The employment field of the patients suffering of tuberculosis as part of an IT system of the disease causing decisive factors

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Abstract: - This study aims at approaching the employment field of the patients who suffer from tuberculosis in Brassov County, Romania, in 2007. The aspects that represent the employment field of the persons involved in causing tuberculosis belong to the category of social economic decisive factors in causing the disease because with the Koch bacillus. Together with other categories of factors involved in falling ill of tuberculosis, a set of information that may represent the database in the field comes into being. This system may be created according to an updated, IT template and it may be included in the sole, national database of the patients suffering from tuberculosis. Achieving an IT system provides the open access to gathering and subsequent processing of information. By this method, it may also be created a system to monitor the decisive factors of tuberculosis, extremely useful for the medical activity carried on within or outside the hospital.

Keywords: - tuberculosis, employment field, monitoring, IT

1 Introduction

The acknowledgement of tuberculosis a social, economic and not only a medical problem create opportunities for researching and identifying new, efficient strategies to provide its prevention and treatment.

For the population considered to be vulnerable to tuberculosis, the ways of approaching the disease must be adapted to the specific cultural profile, according to the ethnicity. This implies adaptability, creativity and multidisciplinary approach of the problems caused by this disease [2].

We consider that there is a tight connection between the social-economic status and mortality, on the grounds that it clearly determines a certain life expectancy. In this context, a significant influence on the mortality and morbidity tendencies is exerted by the position of the individuals on the hierarchic scale. Consequently, the persons who belong to social classes and categories defined by a higher social economic status may expect to live longer than those who belong to social classes featured by a lower social economic status. This aspect emphasizes the differences between the social classes concerning the structure of morbidity that are explained by a higher training ratio and by more substantial financial resources [8,14].

The social economic status of the individuals may affect their access to information on tuberculosis, diagnosis and treatment [1]. Also, it influences the possibility of the individuals to obey the requirements of an anti-tuberculosis therapy [12].

We appreciate that health and economic development are strictly interdependent [3]. Approximately 1/3 of the world population is infected by Koch bacillus, most of the infected ones coming from the underdeveloped countries or from the countries that are presently developing [13]. According to the Universal Declaration of the Human Rights, the limitation and the derogation of the clauses acknowledge the need to limit the rights. These kinds of clauses are primarily invoked, in order to protect the rights of the individuals when such limitations are required [15].
2. Problem formulation

2.1 The decisive factors in causing tuberculosis and public health

Tuberculosis is a worldwide spread disease affecting public health, due to its decisive factors. Among the globally encountered major causes it must have been mentioned those of certain diseases, as well as social and medical aspects.

To the above categories belong: the human immunodeficiency virus (HIV), the increase of pathology by drugs consumption, the increasing number of persons not having a stable residence, the immigration increase and last but not least, the patient’s lack of adherence to treatment.

The conclusion of this list is that the resurgence of tuberculosis is directly correlated with the approach of the disease in the context of the public health problems.

From this point of view it may be considered that the patients not adhering to therapy or those who have additional medical or social problems may affect the public health within a society.

In this context, it is important to be a balance between the rights of the patient and public health protection [11].

The access to the medical services may help, but in a low percentage. From this point of view, the only efficient attitude is the one to directly attack poverty, in order to reduce the discrepancy between the social classes. [7].

2.2 The occurrence of the tuberculosis cases worldwide and the need to monitor the determinant factors

Measuring the health and disease patterns is not easy, even if having agreed upon the definition of the medical terms. Anytime a certain disease may defeat the apparent health condition of the patient.

The two main methods by which it is assessed is the official statistics and the community inquiries [10].

World Health Organization, being aware of the limits of the measure of the health state of the population and implicitly of the tuberculosis dissemination, considers that the real incidence cannot be exactly calculated within a territory, but it may be estimated according to the registration of the epidemiological cases and models. [16]

The incidence of tuberculosis is expressed by the number of cases of illness, namely the new and recidivating cases, that may be registered within a year for a population and it concerns 100,000 inhabitants. According to this calculus, it is deduced the detection ratio, $D$:

$$D = \frac{R}{T} \cdot 100 \, [\%]$$  \hspace{1cm} (1)

where $R$ represents the number of registered cases and $T$ is the number of estimated, existent cases [2].

Due to the fact that an ensemble of determinant factors causes tuberculosis, it is useful to implement an IT acquisition and processing system for information concerning the categories of factors implied in the occurrence of the disease.

3. Problem solution

The study concerning the data of the employment field of the patients suffering from tuberculosis within the county of Brasov, Romania, in 2007 and the level of suffering of tuberculosis of the population, the statistic processing of the data, offers the access to information, by creating a database and an IT medical system. This may include information concerning the evaluation of the social-economic factors that cause the disease.

In diagnosing the infection by the Koch bacillus, the screening is achieved by different methods and medical techniques. These include: the standard pulmonary radiography, the coctaneous test, namely the intradermal to tuberculin, being highly relevant in the case of the children, and also the different laboratory tests including the Quantiferon-Tb Gold test and the test of the sputa by direct examination and by culture. The results of the mentioned investigations may be included within the database integrated in a special designed software system [4].

In order to model the monitoring process of the disease, it is necessary to include together with the medical information the social factors that are considered to be causing the disease. From this point of view, there is taken into account the compliance to the treatment of the patients suffering of tuberculosis and the social economic state of the hospitalized patients.

In order to preserve the confidentiality of the patients’ data, there will be mentioned only the age, the gender, the urban or rural residence, the existence or the inexistence of stable incomes, the received material assistance, the quality of the medically insured person and also the employment profile. Also, it is necessary to know the relation of the patient with the family physician and the distance between his residence and the medical office. To the above-mentioned facts, there are added the screening methods of tuberculosis, previously mentioned. Information stored in the database regarding the social-economic factors and
The other categories of medical factors implied in generating tuberculosis, could be exported so that to be external processed by software as SPSS, Matlab, Excel and so on [6].

3.1 Results and discussions

The study is based on the data related to the employment profile of the patients who are registered as suffering of tuberculosis. These references are among the determinant social-economic factors in causing the disease. According to the results of this study, it was proven that the social-economic impact of tuberculosis is very high, the disease frequently affecting the adults, during the period when they are economically active. The data concerning the employment profile of the patients, who are registered as suffering of tuberculosis in Brasov County in 2007, comprise five citizens’ categories. The results are presented in Figure 1.

![Figure 1 - Employment profile of the persons suffering of tuberculosis](image1)

The data presented within the graphics are recorded in the database, where it is registered the employment field of the persons, who suffer from tuberculosis or who caused the rendering sick of the children.

Children are also vulnerable to the direct and indirect interaction with the family members who suffer from tuberculosis.

If the main member of the family is sick and he loses his capacity to work, the child may be exposed to malnutrition, which increases the degree of getting tuberculosis, producing negative effects that cause long term failures concerning the health condition and the educational level.

The families who lose their incomes will experience poverty by the lack of their own budget. Also, if the individual who is providing medical care is suffering of tuberculosis or he is taking care of a sick member of the family, the education of the child may be neglected.

Children are especially vulnerable if their mother renders sick or if she dies. The children of the families with cases of tuberculosis may be withdrawn from the school system and may be obliged to work. Both scenarios waive their right to education and oblige them to live together with persons suffering of active tuberculosis. The employment profile of the parents who caused the tuberculosis of children in 2007, in Brașov County, implies three categories of persons, presented in Figure 2.

![Figure 2 - The employment profile of the parents of the children suffering of tuberculosis](image2)

The study was completed by means of the imagistic screening method of tuberculosis.

Within this context, there were achieved standard pulmonary radiographies. By means of the screening method of tuberculosis there are presented different aspects of this disease. The imagistic method was used for the completion of the study related to the employment profile of the persons who are suffering of tuberculosis and of the ones who determined the rendering sick of their children.

The standard pulmonary radiographies present different aspects of the pulmonary tuberculosis. These can be found within the Figure 3 to Figure 8. All images can be stored in the database.
According to the above-mentioned, using special designed software, the data of the study will be presented within a direct access, useful to the medical activity intra-hospital and inter-hospital.

This aspect imposes if the employment profile of the persons suffering of tuberculosis in 2007, in Brașov County, Romania and the social categories of these ones, is different.

Such a database presents obvious advantages [5]:

- exploitation in research, medical practice, within the specialty education system;
- keeping the digital format of the images of the investigated affections;
- Computer-Aided Detection (CAD) and Computer-Aided Diagnosis (CADx);
- increase of the precision of initial and evaluative identification of an affection;
- rapidity, accuracy, consistence and a high degree of trust on the interpretation of the results;
- obvious improvement of the prophylactic management and treatment;
- high performance data and image processing;
- monitoring the evolution of the condition of the state of the patients after having applying new treatment methods;
- reducing the costs of the long-term treatments, long hospitalization periods, supplementary tests and the number of surgical interventions;
- increase of the quality and the accessibility of the medical services.

The designed database may be included within a profile system, created at national level. This software solution would include the determinant social-economic factors in producing the disease.

A complex database may be populated with data acquired by means of the screening imagistic method of tuberculosis, the theoretical orientation related to the medical aspects for the correct treatment of the disease and decisions related to taking care of the hospitalized patients. This may be linked to the similar database, profile, nationally implemented, including the patients suffering of tuberculosis. The system represents one of the modern methods for acquiring and processing medical data, successfully used within and outside the hospital.

4. Conclusion

Concerning the impact of tuberculosis at worldwide level and the ensemble of the determinant medical and social-economic factors, there are observed certain orientation within the relation between the social-economic state of the population and the disease. Within the context, a significant influence of the mortality and morbidity tendencies is exercised by the position of the individuals on the social hierarchy.

The trained and educated persons are defined by the life styles that allow them to frequently access medical services in order to take care of their health. On the other hand, the persons belonging to the poor social classes, beside the absence of the financial resources, are characterized by certain values that seem to explain the low application to medical services.

The strategies that are meant to prevent tuberculosis must be concentrated on the needs of the individual and on his rights. Not observing them may affect the public well-being and there must be accepted only if there are not other ways to affect the public health [9].

The study aimed at gathering the necessary information, concerning the data related to the employment profile of the patients suffering of tuberculosis.

The gathered data constitute a part of the information registered within the category of the determinant social-economic factors in producing the disease.

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