were performed in 137 patients. The radiological study showed that the involvement wasbilateral in 60 patients (43.8%) and unilateral in 70 (53.3%). The chest X-ray findings were normal in 4 patients (2.9%), all of whom had the extrapulmonary form of TB. The statistical analysis of the chest X-ray findings revealed relative equality in the distribution of the degree of involvement (Table 2).

**Table 3 –** Statistical analysis of the variables related to chemotherapy and to the result of the treatment of the tuberculosis patients treated at the Dr. Antônio Granja Municipal Health Care Center, Parque Fluminense, Duque de Caxias, Brazil, divided into two study groups.

| Variable | Treatment-only | Treatment + food baskets | p |
|---|---|---|---|
| Treatment regimen | | | |
| Regimen 1 | 55 (80.9) | 59 (80.8) | 0.99 |
| Regimen 1R | 13 (19.1) | 14 (19.2) | |
| Side effects | | | |
| Absent/mild | 61 (91.0) | 66 (89.2) | 0.71 |
| Severe | 6 (9.0) | 8 (10.8) | |
| Outcome | | | |
| Cure | 46 (69.7) | 61 (87.1) | 0.013 |
| Treatment abandonment | 20 (30.3) | 9 (12.9) | |

Data presented as n (%).

The treatment regimens initially employed were regimen 1 (114 patients; 80.3%) and regimen 1R (27 patients; 19%). One patient (0.7%) presented treatment failure and was treated with regimen III. Tolerance to chemotherapy was satisfactory, since only in this last case the temporary discontinuation or cessation of the treatment was necessary. Adverse effects were absent in 56 patients (39.7%), mild in 71 (50.4%) and severe in 14 (9.9%). Again, there were no statistical differences between the groups (Table 3).

The treatment outcomes were as follows: cure, in 107 patients (75.4%); treatment abandonment, in 29 (20.4%); treatment failure, in 1 (0.7%); and death, in 5 (3.5%). When cure and treatment abandonment were analyzed in isolation, a statistically significant difference was found between the two groups (Table 3). In the treatment-only group, 46 patients (69.7%) were cured and 20 patients (30.3%) abandoned the treatment, whereas in the treatment+food baskets group, 61 patients (87.1%) were cured and only 9 patients (12.9%) abandoned the treatment (p = 0.013), showing a strong statistical difference between them.

## Discussion

Despite the methodological limitations, such as the use of a secondary source of information, the non-simultaneous temporality of the groups and the retrospective nature of the study, it can be concluded that the tested intervention, that is, the distribution of food baskets, significantly increased treatment adherence. It is presumed that, somehow, the distribution of supplementary food must have reduced the interference of socioeconomic factors, such as the low level of education, unemployment, low income and hunger, implied in the treatment abandonment question.

Obtaining success in adherence to TB treatment remains a challenge. Within the complexity of the factors involved, aspects of the very disease, of the patient and of the health service are involved. The treatment abandonment experience has even generated a prediction model.[5] In this model, sputum smear microscopy, unemployment, alcoholism and lack of access to the clinic were determinants of treatment failure. Similar difficulties were also found in a study conducted at a university hospital,[6]

where difficult physician-patient relationships, limited access and lack of home visits increased treatment abandonment rates. In a study on deaths attributed to TB among patients treated at health care clinics in the metropolitan region of Rio de Janeiro,[7] the result of this equation was shown: low detection of the disease, high treatment abandonment rates and failure to comply with consensual norms in managing the cases. Comparing these characteristics with those found in the present study, it is possible to presume that at least two of those are related to the treatment abandonment at the health care clinic evaluated: limited access to treatment, represented by the 70% of the patients residing in other districts, of which 24% were diagnosed in another facility; and a low rate of positivity on sputum smear microscopy (approximately 44%). Within this context, various authors have attempted to define the incentives to adhere to treatment.[8-10] Among poor populations in the United States, financial and nonfinancial incentives have both been shown to improve adherence to the supervised treatment known as directly observed therapy, short-course (DOTS).[9] Another study conducted in the United States showed that the increasing number of benefits offered during treatment resulted in an inversely proportional decrease in treatment abandonment rates.[10] Although it is a different TB control strategy, food basket distribution resulted in similar levels of adherence (greater than 80%) in the present study. In the 1990s, as a result of these analyses, the health administrators of many American states adopted the use of many types of incentives—principally in the form of transportation passes, clothing and food—in order to improve cure rates and control TB in endemic areas.[11] In developing countries, the preoccupation with adherence to treatment has also motivated studies aimed at identifying the principal factors involved.[8,12,13] Socioeconomic aspects and obstacles to obtaining treatment, as well as limited understanding of the disease and of chemotherapy, were found to be common factors. In the present study, a more specific approach was not taken, due to the lack of such data on the medical charts. There is a real need for further studies on these questions in Brazil.

In Brazil, more precisely in the state of Rio de Janeiro, where the state of the public health care system is often precarious, the variables of the system, such as the delay of the implementation of the DOTS strategy, the poor rapport between the patient and the health care staff, the lack of home visits, problems in scheduling medical appointments, inefficient distribution of medication and obstacles to the performance of tests (radiological and biochemical), should be carefully analyzed. These factors are present at all levels of treatment,[6,7,11] and are reported by the patients themselves when called upon to give their opinions.[14] However, the situation in other states, such as the state of São Paulo,[15,16] is different, especially in terms of the implementation of the DOTS strategy, indicating the important roles that incentives and the political commitment of governments play in identifying problems and in the appropriate response of health care clinics.

In the present study, it was possible to estimate the beneficial effect that a simple incentive (food basket distribution) has on the rates of cure and treatment abandonment at a primary health care clinic. The population treated was homogeneous, there were no changes in the program staff or in the chemotherapy, and were no physical renovations in the health care clinic. Therefore, we can suggest that the aforementioned incentive was the only cause of the observed change. On the basis of our findings, we can conclude that, in Brazil, the adoption of measures to motivate adherence to treatment can be useful in reaching the goals set by the World Health Organization,[1] despite the fact that other social and structural improvements are still needed. Complementary studies, with appropriate methodological designs, should be carried out in order to confirm our hypothesis.

## Acknowledgments

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