ASSOCIATION OF PSYCHOLOGICAL STATUS WITH FIRST DIAGNOSED PULMONARY TUBERCULOSIS IN MEN

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Abstract

The aim. Assessment of the initial psychological status of men with first diagnosed pulmonary tuberculosis and the study of its associations with the clinical course of the disease.

Materials and methods. The study involved 54 men with first diagnosed pulmonary tuberculosis. Patients had a dynamic complex clinical, laboratory and instrumental examination with an assessment of the psychological status according to the State-Trait Anxiety Inventory (STAI) and the Beck Depression Inventory (BDI).

Results. The evaluating of initial psychological status in patients with first diagnosed pulmonary tuberculosis, depressive states of varying severity were found in 47.05 % of patients, moderate state anxiety – in 74.51 % of patients, moderate trait anxiety – in 35.29 %. We revealed associations of the levels of anxiety and depression with the degree of bacterial excretion and the duration of the intensive phase of therapy.

Conclusions. To assess the psychological status of patients with first diagnosed infiltrative pulmonary tuberculosis, it is advisable to use the STAI and the BDI.

Patients with first diagnosed infiltrative pulmonary tuberculosis in 100 % of cases have psychological status disorders with a predominance of moderate state anxiety and the absence of depressive disorders in only half of them. More expressed violations of the psychological status (anxiety, depression) identifies patients who are married and have a steady job.

In patients with first diagnosed infiltrative pulmonary tuberculosis, an increase in the severity of anxiety and depression is associated with more expressed bacterial excretion, decrease in body weight, greater frequency of destruction of lung tissue, prevalence of the tuberculosis process by more than 2 lung segments, decrease in the effectiveness of standard therapy and prolongation intensive phase of treatment.

Keywords: infiltrative pulmonary tuberculosis, lung destruction, depression, anxiety, psychological status, efficiency of treatment, psychological sphere, STAI, BDI, marital status.

1. Introduction

According to World Health Organization's report 2019, tuberculosis has caused an estimated 1.4 million deaths. At the same time, over the same period, about 10 million new cases of the disease were detected. Despite the fact that over the past 20 years, modern medicine has managed to save more than 60 million people from tuberculosis, the problem still does not lose its relevance and requires targeted attention from the state and the medical community [1]. Today tuberculosis

is epidemic in nature, and the fight against it is aimed at solving the most important medical and social problem [2].

Among the factors that can influence the development and course of tuberculosis infection, the psychological state of the patient may have a certain value [3].

According to the literature, there are common risk factors for the development of tuberculosis and depression [4, 5]. It is also assumed that the chances of developing tuberculosis are significantly increased in patients with depression at the background of a decrease of immune defences [6]. It is known that with the background of depression there is a suppression of cellular immunity factors activity and an increase of catecholamines, histamine, opioids and some pro-inflammatory cyto-kines expression, which negatively affect the susceptibility to tuberculosis infection [7]. In turn, the chronicity of the tuberculous process causes the progression of tissue hypoxia, contributing to the development of anxiety and depression [8].

With the depression of psychological state in tuberculous patients, cases of alcohol and drug abuse are increasing. This is negatively affects adherence to treatment, increases the likelihood of developing drug resistance of Mycobacterium tuberculosis and prolongs the period of bacterial excretion [9].

Compared to healthy people, the prevalence of depression in tuberculosis patients is 3 times higher [10, 11]. Age is of great importance, so in patients over 35 years of age, the risk of developing depression reaches 40–70 % [12, 13], and after 65 years, this index becomes even higher [14]. In countries with low developed economies the prevalence of depression among patients with tuberculosis is in the range 46–80 % [15].

Most of modern research studied disorders of the psychological status in patients with diabetes mellitus, malignant tumours, ischemic heart disease, COPD [16, 17]. At the same time, there are few studies of psychological characteristics in patients with pulmonary tuberculosis. This was the reason for our research.

The aim of our study was to assess the initial psychological status of men with first diagnosed pulmonary tuberculosis and the study of its associations with the clinical course of the disease.

2. Materials and methods

The results of the research was conducted on the basis of: Municipal non-profit enterprise of Kharkiv regional council «Regional anti-tuberculosis dispensary No. 1», Municipal non-profit enterprise of Kharkiv regional council «Regional tuberculosis hospital No. 1», State health institution Regional tuberculosis 3, Municipal non-profit enterprise of Kharkiv regional council «Regional clinical anti-tuberculosis dispensary No. 7». The study was conducted in the period 2020–2021.

The study included 51 patients, all men with first diagnosed infiltrative pulmonary tuberculosis aged 25 to 50 years (mean age 40 ± 7.76 years) without concomitant diseases.

The patients had a comprehensive study of clinical, laboratory and instrumental parameters. The examination and treatment were carried out in accordance with the current protocol of the Ministry of Health of Ukraine No. 620 «Tuberculosis». All patients were questioned using the Spielberger's Anxiety STAI (State-Trait Anxiety Inventory) [18] adapted by Khanin Y. (1978) [19] and the Beck Depression Inventory (BDI) [20].

The study was conducted in accordance with the requirements of good clinical practice, the Council of Europe Convention on Human Rights and Biomedicine, the Helsinki Declaration of the World Medical Association and approved by the local ethics committee of the Kharkiv Medical Academy of Postgraduate Education (protocol No. 1, from 11.02.2021). All patients signed informed consent for participating in the clinical trial.

Statistical analysis of the results was carried out using the Microsoft Excel 9 software. We used descriptive statistics throughout the study. We used the Mann-Whitney U-test to validate the study.

3. Results

We examined 51 patients with first diagnosed infiltrative pulmonary tuberculosis. According to the results of a survey on the STAI, it was found that the proportion of patients with low state anxiety (S-Anxiety) was 25.49 ± 6 % ($n = 13$). The remaining 74.51 ± 6 % of the study participants ($n = 38$)

had a moderate S-anxiety. The proportion of patients with low trait anxiety (T-Anxiety) was 64.71±7 % (*n*=33), and with moderate T-anxiety – 35.29±7 % (*n*=18).

After questioning patients on the BDI, it was found that 52.94±7 % of patients (*n*=27) had no signs of depressive disorders, and 37.25±7 % (*n*=19) and 9.8±4 % (*n*=5) had respectively moderate and mild depression.

In 58.82±7 % of patients (*n*=30), sputum microscopy showed massive MTB excretion. All of these patients had moderate S-anxiety. Among patients with moderate T-anxiety, the proportion of massive MTB-excretors was 88.89±8 % (*n*=16), and among patients with low T-anxiety – 42.42±9 % (*n*=14).

All patients with moderate depression was in the group of massive MTB excretion, while in patients with mild depression and without depression, massive bacterial excretion was detected, respectively, in 63.16±11 % (*n*=12) and 48.15±10 % (*n*=13) cases.

Patients with moderate S-anxiety in 78.95±7 % (*n*=30) of cases had destructive changes in the lungs, and patients with a low S-anxiety – in 7.69±8 % (*n*=1). In patients with moderate and low T-anxiety decay cavities in the lungs were detected in 88.89±8 % (*n*=16) and 45.45±9 % (*n*=15) cases respectively.

All men with moderate depression belonged to group with destructive changes in the lung tissue. In patients with mild depression decay cavities were found in 84.21±9 % (*n*=16) and in patients without depression in 37.04±9 % (*n*=10) cases.

The prevalence of tuberculous process over 2 segments of the lungs was detected in 52.63±8 % of patients (*n*=20) with a moderate S-anxiety, in 15.38±10 % of patients (*n*=2) with a low S-anxiety, in 77.78±11 % (*n*=14) among patients with a moderate T-anxiety and in 24.24±7.5 % (*n*=8) with a low T-anxiety.

All patients with moderate depression had pulmonary tissue damage in more than 2 segments, while in patients with mild depression and without depression, the prevalence of lung damage in more than 2 segments was in 63.16±11 % (*n*=12) and 18.52±8 % (*n*=5) cases respectively.

We studied the features of the psychological status depending on marriage, the presence of a permanent job, as well as the relationship between the severity of psychological disorders and the patient's body weight. The distribution of S-anxiety, T-anxiety levels and the severity of depression in the examined patients depending on marriage shown at **Fig. 1**.

Reducing of body mass index (BMI) was found in 39.47±8 % of patients (*n*=15) with a moderate S-anxiety and in 7.69±8 % (*n*=1) with a low S-anxiety. Among the study participants with moderate and low T-anxiety reduction of BMI respectively found in 61.11±12 % (*n*=11) and 15.15±6.5 % (*n*=5) of cases.
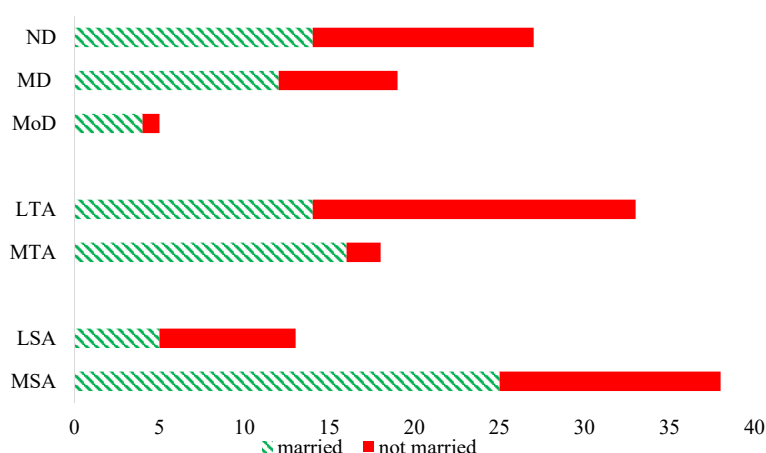

Fig. 1. S-anxiety, T-anxiety levels and the severity of depression in men with first diagnosed pulmonary tuberculosis, depending on marriage. (ND – no depression, MD – mild depression, MoD – moderate depression, LTA – low T-anxiety, MTA – moderate T-anxiety, LSA – low S-anxiety, MSA – moderate S-anxiety)

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All patients with moderate depression were included in the group with a reduced BMI. Among patients with mild depression reduction in BMI was found in 42.1 ± 12 % of cases ($n = 8$), and in patients without depression – 11.11 ± 6 % ($n = 3$).

T-anxiety, S-anxiety levels of and the degree of depression in patients depending by employment shown at **Fig. 2**.
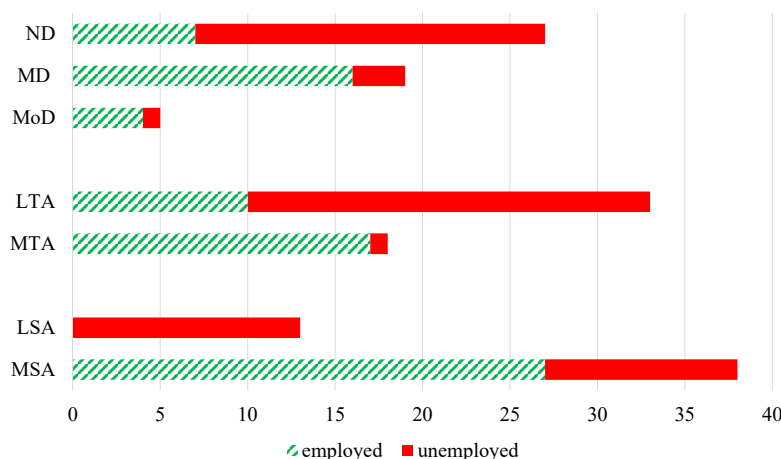

Fig. 2. T-anxiety, S-anxiety levels and the degree of depression in patients depending on employment. (ND – no depression, MD – mild depression, MoD – moderate depression, LTA – low T-anxiety, MTA – moderate T-anxiety, LSA – low S-anxiety, MSA – moderate S-anxiety)

Patients with a low S-anxiety did not require prolongation of therapy, while 36.84 ± 8 % of patients ($n = 14$) with a moderate S-anxiety demanded prolongation of treatment for 30 days. Among men with a moderate T-anxiety prolongation of treatment took place in 55.55 ± 12 % of cases ($n = 10$), and in patients with a low T-anxiety – in 12.12 ± 6 % ($n = 4$).

All men with moderate depression required a 30-day prolongation of therapy. In 36.84 ± 11 % of cases ($n = 7$) treatment was prolonged in patients with mild depression and in 7.4 ± 5 % of cases ($n = 2$) in patients without depression.

4. Discussion

The results of our study showed the effectiveness and appropriateness of questioning patients with first diagnosed pulmonary tuberculosis using the STAI and BDI. According to the questionnaire data, the patients were distributed as follows: according to the STAI, low S-anxiety was found in 25.49 % ($n = 13$) patients and 74.51 % of patients ($n = 38$) showed moderate S-anxiety; low T-anxiety was found in 64.71 % ($n = 33$) patients, moderate T-anxiety – in 35.29 % ($n = 18$) patients. After responded patients on the BDI 52.94 % ($n = 27$) of them were assigned to the group without signs of depressive disorders and 37.25 % ($n = 19$) and 9.8 % ($n = 5$) respectively showed signs of moderate and mild depression. Severe anxiety and depression were not revealed in the observation group. The examined category of patients with pulmonary tuberculosis was characterized by the presence of moderate S-anxiety in 3/4 patients, and moderate T-anxiety and moderate depression – in more than a 30 % of patients. The results of the study indicated the presence of anxiety in 100 % of patients with first diagnosed infiltrative pulmonary tuberculosis and the absence of depressive disorders in only half of them.

More than half of the patients (58.82 %) had massive MTB excretion according to sputum microscopy; all of them were in moderate S-anxiety group. In the group with moderate T-anxiety there were two times more massive MTB-excretors, than among patients with a low T-anxiety ($p = 0.096$). The severity of depressive disorders also showed a relationship with the massiveness of MTB excretion – with an increase in the severity of depression, the frequency of detecting massive MTB excretion also increased. Greater reductions in BMI also took place in patients with more severe

disorders of psychological status. These results indicated the association of an increase in the severity of anxiety and depression with massive MTB excretion and weight loss in patients with first diagnosed infiltrative pulmonary tuberculosis.

The results of the study showed that destructive changes in the lungs, respectively, were 10 ($p<0.03$) and 2 ($p=0.041$) times more often in patients with a moderate S-anxiety and T-anxiety compared with their frequency in patients with mild forms of S-anxiety and T-anxiety. According to our study, destructive changes in the lungs were detected in all patients with moderate depression, in 84.21 % of patients with mild depression, and in 37.04 % of patients without depression.

The prevalence of the tuberculous process in more than two segments of the lungs, respectively, 3.4 ($p=0.018$) and 3.2 ($p=0.002$) times often in moderate S-anxiety and T-anxiety cases compared with their frequency in mild forms of anxiety. Patients with moderate depression in 100 % of cases had lung damage over 2 segments, and patients with mild depression and without depression – 1.6 ($p>0.05$) times and 5.4 ($p=0.053$) times rarely, respectively. Thus, in patients with more symptoms of anxiety and depression, destructive and widespread lung lesions were revealed.

Our data also indicated that more expressed disorders of the psychological status (anxiety, depression) were detected in patients who were married and had a permanent job.

The prolongation of the intensive phase of treatment required 38.84 % of patients with a moderate S-anxiety, 50 % of patients with a moderate T-anxiety, 12.12 % of patients with a low T-anxiety, all patients with moderate depression and, respectively, 36.84 % and 7.4 % of patients with mild depression and without depression. These data testified to the lesser effectiveness of standard therapy in more severe disorders of psychological status.

As shown in studies by Duko B., depression and anxiety in TB patients were detected in 43.4 % and 41.5 %, respectively, which is similar to our study.

As shown in studies by Duko B. et al. depression and anxiety in TB patients were detected in 43.4 % and 41.5 %, respectively, which is similar to our study [21]. In the study by Aamir S. et al. psychological disorders were observed in 72 % of TB cases, which is much more [22]. Tola H. H. et al. in their study note a significant link between marital status and depression [23]. This manifests itself in increased rates of depression in unmarried patients. In our study, a different picture is observed with the prevalence of depression in married men. This may be due to the small sample of patients. This study showed an association of depression with less effective TB therapy, which is also reflected in a systematic review and meta-analysis in 2020 [24].

As noted in the Chandra M. study, depression remains a poor predictor of tuberculosis [25]. The combination of depressive disorders and tuberculosis requires joint approaches at the state level to develop a program for the management of such clinical cases.

The limitations of the research include the study of only men, a small number of patients, the use of only two questionnaires, the use of descriptive statistics.

In the future, the research should be continued in a larger number of patients, including women. In addition, it should include a questionnaire on quality of life, CT of the lungs, pulmonary spirometry and a study of indicators of humoral and cellular immunity.

5. Conclusions

It is advisable to use the STAI and the BDI to assess the psychological status of patients with first diagnosed infiltrative pulmonary tuberculosis.

Patients with first diagnosed infiltrative pulmonary tuberculosis in 100 % of cases have psychological status disorders with a predominance of moderate S-anxiety and the absence of depressive disorders in only half of them. More heavily violations of the psychological status (anxiety, depression) identifies patients who are married and have a permanent job.

In patients with first diagnosed infiltrative pulmonary tuberculosis, an increase in the severity of anxiety and depression is associated with massive bacterial excretion, decrease in body weight, and greater frequency of lung tissue destruction, prevalence of the tuberculosis process by more than 2 lung segments, decrease in the effectiveness of standard therapy and prolongation intensive phase of treatment.

Conflict of interests

Acknowledgments

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