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**Tuberculosis in Homeless Adults in
Bucharest**

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Tuberculosis in Homeless Adults in Bucharest

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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.

This study aimed to analyse a cohort of HA suffering from TB in Bucharest, in terms of socio-demographic and clinical aspects, as well as direct costs arising from the detection, monitoring and treatment of these people.

Data were collected from the electronic database of the National Tuberculosis Programme, for HA patients with TB declared in 2013.

The results showed that most patients are young men, representing new pulmonary TB cases, that can transmit the disease, with associated conditions (HIV, drug and alcohol consumers, with a liver pathology).

The average length of stay in the case of sensitive tuberculosis cases in HA is about 3.4 times higher than that at the country level and they were treated for 11 to 13 months, depending on their associated conditions.

Keywords: Tuberculosis, homeless adults, direct costs, health and social services

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Introduction

Nowadays tuberculosis (TB) affects people with low and also high socio-economics status. Romania is on the first place regarding the global incidence between European countries.(1)

Each year there are cases regarding vulnerable groups.

Homeless adults (HA) represent a vulnerable population group, often with polymorbidity, interest in preventive medicine and health promotion actions are almost inexistent, and due to poor living conditions, they have a weak immunity, the tuberculosis in these individuals representing a problem of medical and social interest.). (2)

They have no income, they are not insured and do not have a general practitioner, whereas their interaction with health services occurs mostly in emergency conditions, and their pathologies are usually detected in advanced stages. Compliance with treatment is low, more so in the case of tuberculosis (TB), which requires treatment for at least 6 months, with periods of 2-3 months or even more, of daily treatment. (3, 4)

The number of HA has increased in the last 5 years in Europe, the average age increasing, too. Among migrant HA it is increasingly frequently families, youth and women. Due to polymorbidity, and especially to the high prevalence of HIV, TB and hepatitis C infection among HA, they likely die prematurely 2-5 times higher than the general population. Pathologies such as cardiovascular diseases or diabetes are less controllable among these people, due to reduced interaction with health services. Among them are more common psychiatric pathologies (especially depression) as well as drug and alcohol abuse. Usually they arrive in the emergency medical services, which in the case of infectious diseases raise public health concerns.(5)

A study conducted in 2009 by the "Carol Davila" University of Medicine and Pharmacy and SAMUSOCIAL - a non-governmental organization, has highlighted, using the morbidity data collected from the medical office of SAMUSOCIAL, an incidence of 40 per thousand and a prevalence of 604 cases per thousand persons examined. These data showed that both the incidence and prevalence for the same period of time are much higher than in the general population of Bucharest (approximately 80%000 inhabitants, respectively 110%000 inhabitants). (6, 7)

For the same year, a study conducted in Great Britain showed that the incidence was of 15%000 for the inhabitants in the general population and 300%000 for the homeless population.

WHO has claimed in 2009 that in many industrialized countries the TB rates in HA can be over 20 times higher than in the general population, that is perhaps due to the conditions of the economic crisis in recent years, and which has resulted in increased poverty. (3)

Because they represent a disadvantaged population group, the pathologies they suffer from are most often detected in the late stages of the disease, which, from the viewpoint of tuberculosis, has a huge impact not only for them, but also for the general population, due to their high mobility, and, last but not

least, for the doctors who come into contact with them. The epidemiological investigation which is required to be conducted for a patient suffering from tuberculosis is hampered, since the HA do not have a good relationship with health services, they are moving from one place to another and are also reluctant to interact with the administrative services.

Art. 213 paragraph e) of Law no. 95/2006 on healthcare reform states that patients suffering from diseases included in the national health programmes established by the Ministry of Health, are insured without the payment of the health contribution until such disease is cured, provided that they have no income from employment, pension or other resources, tuberculosis being one of the pathologies included in such programmes. (8)

HA should receive welfare and should benefit from primary care, so as to minimize the negative consequences associated with their particular situation. The tuberculosis treatment, in our country, is free for all patients, regardless of their social status. (8)

Starting in 2013, the purchase of medicines and sanitary materials necessary for the National Programme for Prevention, Surveillance and Control of Tuberculosis, 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, in article 16, paragraph 1:

"(1) The Ministry of Health, in its capacity of centralized public procurement unit, designated in accordance with the law, carries out, at national level, centralized procurements of medicines, sanitary materials and other similar products, for the implementation of:

b) the national programme for prevention, surveillance and control of tuberculosis." (9)

To reduce the impact of these consequences for HA, and for the society, is required an interdisciplinary approach that effectively uses all available resources of our society (human, institutional, financial, logistic resources).

Aim of the Study

The aim of this study was to analyse a cohort of adult homeless patients suffering from tuberculosis, 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.

Methodology

The methodology was a descriptive approach to HA suffering from TB, reported in 2013 in Bucharest. Data were collected from the electronic database of the National Programme for the Prevention, Surveillance and Control of

Tuberculosis (NPPSCT) and from the reporting sheets of the outpatient TB care in the sectors of Bucharest for such cases.

In this study have been included only the HA found in the electronic database of NPPSCT as being "homeless" people, over 18 years old.

In the calculation of costs have been taken into account the costs directly determined strictly for detection, monitoring and treatment of patients with TB, and it 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, the cost for HIV testing, nor indirect costs, that should be paid by patients.

What has been taken into account, was the cost of the pneumology clinical examination of RON¹ 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 chemosensitive TB cases and RON 1,900 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 10,470, and in the continuation phase is of RON 710 (RON 11,180 for 24 months). (9)

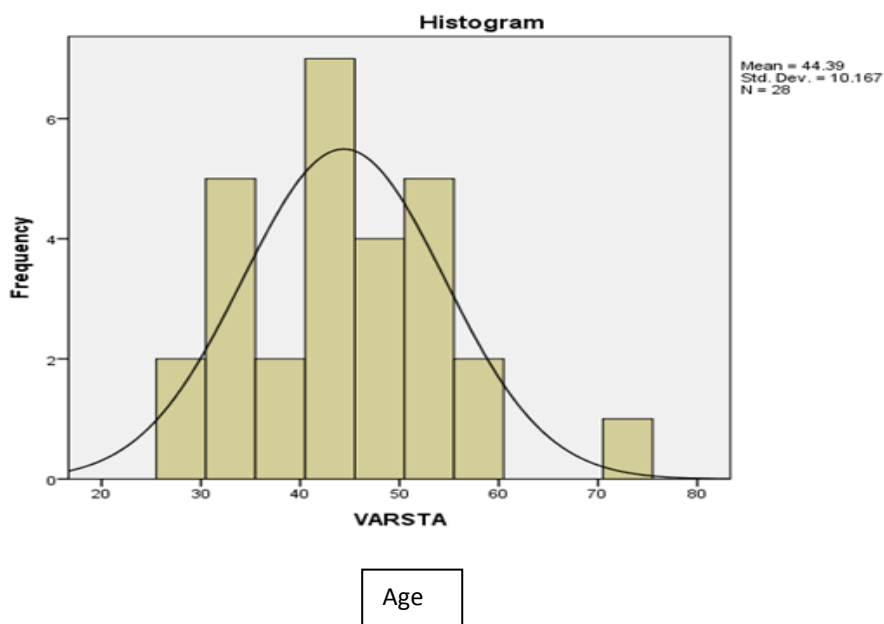
The data was summarized in a database in Excel and its processing was performed using SPSS version 20, and Microsoft Excel, including the descriptive statistics analysis of socio-demographic and clinical data, as well as concerning the assessment of direct costs.

Results

The HA declared in 2013 in Bucharest were 28 in number, of which 26 men, the average age being of 44.39 ± 10.16 years, the median age was of 44 years old, all of them being pulmonary cases, and in terms of categorizing them, there were 16 new cases, 8 relapses and 4 defaults (Figure no. 1). There was no correlation between the case category upon reporting and the number of days of hospitalization ($p = 0.117$).

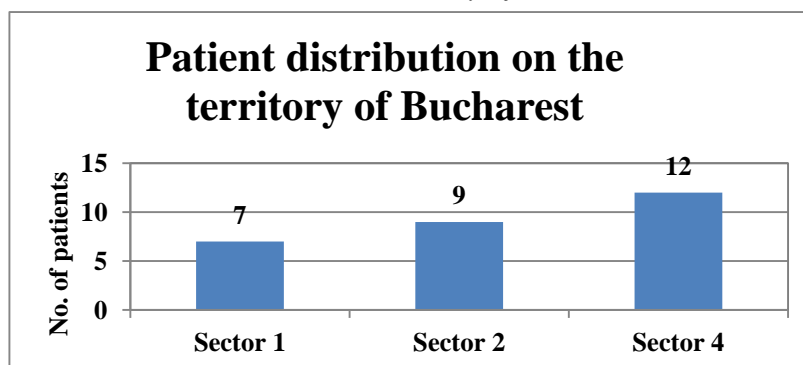
¹1 Euro = 4.4 lei (2013)

Figure 1. Distribution of HA Suffering from TB According to Age Group



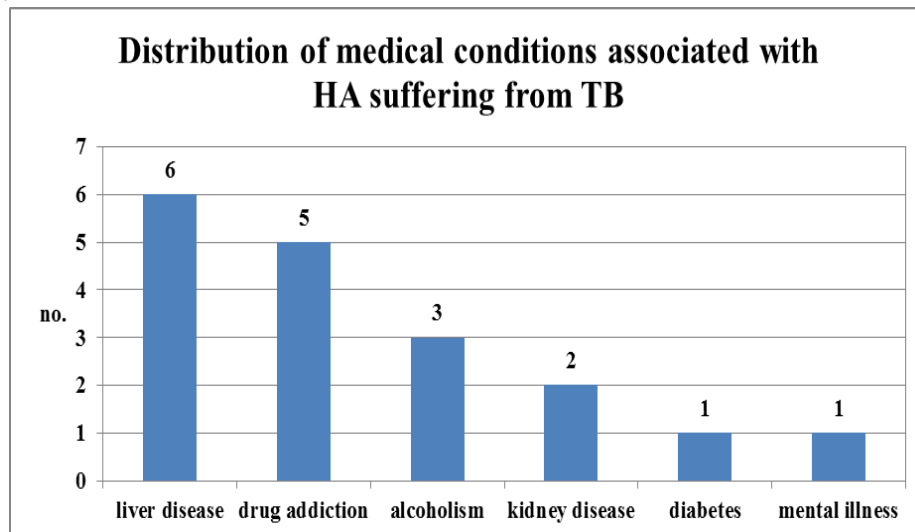
Depending on the Sector in Bucharest in which they were detected, 12 of them are from sector 4, 9 from sector 2 and 7 from sector 1 (Figure no. 2).

Figure 2. Patient Distribution on the Territory of Bucharest



The most common associated conditions in these patients were liver diseases - 6, drug addiction - 5 and alcoholism in 3 of them (Figure no. 3).

Figure 3. *Distribution of Medical Conditions Associated With HA Suffering From TB*



Of the 19 patients tested for an association with HIV, 8 were positive and 7 of them were receiving antiretroviral treatment. 3 HA suffered from multidrug-resistant tuberculosis.

This study aimed to quantify the costs only in patients detected with TB. Patient detection requires a specialized consult with a clinical examination, a pulmonary X-ray and a bacteriological test with DST.

The cost of detecting the disease in a patient declared HA, in 2013, was of RON 43 (RON 1,204 in total), to which will be added the cost of a bacteriological test of RON 71 (RON 1,988 in total) and RON 102 for DST (for a positive culture).

From a bacteriological point of view, upon diagnosis (T0), 25 of the 28 patients had positive bacteriological tests of sputum, both for microscopy and culture, one patient had both negative culture and microscopy, one had a positive microscopy and a negative culture and one had a negative microscopy, but a positive culture.

On average, for each patient have been conducted 5 bacteriological tests for the current reporting, with at least one (patient deceased before starting the treatment) and a maximum of 14 (for MDR-TB patients), totalling 141 bacteriological tests. The cost of the 141 bacteriological tests was of RON 10,011 (RON 357.53 per patient).

For the 26 patients with positive cultures, only 24 DSTs were performed (only 1 patient also had another DST during treatment). Of these, 3 were extended DSTs, the rest of them were tested only for first line drugs. The cost determined by such tests was of RON 2,550 for DST short series and of RON 2,523 for DST long series, totalling RON 5,073.

The median number of hospitalizations was 2, the minimum was 0 and maximum 8, totalling a number of days of hospitalization of 3,390. Of these days of hospitalization, 239 were for 2 of the 3 patients with multidrug-

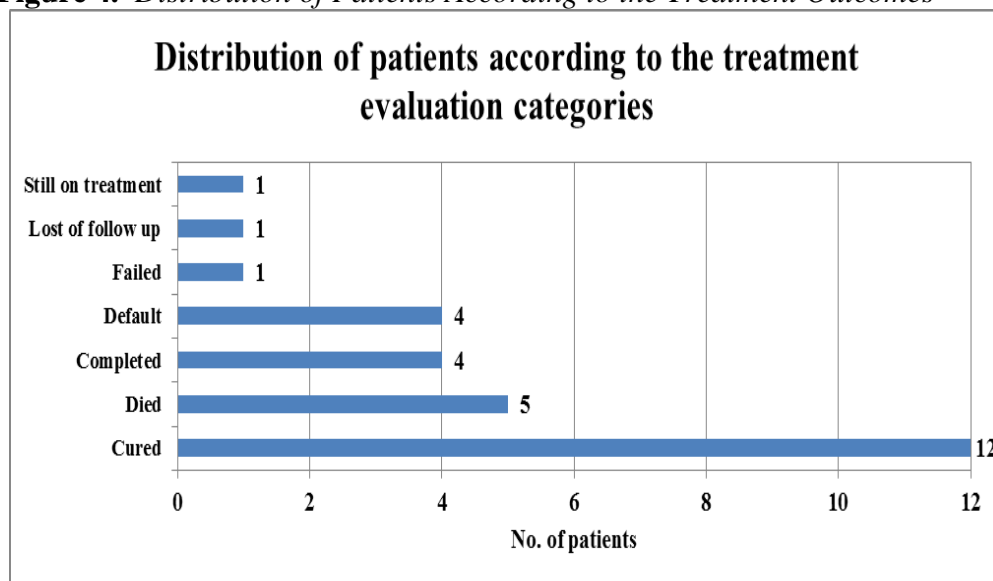
resistant TB (MDR-TB). The cost determined by such hospitalization days was of RON 1,181,981.

The median duration of hospitalization was of 129.0 days, with a minimum of 0 and a maximum of 296 days. The average length of stay of these patients was of 121.07 ± 79.55 days, with an average of 126.04 ± 79.48 days for sensitive TB. Hospitalizations were in both pneumology hospitals and in the MDR Centre, as well as in nursing homes/sanatorium.

On average, the duration of treatment was of 7.32 ± 5.02 months, with a median of 6.5, minimum 0 and maximum 25.5 months. The amount of months of treatment was of 205, of which 28.5 months included treatment for the MDR-TB case, 11 in an intensive phase, and the remaining for regimen I and regimen II treatments, as well as individualized treatment with HR. Chemosensitive TB patients were treated for 11 to 13 months, depending on their associated conditions, especially because of the association with HIV. The cost of treatment for these patients was of RON 13,276.25 for the treatment of MDR-TB patients and of RON 7,221.79 for patients with chemosensitive TB, a total of RON 20,498.04.

The total cost for detected and treated HA in 2013, in Bucharest, has reached the amount of RON 1,218,767.04 (per patient is of RON 43,527.39).

Figure 4. *Distribution of Patients According to the Treatment Outcomes*



Regarding the evaluation of patients, 12 of them were cured, 5 died, of which one suffered from MDR-TB, before being hospitalized and treated, 4 of them received complete treatment, 4 of them abandoned the treatment-defaulted and 1 was lost of follow up; 1 was evaluated as failure and has not yet resumed treatment, and one suffering from MDR-TB still undergoes treatment (Figure no.4).

Conclusions

The characteristics of HA suffering from TB in Bucharest show that they are young adults, men, associated with HIV, drugs and alcohol consumption and liver diseases. All of them were, in terms of location, pulmonary cases that can transmit the disease. Average length of stay for sensitive TB in 2013, at the country level, was set for 37 days.⁽¹⁰⁾ The average length of stay for HA patients is about 3.4 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 chemosensitive TB is higher than normal (6 months of regimen I treatment, 8 months of regimen II treatment), due to their associated medical conditions, in particular the HIV co-infection, the fact that they are drug users and have a hepatic pathology.

To get a complete picture of the size of costs for these patients, we should continue this study with one in which the costs for these patients will be compared with the same costs determined by the remaining adult patients with TB registered in Bucharest during the same period.

The difficulty lies in finding optimal solutions for a proper monitoring and a correct and complete treatment for these people, with the possibility to reduce costs. To this end, it would be necessary a collaboration with health services and social services.

Discussions

HA patients declared in 2013 were mostly on the second or third reporting, those categorized as relapses having previously completed the treatment. This means that, in their community, such cases are linked. However, there are also lost cases, in the cohort of 2013 there were 5 patients who, even if they became negative after treatment, they may again become positive, and furthermore, 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, etc.), is preferred a treatment under direct observation - DOT - 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.

At an international level, Romania annually submits the situation of vulnerable groups, and among them, the cases reported for HA. Data for all reports that are submitted regarding TB are extracted from the electronic database of NPPSCT, thus it must be fully and correctly filled in. The number of persons checked as homeless within the social groups in this database is sometimes undersized, because some of them have identity cards. The healthcare personnel and people who fill in the database should be trained in this respect, and this could be a next step in conducting the study.

It is also necessary to take into account the social costs caused by TB in these HA and therefore to reduce the impact of the consequences concerning these persons and also for the community, it takes an interdisciplinary approach to effectively use all available resources of our society (institutional, human, financial, logistical).

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(Order no. 423-191/2013 approving the Methodological Norms for the application in 2013 of the Framework Contract on conditions of granting medical assistance within the social health insurance system for the years 2013-2014)