ROLE OF MEDICAL AND SOCIAL FACTORS IN THE DEVELOPMENT OF TUBERCULOSIS IN SOURCES OF M. TUBERCULOSIS INFECTION

The paper describes results of study of social characteristics of patients in foci of drug-sensitive M. tuberculosis excretion (Group I) and multidrug resistant tuberculosis (MDR TB) (Group II). Main risk factors of TB disease in sources of M. infection are revealed. 58.1% of patients with MDR TB were jobless, and 43.1% of newly detected drug-sensitive TB patients did not have work as well. 35.0% of Group II patients didn’t have a home or lodged the hostels, while homeless made only 2.0% in Group I patients. 36.6% Group II patients had lower living income per month (up to 5000 KZT) than patients in Group I (16.7%). Level of education in patients of Group I was reliably higher that of those of Group II (P<0.05). More than a half of patients in Group II (55.6%) and 26.9% in Group I had the harm habits: smoking and alcohol abusing. 9.7% of patients with MDR TB were drug abusers.

Keywords: Multidrug resistance, TB infection foci, M. tuberculosis source.

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Introduction

At present stage tuberculosis (TB) remains one of the most prevalent infections in the world and presents the great danger for the health of population [Khruljova, 2001; Rybkina and Belov, 1991; Khomenko, 1994]. Growing number of cases with multidrug resistant and extensively resistant strains of Mycobacterium tuberculosis threaten seriously to the adult and children population of the country (Litvinov, 2000; Styblo, 1985; Badleeva, 2000). Until now, drug resistant forms of TB are detected in children of the younger age, and untimely isolation of children from TB bacillary loci plays the certain role in this (Aksenova and Meissner, 1999).

Aim of our study was to reveal the main medical and social factors leading to TB disease development in adults and investigate the TB infection and TB disease development among children and adolescents living in the loci with TB sources.

Material and methods

Material of our study was the medical documentation of 72 adult TB patients (Group I) having sensitivity of M. tuberculosis (MBT) to anti-TB drugs of the first line. Also, there were studied 93 patients with MDR TB (Group II) from Almaty'oblast which were the sources of M. tuberculosis infection in the loci where also lived 209 children and 57 adolescents.

To evaluate the contributions of independent variables (factors influencing TB disease development) and dependent variable (TB incidence among adults and children in the same TB sources) we used the method of poly-factorial analysis. The statistical analysis was performed in computer program SPSS-17.

The evaluation of reliability of differences in the quality signs was made using the binary logistical regression and criterion χ² (for 3 parameters or more), and the analysis by Wald served as a method of recognition. 95% confidence interval was determined, i.e. a real value was determined in the limits of 95% of probability). Value in 0.05 was adopted as a critical level of difference reliability.

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Results

Males were prevalent in both groups by gender distribution (58.7% and 52.7% respectively). The frequency of TB prevalence was studied among patients in the age groups 18-21, 22-25, 26-28, 29-33, 34-37, 38-42, 43-48, 49-55 and 56 years or older. Persons from 26 to 33 years (23.3%) were prevalent among patients of the Group I; and patients from 43 to 48 years (18.3%) were prevalent in Group II. Jobless in groups made 43.1% and 58.1% respectively. Patients with low family income (up to 5000 KZT monthly) made 36.6% in Group II and in 16.7% in Group I.

Education state among patients in the Group I and Group II is presented in the Table 1.

<table>
<thead>
<tr>
<th>Patients</th>
<th>Education spectre (%)</th>
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<tbody>
<tr>
<td></td>
<td>Incomplete secondary</td>
<td>Secondary</td>
<td>Secondary</td>
<td>Higher</td>
<td></td>
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<tr>
<td>Group I</td>
<td>6.9±0.05</td>
<td>52.8±4.9</td>
<td>13.9±1.5</td>
<td>26.4±3.5</td>
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<tr>
<td>Group II</td>
<td>9.7±0.08</td>
<td>75.3±6.8</td>
<td>7.5±0.9</td>
<td>7.5±0.95</td>
<td></td>
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<tr>
<td>P</td>
<td>P&gt;0.05</td>
<td>P&gt;0.05</td>
<td>P&lt;0.05</td>
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</table>

As it is following from the table, in the sources of tuberculosis infection between compared groups the reliable difference was not revealed among persons with incomplete secondary and secondary education. Contrary, in Group I the persons with secondary specialized education and higher education occurred reliably more frequently (P<0.05).

Study among patients of both groups revealed that more than a half of patients had the harm habits. Smoking patients and patients using alcohol made 55.6% and 26.9% in the respective groups. Also, 9.7% of patients MDR TB in Group II were drugs abusers.

Along with this, living conditions were significantly different in patients of the two compared groups. The patients in Group I had the private comfortable apartments with one or two rooms (64%), private houses with 3 rooms (34%), only 2% of patients were homeless and lived in the hostels. While, 9% of the patients in Group II had the comfortable houses, 56% lived in apartments with two rooms, 23% of patients rented the lodgings, and 12% lived in the hostels.

Thus, the social conditions of patients with MDR TB (Group II) differed rather sharply from the patients newly detected with M. tuberculosis (Group I). As expected, Group 2 patients comprised older people having disease relapses in anamnesis. They had larger percentage of jobless; therefore, their income was rather essentially low. Majority of these patients had the secondary education.

Tuberculosis process was revealed in 92.5% of patients in Group II and in 61.1% of cases in Group I at their addressing to the different medical settings. It means that patients with TB do not undergo required prophylactic examination and they addressed to the different medical institutions only when their health worsened.

The clinical structure of tuberculosis in both Groups is mainly presented by infiltrative pulmonary tuberculosis. In the structure of tuberculosis among newly detected patients with preserved sensitivity the destructive and advanced processes occurred predominantly in form of infiltrative pulmonary TB (ITL) (86.3%); while caseous pneumonia (Cas.pn.) occurred in 7.7%, tuberculosis pleurisy (TP) and focal TB - in 4% and 20% respectively.

Advanced and destructive processes were also characteristic to patients with MDR TB. But finding in 8.6% of cases the fibrous-cavernous pulmonary tuberculosis (FCTB) suggests that changes in the clinical structure led to the process chronization in those patients.
Poly-factorial analysis revealed two main components. Therefore, there were selected two factors only for further consideration. The first factor explained 31.3% of the dispersion; the second one did 21.8%. The first component included: the low monthly income (5000 KZT ($r=0.856$), delayed addressing of a patient to the medical setting ($r=0.734$), absence of stable job ($r=0.558$) and presence of harm habits ($r=0.546$). The second component included: the age of a patient ($r=0.807$), marital status (divorced) ($r=0.705$), and presence of secondary education ($r=0.605$). Therefore, main factors leading to the tuberculosis disease development in patients are: the minimal living standard due to the jobless, neglected care to their health status, lower educational level, and pernicious habits presence.

By results of investigation disease outcome was favorable mainly in groups (72.6% and 64.1% respectively), 1.4% and 2.2% of patients died respectively. The treatment failure was registered in 2.7% in the Group I, and it was absent in the Group II, and treatment default was observed in 1.1% in the Group II, while it was not observed in the Group I. The analysis revealed the moderate correlative connection between disease outcome and marital status ($r=0.473$); possibly, presence of a family favored treatment outcome to a patient.

Thus, at the present stage the main risk factors of TB are the low cost of living due to lack of permanent employment, poor living conditions, low levels of education among the patients themselves, the presence of bad habits and irresponsible attitude towards their health. It was stated the specter of more difficult forms of tuberculosis process in patients of the Group II of observation with MDR TB. TB incidence is more manifested in children with MDR TB sources compared with TB patients still having sensitivity of M. tuberculosis to anti-TB drugs of the first line (12.2% versus 7.7%).

References


