

COSTS-OF-ILLNESS EVALUATION METHODOLOGY DUE TO TUBERCULOSIS IN HOMELESS ADULTS IN BUCHAREST

NICOLETA VALENTINA CIORAN¹, DANA GALIETA MINCĂ²,
LĂCRĂMIOARA AURELIA BRÎNDUȘ³

^{1,2,3} "Carol Davila" University of Medicine and Pharmacy București

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Abstract: Homeless adults (HA) are a vulnerable population group, living in poor socio-economic conditions, with a low interaction with health services. The World Health Organization (WHO) stated that in the industrialized countries, the incidence in HA can be over 20 times higher than in the general population.(1) This study aimed at analysing a cohort of HA suffering from tuberculosis (TB) in Bucharest in 2013 to establish a costing model due to detecting, monitoring and treatment of disease in these patients. In conclusion, HA require more days of hospitalization (average length of stay is 3.3 times higher than sensitive TB in the general population) with higher costs. The duration of TB treatment regime I or II is up to 11 months (usually lasts 6 or 8 months), which also leads to higher costs.

INTRODUCTION

Homeless adults (HA) represent a vulnerable population group, often with polymorbidity, and they have a weak immunity due to poor living conditions, interest in preventive medicine and health promotion actions are almost non-existent (2), tuberculosis (TB) in these individuals representing a problem of interest not only medical but also social. The incidence in HA in industrialized countries can be over 20 times higher than in the general population as the World Health Organization (WHO) stated in 2009.(1) Compliance with treatment is low, more so in the case of TB, which requires treatment for at least 6 months, with periods of 2-3 months or even more, of daily treatment.(1,3,4,5)

The tuberculosis treatment, in our country, is free for all patients, regardless of their social status and starting in 2013, the purchase of medicines and sanitary materials necessary for the National Programme for Prevention, Surveillance and Control of Tuberculosis (NPPSCT), was again centralized, as specified in the Order no. 422/2013 on the amendment and completion of the Technical regulations of implementing the national public health programmes for the years 2013 and 2014.(6,7)

PURPOSE

The purpose of this study was to generate a model for determining the costs of tuberculosis in HA, and the proposed objectives were to analyse these people in terms of socio-demographic and clinical characteristics, as well as to assess the direct costs arising from the healthcare provided to such persons.

MATERIALS AND METHODS

The methodology was a descriptive approach to HA suffering from TB, reported in 2013 in Bucharest. Data were collected from the reporting sheets of the outpatient TB care in the sectors of Bucharest and from the electronic database of the NPPSCT for such cases but not all patients listed as "homeless"

- some of them had identity cards (ID).

In the calculation of costs, there have been taken into account the costs directly determined strictly for detection, monitoring and treatment of patients with TB, and there was not taken into account the cost of epidemiological investigations carried out in each case, the cost of investigations conducted for persons who were in contact with cases of tuberculosis, the cost of other sanitary materials consumed, nor the cost for HIV testing.

The direct cost for a patient is revealed from summing: the cost of the pulmonology clinical examination of RON 16 + the cost of a pulmonary x-ray of RON 27 + the cost of the bacteriological examination - microscopy RON 17 and culture RON 54 + the cost of an drug sensitivity test (DST) which, for the short series (isoniazid, rifampicin) is of RON 102 and for a long series (and second line drugs) is of RON 841 + the maximum cost of a day of hospitalization, which in 2013 was of RON 231 for sensitive TB cases and RON 1900 for multidrug-resistant tuberculosis cases (MDR-TB), includes accommodation, payment of the medical personnel, tests that are not covered by the Ministry of Health for a TB case (except for an x-ray, bacteriological -bK- examination and adjuvant medication) + the average cost for a treated TB patient per year is of RON 491 (regimen I, II, individualized, but not for MDR-TB)/ a patient with MDR-TB in the intensive phase is of RON 10470, and in the continuation phase is of RON 710 (RON 11 180 for 24 months).(7)

The data was summarized in a database in Excel and its processing was performed using SPSS version 19, and Microsoft Excel, including the descriptive statistics analysis of socio-demographic and clinical data, as well as concerning the assessment of direct costs.

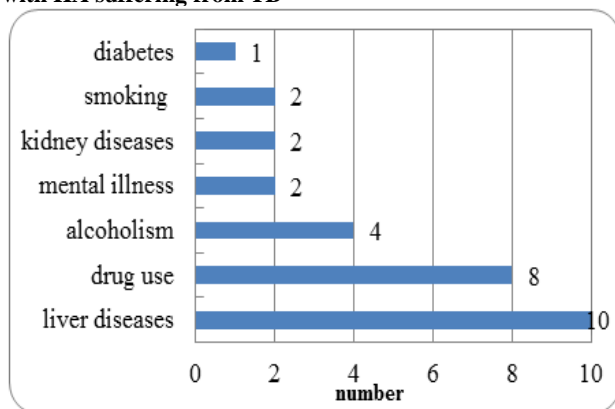
RESULTS

The HA declared in 2013 in Bucharest were 45 in number, of which 36 men, the average age being of 43.64 ± 11.91 years, the median age was of 44 years old; 43 of them

¹Corresponding author: Nicoleta Valentina Cioran, Str. Leonte Anastasievici, Nr. 1-3, Sector 5, București, România, E-mail: nico_cioran@yahoo.com, Phone: +40745 419994
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were pulmonary cases, 2 extrapulmonary cases, and in terms of categorizing them, there were 30 new cases (including those 2 extrapulmonary cases), 8 relapses, 6 defaults and 1 failure. Depending on the sector in Bucharest in which they were detected, 17 of them are from sector 4, 14 from sector 1, 12 from sector 2 and 2 from sector 6.

Figure no. 1. Distribution of medical conditions associated with HA suffering from TB



The most common associated conditions in these patients were liver diseases - 10, drug use - 8 and alcoholism in 4 of them, but also mental illness and kidney diseases in 2 patients, smoking - 2 patients and diabetes - 1 (figure no. 1).

Of the 33 patients tested for an association with HIV, 15 were positive and 14 of them were receiving antiretroviral treatment. 3 of the HA suffered from multidrug-resistant tuberculosis and 2 of them from isoniazid-mono-resistant tuberculosis.

The detection cost for an HA patient declared in 2013 was of RON 43 (RON 1 935 in total) - clinical examination and pulmonary x-ray, to which will be added the cost of a bacteriological test and an ABG (for those with a positive culture).

On average, for each patient have been conducted approximately 5 bacteriological tests (5.11) for the current reporting, with at least one (patient deceased before starting the treatment) and a maximum of 15 (for MDR-TB patients), totalling 230 bacteriological tests (for the 2 extrapulmonary cases, there have not been conducted such bacteriological tests). The cost for such bacteriological tests was of RON 16 330 (RON 362.88 per patient).

At the time of diagnosis (T0), 40 patients had a positive culture. For them, there were conducted the following tests: 1 DST (drug sensitivity test) for each of the 29 patients, 2 tests in the case of 2 patients, and these were only for first-line drugs, and for 5 patients were conducted extended DST tests (another 5 patients with positive cultures did not benefit from an DST test). For one patient one DST was conducted during the course of treatment, because on T0 the culture was negative. The cost determined by conducting the tests was of RON 3 468 for DST - short series, and of RON 4 205 for DST - long series, totalling RON 7 673.

The median number of hospitalizations was 2, the minimum was 0 and maximum 8, totalling a number of 106 hospitalizations, 2.35 per patient.

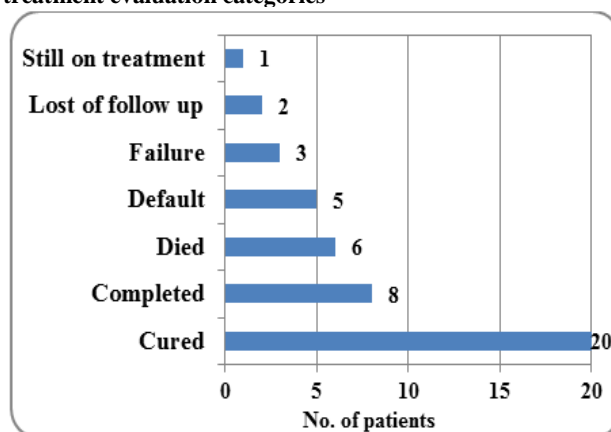
The median duration of hospitalization was of 114 days, with a minimum of 0 and a maximum of 331 days. The average length of stay of these patients was of 123.53 ± 80.55 days, with an average of 123.72 ± 81.83 days for sensitive TB. Hospitalizations were in both pulmonology hospitals and in the MDR Centre, as well as in nursing homes/sanatorium.

The number of days of hospitalization is of 5 559. Of these, 239 were for 2 of the 3 patients with MDR-TB - 1 patient with MDR-TB died before being hospitalized and before starting treatment. The cost determined for hospitalization days was of RON 1 228 920 for chemosensitive TB and RON 454 100 for MDR-TB, totalling RON 1 683 020.

On average, the duration of treatment was of 7.58±3.83 months, with a median of 6.5, minimum 0 and maximum 17.75 months. The amount of months of treatment was of 341.25, of which 20.75 months included treatment for the MDR-TB cases (3.00 months in intensive phase and 17.75 months in the continuation phase), and the remaining for regimen I and regimen II treatments, as well as individualized treatment with Isoniazid and Rifampicin or just with Rifampicin. The cost of treatment for these patients was of RON 4 713.90 for the treatment of MDR-TB patients and of RON 13 113.79 for patients with sensitive TB and mono-drug resistance, a total of RON 17 827.69.

The total cost for detected and treated HA in 2013, in Bucharest, has reached the amount of RON 1 726 785.69 (per patient is of RON 38 373.01).

Figure no. 2. Distribution of patients according to the treatment evaluation categories



Regarding the assessment of patients, 20 of them were cured, 8 had a complete treatment assessment, 6 of them died - of which one suffered from MDR-TB, before being hospitalized and treated, 5 of them have abandoned treatment and 2 were lost, 3 were evaluated as failure and one patient with MDR-TB still continues treatment (figure no. 2). So far, only 3 patients who initially abandoned, have resumed the treatment.

DISCUSSIONS

One third of HA patients declared in 2013 were at least on the second treatment, which means that in their community the cases are linked. In the 2013 cohort, there were 7 patients who abandoned or were lost during the treatment, and three failures - patients who, even if they were negative after the treatment has been administered, they may again become positive, and more, they can contract resistant strains. For a proper monitoring and a comprehensive treatment, due to the particularities of these people (unable to follow an appropriate hygienic-dietary regime, lack of minimum living conditions, high mobility, living in communities etc.), a treatment under direct observation (DOT) is preferred, administered in the hospital, thus leading to increased costs of hospitalization for these patients, otherwise, there is a higher risk of abandoning treatment and the danger of contracting resistant strains.

As in the electronic database of NPPSCT there are not completed information regarding radiological monitoring and

biological examinations carried out on patients during treatment, the total cost may be undervalued.

The TB costs for HA should be compared with the TB costs for the general population, patients declared in Bucharest during the same period.

The difficulty lies in a proper monitoring and the correct and complete treatment of such persons, in order to reduce the costs incurred with TB patients. To this end, it would be necessary a collaboration with health services and social services.

Given the medical and social implications caused by TB in this vulnerable group, outside of an early diagnosis, a correct and complete treatment and monitoring, it is important that in the electronic database of NPPSCT these people to be checked as homeless among the social categories; at this time, their number is undersized (for 2013 there were registered 28 of the 45 HA), sometimes because they have an ID.

The only source of data, according to which our country is reporting both nationally and internationally, is precisely this database. The healthcare personnel and people who fill in the electronic database should be trained in this respect, and this could be a next step in conducting the study.

CONCLUSIONS

The characteristics of HA suffering from TB in Bucharest show that they are young adults, men, associated with HIV, liver diseases, drugs and alcohol consumption.

Of the 45 patients, 43 of them were, in terms of location, pulmonary cases that can transmit the disease.

The optimal length of stay for sensitive TB in 2013, at the country level, was set for 37 days.(8)

The average length of stay at HA is about 3.3 times higher than the average length of stay for TB cases at the country level, so that the costs of hospitalization are also higher.

The duration of treatment for sensitive TB is higher than normal (6 months of regimen I treatment, 8 months of regimen II treatment).

The patients without MDR-TB were treated for 11 to 15 months, due to their associated medical conditions, in particular the HIV co-infection, the fact that they are drug users and suffer from a liver disease.

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