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Research article

## Psychosocial characteristics of tuberculosis patients in Russia and treatment compliance factors

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**Abstract.** The authors of the article analyse approaches to treatment for tuberculosis (TB), which have become widespread throughout the world. Scientists from different countries have made attempts to study the influence of psychological, social, cultural, ethnic, and geographical factors on the spread of tuberculosis and the effectiveness of its treatment. But so far little is known about personal or sociocultural factors that lead to a violation of treatment compliance, which significantly actualises the problems stated in this article. The relevance of the study is also determined by the fact that all measures currently used for treating tuberculosis do not lead to its complete eradication and elimination of the epidemic in the world as well as in the Russian Federation. The purpose of this work was to study the psychosocial characteristics of TB patients in Russia and their interrelationships, which will provide an opportunity to predict the patients' behaviour in a disease situation and their treatment compliance. The study involved 1600 respondents aged 19–60 years: 800 women and 800 men, residents of Samara (Russia), of which 800 persons were TB patients and the other 800 were conditionally healthy. The following psychodiagnostic techniques were used: The World Health Organisation Quality of Life (WHOQOL) Questionnaire (core module), The Level of Social Frustratedness Questionnaire, The Neurotic Disorders Questionnaire (Russian modification of H.D. Hansgen's BVNK-300), M. Bond's Defense Style Questionnaire (DSQ) in Russian adaptation by E. Tunik, The Ways of Coping Questionnaire (WSQ) by S. Folkman and R. Lazarus in a modified and adapted Russian version, The Type of Attitude Towards the Disease (TATD) Questionnaire, and The Level of Compliance Questionnaire. It was found that the TB patients had a significantly decreased quality of life, especially in the spheres of social relations, psychological state and spirituality. Characteristic features of the TB patients in Russia were disorders of the digestive and cardiovascular systems, sleep and motor disorders, affective instability, mental exhaustion, excitability, impaired working ability, fears, and social-psychological maladaptation. The respondents tended to use more maladaptive psychological defence mechanisms. As the leading coping ways for the TB patients, search for social support and acceptance of responsibility were identified. The prevailing types of attitudes toward the disease were characterised by an intrapsychic orientation, causing impaired social adaptation of these patients. The authors constructed regression models of compliance to determine strategies for TB patients psychological support. The results of the study as well as the constructed models can be used for training professional personnel in the field of medicine, clinical psychology, social work and social pedagogy in order to optimise the provision of medical, social, psychological and pedagogical assistance to TB patients in Russia and in other countries of the world: stu-

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dies show that the factors identified and analysed in this paper are similar in TB patients in different countries, regardless of their geographic location or the level of economic development and cultural features.

**Key words:** tuberculosis patients, quality of life, social frustration, psychological defence, ways of coping, type of attitude towards the disease, compliance

## Introduction

Treatment efficacy depends on many medical and social factors. However, no matter how high the medical technologies or the level of professionalism of doctors might be, the success of treatment, the absence or minimisation of complications, the effectiveness of rehabilitation measures will depend on the patients' readiness for treatment and recovery, their ability to receive medical care, and responsibility for their health before themselves and society.

At the international level, compliance to TB treatment is recognised as a key principle of the TB eradication mechanism. Scientists from different countries have made attempts to study psychological, social, cultural, ethnic, and geographical factors influencing the spread of tuberculosis and its treatment efficacy. But so far little is known about personal or sociocultural factors that lead to a violation of treatment compliance. Given the lack of resources for treating tuberculosis, treatment compliance is affected by poverty, gender discrimination, social context, healthcare system development, and personal characteristics of patients. The NICE Medication Compliance Guide focuses on adapting support for patients to their individual needs, taking into account perceptions of illness and treatment, personal, social, and material resources that influence treatment motivation (Wurie et al., 2018).

Russia, India and China are the countries that bear the heaviest burden of tuberculosis. Tuberculosis is also rampant in many African countries. Violations of treatment compliance and, as a consequence, the low treatment effect and developed multidrug resistance of the causative agent of tuberculosis do not allow bringing the cure in these regions to 85% recommended by WHO and stopping the spread of tuberculosis.

The scientific literature presents the results of studies on the incidence of tuberculosis throughout the world. These studies are multidirectional in nature: from historical and archaeological to social and economic ones. Below are a number of some studies conducted by foreign researchers.

Of interest to us are the findings of scientists obtained as a result of studying archeogenetics and the evolutionary development scenario for mycobacterium tuberculosis. It has been established that already in the period preceding the Neolithic Age, people encountered and interacted with mycobacteria tuberculosis (Pascale, 2015). Another study was concerned with the rate and geography of the spread of drug-resistant TB forms. It was revealed that they spread at a high rate in the WHO European region. Of the 27 countries with a heavy burden of multidrug-resistant tuberculosis, 15 are in the European region (Jakab et al., 2015). One more study presented a comparison of factors affecting the incidence of tuberculosis among refugees and immigrants in South Korea (Kim, 2020). Scientists from Malaysia highlighted demographic and socio-economic factors that contribute to the spread

of tuberculosis as the main ones that countries with a heavy burden of tuberculosis should pay attention to (Mahindran, Ahmad, 2020).

The subjects of research were types of attitudes towards tuberculosis and its perceptions among military personnel (Chang-gyo Yoon et al., 2019) as well as the relationship between age and the incidence among medical workers (Seuk, 2018) are presented. Various medical and social technologies of interaction with adolescent TB patients were studied (Enane et al., 2020). The findings of a cross-sectional study of current national patient care and support policies in countries with a high burden of tuberculosis are set out. TB treatment programmes were analysed in 23 of the 30 countries with a heavy burden of tuberculosis, representing 77.4% of TB cases worldwide. It is found that national policies in many countries have not yet fully accepted the WHO global recommendations for the care and support of TB patients (Cocozza et al., 2020).

The results of the studies demonstrate that age and residence affect treatment compliance. The knowledge of the expected response to treatment, the daily doses of the administered drugs, the side effects and duration of the treatment, as well as the use of professional monitoring tools for taking anti-TB drugs, play an important role in developing treatment compliance.

Doctors, social workers and psychologists all over the world are trying to solve the problem of TB treatment compliance. For this purpose, various research methods are used.

Based on a territorially stratified method for collecting information, 1020 households in Eastern Cape (South Africa) were studied. It was revealed that 95% of the respondents believed that people with TB tended to hide their disease for fear of condemnation by others. At the same time, neither age, nor gender, nor educational background affected this point of view. Most of the respondents believed that only poor people who could not afford treatment spread tuberculosis.

The society is inclined to accuse patients with tuberculosis of using alcohol and drugs, smoking a lot, which means that they deserve to suffer from tuberculosis. More than 50% of patients consider tuberculosis an African disease, which is certainly combined with HIV infection. All the respondents believe that tuberculosis patients deserve public condemnation. One of the reasons why TB patients stop treatment the respondents consider improving health before the end of the treatment course, fear of being rejected by society, forgetfulness in taking medications, alcoholism, irresponsibility, and fear that their visiting a specialized clinic may be made known. A high level of stigmatisation of the population is revealed: 95% of the respondents believe that TB patients tend to hide this fact because of fear of being condemned by others. The authors point to the need for a patient-oriented approach to treating tuberculosis, reducing the stigmatisation of society and increasing the active role of patients in the treatment process (Cramm et al., 2010).

A study of the psychological stress severity among TB patients in South Africa uncovered its high level. Up to 81% of the subjects had mental disorders. In addition, 34% of the respondents said that they missed at least 10% of medications over the past month. Based on the results of the study, the authors point out the need for structural changes in the state economic policy to combat poverty combined with psychological intervention for successful TB treatment (Peltzer et al., 2012).

In South America, in Peru, a study was made regarding treatment compliance factors. It was found that the refused anti-TB treatment was associated with discomfort during treatment, drug use, poverty, sexual identity (men more often stopped treatment without permission than women), resistance to antibiotics, and increased material costs for treatment (Culqui et al., 2012)

A systematic analysis of a large number of studies conducted in different countries by P. Ruiz-Grosso, R. Cachay, A. de la Flor, A. Schwalb, C. Ugarte-Gil revealed that the depressive symptoms diagnosed in TB patients were related with negative treatment outcomes. The authors believe that management of TB patients should include screening for depression. A significant correlation was found between depression and low TB treatment compliance (Ruiz-Grosso et al., 2020).

S.H. Chang and J.K. Cataldo analysed 1268 studies conducted around the world to identify differences and similarities in the impact of TB perceptions on knowledge about the disease, attitude to it and its treatment compliance in different countries. The results confirmed cultural differences in the incidence of tuberculosis and stigmatisation of society (Chang, Cataldo, 2014).

In countries with a heavy burden of tuberculosis, scientists are trying to find a solution to the problem of TB treatment compliance. J. van den Boogaard and his colleagues see one of the possible strategies for increasing treatment compliance by shortening the duration of treatment, creating electronic means to track drug administration for TB patients, and developing easily and quickly accessible markers of treatment outcomes (Van den Boogaard et al., 2011).

There have been studies of numerous factors that influence the development of treatment compliance in TB patients. However, studies of the psychosocial characteristics of such patients are fragmented. In this regard, the studies conducted by Ethiopian scientists are of interest to us. These studies identified the main areas where health promotion measures should be directed to increase treatment compliance in TB patients of different ages, gender, educational level and social status, namely: the status of antiretroviral therapy, material condition of the patient's family and economic development of the state in general as well as alcohol consumption and psychological disorders (Tola et al., 2017).

There have been not so many foreign studies on the psychological characteristics of TB patients in the scientific literature. They mainly concern the medical and social aspects of their treatment compliance. Thus, the research of G. Fagundez et al. show that there are many interacting factors that influence treatment compliance of TB patients. Insufficient knowledge about the disease, regimen and duration of treatment; side effects of drugs; long treatment period; changes in the level of material well-being; loss or change of job; financial difficulties associated with the disease, remoteness of the medical institution from the patient's place of residence; lack of access to medical services; discrimination; social stigmatization – these are just some of the factors that influence TB treatment and recovery (Fagundez et al., 2016; Haslinda, Hanafiah, 2017).

The influence of the psychological characteristics of TB patients on the course and outcome of the disease has been studied for many years by doctors and psychologists from different countries. Most of the studies were conducted in Russia, since the burden of tuberculosis infection in our country has been and remains quite heavy.

N.V. Zolotova and her colleagues revealed in TB patients a high level of trait anxiety, decreased vitality, fears, negativity towards other people, and somatoform disorders (Zolotova et al., 2019). Their works describe the influence of the patient's psychological status on the TB process dynamics. It has been established that cases of multidrug resistance are significantly more often recorded in patients whose psychological status is impaired. Doctors record more subjective complaints and side effects of drugs in such patients (Zolotova et al., 2018).

V.V. Streltsov and his colleagues highlight the fact that tuberculosis has a strong effect on the psychological state of patients. The risk of developing borderline neuro-psychiatric disorders increases while treatment compliance decreases (Streltsov et al., 2014). Inadequate types of attitude to the disease are often formed in newly diagnosed patients due to their low awareness of the nature, course and prognosis of the disease (Belostotsky et al., 2015; Sherstneva et al., 2015). The need for long-term treatment, hospitalisation, and drug administration causes instability of the emotional background and a decrease in mood (Mordyk et al., 2016).

Of great importance for TB patients is social support of their families, colleagues and friends. It is also important to form and maintain their motivation for treatment and recovery. The necessity of combining medical, psychological and social support as well as using an individual approach to increase treatment compliance in TB patients is highlighted in the work of A.V. Mordyk and his colleagues (Mordyk et al., 2016). They used data from studies of patients with fibrous-cavernous TB. After studying their personalities, the researchers concluded that these patients are characterised by imbalance, moroseness, emotional lability, and a low level of aspiration (Mordyk et al., 2016).

Currently, there are a number of studies in the scientific literature based on ideas about the psychosocial nature of tuberculosis. Thus, S.V. Kandrychyn notes the importance of social-psychological factors in the incidence of tuberculosis (Kandrychyn, 2018). I.V. Buynevich and his colleagues investigated the personalities of pulmonary TB patients undergoing palliative treatment. They found that in the course of treatment a passive type of response is formed, social relations are broken, plentiful complaints about health appear, and patients become morose and “withdraw into the disease”. Hypochondriac disorders determine the psychological status of patients with incurable TB forms (Buynevich et al., 2016). Disorders of the emotional background, mnemonic processes, and social relations are described in the works of TB doctors and psychologists (Erokhin et al., 2014; Dobrovolskaya et al., 2016; Gurova et al., 2016).

The scientific novelty of our study is in the fact that it highlighted the psychosocial factors affecting treatment compliance of TB patients in Russia and a regression analysis made it possible to obtain linear mathematical models of social, emotional, behavioural and general compliances. They formed the basis for the model of psychosocial support for TB patients.

The main hypothesis underlying this study is as follows: the developed model of psychosocial support is a system of characteristics of the psychosocial state that affect the course of medical diagnostic and rehabilitation processes and the development of treatment compliance in TB patients in Russia.

## Methods

**Participants.** The *Experimental Group (EG)* consisted of 800 subjects aged 19–60 years: 400 women and 400 men, residents of Samara (Russia). The criteria for inclusion in the group were: informed consent to participate in the study, the following diagnoses (according to ICD-10): A15.6 Tuberculous pleurisy, confirmed bacteriologically and histologically; A15.7 Primary tuberculosis of the respiratory system, confirmed bacteriologically and histologically; A15.8 Tuberculosis of respiratory organs, confirmed bacteriologically and histologically. Infiltrative and focal tuberculosis predominated; pulmonary tuberculosis was diagnosed in 21% of the cases. Drug resistance (including multiple) was detected in 49.8% of the patients in a representative sample.

*EG sociodemographic characteristics.* At the time of the study, 67% of the respondents worked, and more than half of them had to change jobs due to tuberculosis. 43% of the patients were in a formal or informal marriage. Almost a third of all the respondents were divorced, including due to tuberculosis. 34% of the respondents lived a solitary life. 50% of the participants had children, however, not all of them had the opportunity to live with their children and raise them, including due to tuberculosis. 68% of the respondents lived in the city.

The criteria for exclusion from the EG were: data in the case history and/or clinical picture of psychotic disorders and severe concomitant somatic diseases, use of psychotropic drugs.

*The Control Group (CG)* was identical to the experimental one in terms of numerical, gender and age composition. It included 800 adult conditionally healthy subjects (400 males and 400 females).

**Techniques.** The following psychodiagnostic techniques were used:

1. *The World Health Organization Quality of Life (WHOQOL) Questionnaire* (core module). The WHOQOL is a quality of life assessment developed by the WHOQOL Group with fifteen international field centres, simultaneously, in an attempt to develop a quality of life assessment that would be applicable cross-culturally ([https://www.who.int/mental\\_health/publications/whoqol/en/](https://www.who.int/mental_health/publications/whoqol/en/)). The WHOQOL-100 includes 100 direct questions. It allows to evaluate the quality of life in 6 spheres of life: Physical Sphere, Psychological Sphere, Independence Level, Spiritual Sphere, Environment, and Spiritual Sphere.

2. *The Level of Social Frustration Questionnaire (LSFQ)* (Vasserman et al., 2014). This questionnaire determines the level of “satisfaction – dissatisfaction” in 20 areas of personality relations, which, according to experts, are most significant for the adult able-bodied person.

3. *The Neurotic Disorders Questionnaire (NDQ)* – Russian modification of H.D. Hansgen’s BVNK-300 by V. Ababkov et al. (1995). The questionnaire is aimed at identifying the current mental state, personality traits (including pathological) and some other pathological conditions of personality. The questionnaire contains 300 items that form 30 scales: 15 clinical, 7 personal, 6 special, and 2 control (Ababkov et al., 1995).

4. *M. Bond’s Defense Style Questionnaire (DSQ-88)* in Russian adaptation by E. Tunik (Tunik, 2010). The DSQ-88 contains 88 items which represented 24 defense mechanisms by M. Bond and S. Wesley (Bond, Wesley, 1996). These de-

fense mechanisms formed four defense styles: (1) *maladaptive action* (somatization, fantasy, consumption, help-rejecting complaining, withdrawal, regression, projection, acting out, inhibition, passive aggressive behavior); (2) *self-sacrificing* (denial, pseudo-altruism, reaction formation); (3) *image-distorting* (omnipotence, omnipotence-devaluation, isolation, primitive idealization, splitting), and (4) *adaptive* (affiliation, humor, anticipation, sublimation, suppression, task orientation).

5. *The Ways of Coping Questionnaire (WCQ)* by S. Folkman and R. Lazarus in a modified and adapted Russian version (Kryukova, Kuftyak, 2007).

6. *The Type of Attitude Towards the Disease (TATD) Questionnaire* (Vasserman et al., 2014). The questionnaire identifies 12 types of attitude towards the disease: harmonic, ergopathic, anosognosic, anxious, hypochondriac, neurastheniac, melancholic, apathetic, dysphoretic, sensitive, egocentric, paranoiac.

7. *The Level of Compliance Questionnaire* (Kadyrov et al., 2014). The *compliance* includes three components: (1) *social compliance* – the desire to comply with the doctor’s prescriptions due to the orientation towards social approval; (2) *emotional compliance* – a tendency to comply with the doctor’s prescriptions due to increased sensitivity; *behavioral compliance* – the desire for accurate adherence to the doctor’s prescriptions aimed at overcoming the disease.

**Statistical processing** of the results was carried out using the statistical package Microsoft Excel, SPSS 16.0. The procedures involved: Mann – Whitney’ *U*-test, correlation and regression analysis, factor analysis. The significance of the differences was determined when a level of  $p \leq .05$  was reached.

**The study protocol** was approved at a meeting of the Committee on Bioethics at Samara State Medical University (protocol No. 191 of 05.04.2018).

## Results

To study *the quality of life* of the adult patients with tuberculosis (EG) and conditionally healthy subjects (CG), *The WHOQOL-100* (core module) was used (Table 1).

The physical sphere of the subjects was characterised by a decrease in the indicators of all factors included in it, and a decrease in the indicators for all the factors of the psychological sphere was also observed; noteworthy is that “Self-esteem” and “Body image and appearance” were to a greater extent reduced in women than in men. The value of “Spirituality, religion, personal beliefs” was slightly reduced. Some respondents noted a change in religious and worldview attitudes in the treatment process. Thus, some patients reported that they came to believe in God, while others stopped believing in higher powers, perceiving their disease as a “lapse” on their part.

To study the severity of *social frustration* of TB patients and conditionally healthy subjects, *The Level of Social Frustration (LSF)* technique was used. Of all the TB patients, 68% showed a moderate level of social frustratedness; 31% belonged to a group of people with an uncertain assessment of frustratedness; and 1% of the respondents had pronounced social frustratedness. The TB patients were reported to be most dissatisfied with their physical and material condition, lifestyle in general and professional activities. Based on the results of ranking the areas of social functioning, it was revealed that the most significant for the subjects were

their position in society, relations with colleagues or parents, their work and level of professional training. For the members of the CG, subjectively, the most significant factors were work, financial situation, position in society, level of professional training and relations with colleagues at work.

Table 1

The life quality indicators in the respondents of EG and CG (WHOQOL-100, in points)

Index	Factors and spheres of life quality	EG (M ± m, N = 800)	CG (M ± m, N = 800)	U-test, p
F1	Physical pain and discomfort	13.83 ± 3.11	14.3 ± 2.96	> .05
F2	Vitality	10.13 ± 3.15	13.3 ± 3.37	> .05
F3	Sleep and rest	10.23 ± 2.97	12.0 ± 3.02	> .05
F4	Positive emotions	9.15 ± 4.1*	11.1 ± 0.85*	≤ .05
F5	Thinking, learning ability, memory	7.69 ± 2.59*	15.8 ± 2.16*	≤ .05
F6	Self-esteem	9.57 ± 3.43*	12.2 ± 2.41*	≤ .05
F7	Body image and appearance	9.74 ± 3.45	10.8 ± 3.63	> .05
F8	Negative emotions	13.5 ± 4.05	13.3 ± 4.21	> .05
F9	Mobility	13.95 ± 2.97	15.1 ± 3.98	> .05
F10	Ability to do everyday routine	12.06 ± 3.19	13.7 ± 3.48	> .05
F11	Drug and treatment dependence	14.78 ± 2.29*	16.0 ± 1.02*	≤ .05
F12	Ability to work	9.45 ± 3.05	10.0 ± 3.16	> .05
F13	Personal relationships	7.48 ± 2.15*	11.4 ± 1.47*	≤ .05
F14	Practical social support	6.91 ± 1.56*	12.9 ± 2.69*	≤ .05
F15	Sexual activity	8.44 ± 2.33*	10.0 ± 1.23*	≤ .05
F16	Physical security	11.11 ± 4.43	13.0 ± 3.26	> .05
F17	Home environment	11.14 ± 4.09	13.0 ± 3.57	> .05
F18	Financial resources	8.26 ± 2.56	9.7 ± 2.18	> .05
F19	Medical and social assistance	11.27 ± 2.45*	9.8 ± 2.39*	≤ .05
F20	Opportunity to receive new information	7.8 ± 2.14*	14.1 ± 2.71*	≤ .05
F21	Opportunity for relaxation and entertainment	8.52 ± 2.29*	10.2 ± 0.16*	≤ .05
F22	Outside environment	11.75 ± 3.77	12.5 ± 3.22	> .05
F23	Transport	13.95 ± 3.76	15.2 ± 3.91	> .05
F24	Spirituality, religion, personal beliefs	9.98 ± 3.81	11.4 ± 4.08	> .05
I	Physical sphere	11.38 ± 1.66	13.2 ± 2.52	> .05
II	Psychological sphere	9.92 ± 1.58	12.64 ± 1.68	> .05
III	Independence level	12.56 ± 1.54	13.7 ± 2.06	> .05
IV	Social relationships	7.6 ± 1.72*	11.4 ± 1.29*	≤ .05
V	Environment	10.48 ± 1.68	12.19 ± 1.21	> .05
VI	Spiritual sphere	9.88 ± 3.81	11.4 ± 2.26	> .05
<b>Overall quality of life</b>		61.88 ± 6.09*	74.53 ± 2.72*	≤ .05
<b>Overall evaluation of life perception</b>		8.89 ± 3.61	10.35 ± 2.27	> .05

To study the structure and severity of *neurotic and neurosis-like disorders* as well as personality traits that are significant for the occurrence of neurotic and psychosomatic disorders, *The Neurotic Disorders Questionnaire (NDQ)* (Russian modification of H.D. Hansgen's BVNK-300 by V. Ababkov et al. (1995)) was used. The results obtained indicate that the TB patients were characterised by increased values of the following factors: fluctuation in the intensity of complaints ( $79 \pm 7.1$ ), digestive disorders ( $121 \pm 11.2$ ), impaired general sensitivity ( $86 \pm 12.7$ ), mental



exhaustion ( $95 \pm 12.2$ ), sleep disturbances ( $87 \pm 5.9$ ), low self-esteem ( $90 \pm 18.6$ ), reduced working capacity ( $74 \pm 16.0$ ), unmotivated fear ( $85 \pm 9.5$ ) and disturbances in social contacts ( $92 \pm 12.0$ ). For these factors, statistically significant differences between the subjects of the EG and CG were obtained (at  $p \leq .05$ ).

Analysing the values of personality scales, it is necessary to note a decrease in the “Neurotic behaviour supercontrol” scale in men manifested in the spontaneity of emotional reactions and behaviour and the decreased ability to reflect. The increased value of the “Social non-adaptability” scale in the TB patients indicates a violation of social adaptation, a decrease in social perception and criticality regarding their behaviour. The analysis of special scales revealed excessive smoking, drinking, hypomaniac manifestations and paranoia in the group of the TB patients.

To study the structure of psychological defences, *M. Bond's Defense Style Questionnaire (DSQ-88)* in Russian adaptation by E. Tunik was applied. Of all the defense mechanisms presented in this questionnaire, the most pronounced in the TB patients were *maladaptive* (indicated in points): projection (6.5), acting out (5.8), consumption (5.7), inhibition (5.7), passive aggression (5.1). Among *adaptive styles* of defence, the most pronounced were affiliation (5.8) and suppression (5.4). In the group of *self-sacrificing* defences, the most pronounced was denial (4.3 points). Statistically significant differences in the severity of the following defense mechanisms between EG and CG were obtained: inhibition, fantasy, humour, suppression, pseudo-altruism (at  $p \leq .05$ ). Thus, the TB patients tended to use more *maladaptive*, poorly effective defense mechanisms that impeded the formation of both adequate perceptions of the disease and adaptive behaviours in the disease.

To determine *ways to overcome difficulties* in various areas of mental activity, we used *The Ways of Coping Questionnaire (WCQ)* by S. Folkman and R. Lazarus in a modified and adapted Russian version (Kryukova, Kuftyak, 2007). The TB patients more often resorted to the search for social support ( $62.77 \pm 9.12$ ), took responsibility for what was happening ( $44.79 \pm 13.78$ ) and tried to avoid frustrating situations ( $47.88 \pm 13.02$ ). However, for the respondents in the CG, it was more common to show confrontation ( $54.19 \pm 18.26$ ) and plan how to solve their problems ( $48.29 \pm 17.18$ ). 68% of the TB patients used the search for social support to cope with a stressful situation, with men being significantly more likely to do so ( $p \leq .05$ ) than women (32 and 18% respectively). In the CG, this number was only 37% of the respondents. 54% of the EG respondents tried to cope with a stressful situation, taking responsibility for what was happening, and women with TB were more likely to behave like that than men (72 and 56% respectively). Thus, for the TB patients, the most characteristic coping behaviour ways were “Search for social support” and “Acceptance of responsibility”.

The results of *The Type of Attitude Towards the Disease (TATD) Questionnaire* in EG is presented in Table 2.

The results presented in Table 2 shows that there were statistically significant differences in the frequency of occurrence of certain types of attitude towards the disease in men and women. Thus, in men, the manifestations of the anosognosic and ergopathic types of attitude to the disease were significantly more often diagnosed, while in women the sensitive type prevailed. However, in the entire group,

prevailing were the types of response to the disease related to the second block (anxious, hypochondriac). They were characterised by intrapsychic orientation, causing violations of the social adaptation of the patients.

Table 2

**Frequency of types of attitude towards the disease in male and female TB patients (TATD, %)**

Type of attitude towards the disease	Men (N = 400)	Women (N = 400)	Whole EG (N = 800)
Harmonic	0	0	0
Ergopathic	54*	38*	46
Anosognosic	70*	46*	58
Anxious	68	60	64
Hypochondriac	68	60	64
Neurastheniac	26	22	24
Melancholic	4	6	5
Apathetic	8	10	9
Dysphoretic	16	18	17
Sensitive	52*	70*	61
Egocentric	9	3	6
Paranoiac	11	6	9

Note. \* – statistically significant differences at  $p \leq .05$ .

To study the compliance of the TB patients, *The Level of Compliance Questionnaire (LCQ)* was used. It was revealed that the general compliance of the TB patients was characterised by a predominant average severity level of 67% (72% of men and 62% of women). The patients in this group had an indefinite attitude towards treatment, they were inclined to act according to the situation. A high level of general compliance was diagnosed only in 19% of the subjects (14% of men and 24% of women). Such patients were noted to tend to have constructive relationships with their doctors and make a positive impression of themselves. They promoted the treatment process, realised its necessity and significance, worried about the consequences of the disease and possible complications. They were focused on treatment and recovery, faithfully followed the doctor's recommendations. A low level of general compliance was diagnosed in 14% of the subjects. Such patients were focused on their decisions and opinions, they disregarded the doctor's opinion, their behaviour was characterised by proneness to conflict. The patients in this group had a tendency to underestimate the severity of the disease and possible complications; therefore, they neglected the treatment recommended by the doctor. They were reported to miss and even refuse diagnostic and treatment procedures. Thus, the vast majority of the examined TB patients can be aware of the severity of their disease and the need for treatment. It is possible for them to develop an active position regarding the medical diagnostic process. A risk group consisted of 14% of patients who stopped treatment without permission.

Numerous correlations revealed between the indicators of psychodiagnostic techniques made it possible to conduct a factor analysis and identify 5 factors that presumably affect the development of treatment compliance in TB patients. These factors were as follows: "Quality of Life", "Compliance", "Vitality", "Spirituality", and "Self-Control".

*Factor I – “Quality of Life”*. Such factors of the WHOQOL as practical social support (–.835), ability to do daily routine (–.728), self-esteem (–.77), general assessment of life perception (–.807), ability to work (–.820), personal relationships (–.823) and social relationships (–.835), positive emotions (–.427) are closely related and determine the high value of the factor. The indicators that reduce the value of the factor are: physical pain and discomfort (.858), weak drug and treatment dependence (.740), negative emotions (.615), disturbances in social relationships (.600), reduced ability to work (.439) from WHOQOL, search for social support (.669) as coping way (WCQ), projection (.617) as defense mechanism (DSQ-88), and sensitive attitude towards the disease (.565).

*Factor II – “Compliance”*. This factor is determined by closely related behavioural (–.788) and social compliance (.759), hypochondriac attitude towards the disease (–.469), and negative emotions (–.554) experienced by the TB patients. The following indicators hinder the development of compliance: increased excitability (.513), confrontation (.600) and flight-avoidance (.737) as coping ways (WCQ); withdrawal (.705) and fantasy (.802) as defense mechanisms (DSQ-88); dysphoretic (.708) and neurastheniac (.719) attitudes towards the disease (TATD); and affective instability (.726) from NDQ.

*Factor III – “Vitality”*. This factor is formed by closely related positive emotions (–.629), opportunity to receive new information (–.592), environmental quality (–.524) and mobility (–.480) from the WHOQOL and emotional compliance (–.705) from LCQ. Passive aggression (.443) as defense mechanisms (DSQ-88), cognitive and social passivity (.447) from NDQ, and satisfaction with one’s lifestyle (.524) and psychoemotional state (.597) from LSFQ have an inverse relationship with the *Vitality Factor*.

*Factor IV – “Spirituality”*. The high values of this factor are formed by closely related WHOQOL indicators such as overall quality of life (.498), spirituality, religion, personal beliefs (.759), spiritual sphere of life (.759), and introverted personality orientation (.641) from NDQ.

*Factor V – “Self-Control”*. Such types of defence mechanism (DSQ-88) as denial (.700), humour (.552), acting out and pseudo-altruism (.657) as well as unmotivated fear (.395) and obsessive thoughts and actions (.379) from NDQ are directly related to the increased values of this factor. The feeling of complete physical security (–.408) from WHOQOL and apathetic attitude towards the disease (–.359) are inversely associated with “*Self-Control*” factor.

Further, a regression analysis (step-by-step selection method) was performed and linear mathematical models of behavioural (Table 3), social (Table 4), and emotional (Table 5) compliances were obtained.

The regression model for *behavioural compliance* (BC) explains 59.8% of the variation of this dependent variable (Table 3) in the TB patients. The model showed that the tendency to simulation (NDQ), the confrontation coping strategy (WCQ) and the dysphoric type of attitude towards the disease are negative predictors of BC and have a negative impact on it. Based on the model, we set up the following formula:

$$BC = -0.48 \times \text{simulation} - 0.18 \times \text{confrontation} - 0.22 \times \text{dysphoric TATD} + 41.87.$$

Table 3

**Best predictor regression model for behavioural compliance in TB patients (N = 800)**

Independent variables	Non-standardised coefficients		Standardised coefficients	t-value	p-value
	B	Std. Error	Beta		
(Intercept)	41.87	1.99		21.02	.0001
Simulation (NDQ)	-0.48	0.10	-0.36	-4.75	.0001
Confrontation (WCQ)	-0.18	0.03	-0.39	-5.62	.0001
Dysphoric TATD	-0.22	0.05	-0.28	-4.03	.0001
<b>Summary of model</b>					<b>Value</b>
Regression coefficient R					.781
Determination coefficient R <sup>2</sup>					.610
Adjusted R <sup>2</sup>					.598
Fisher F-test					50.05, p < .0001

Table 4

**Best predictor regression model for social compliance in TB patients (N = 800)**

Independent variables	Non-standardised coefficients		Standardised coefficients	t-value	p-value
	B	Std. Error	Beta		
(Intercept)	15.69	2.9		5.39	.0001
Affiliation (DSQ-88)	2.07	0.24	0.50	8.82	.0001
Fantasy (DSQ-88)	-1.18	0.31	-0.25	-3.85	.0001
Neurasthenic TATD	-0.18	0.05	-0.20	-3.32	.0010
Negative emotions (WHOQOL)	0.39	0.15	0.16	2.61	.0110
<b>Summary of model</b>					<b>Value</b>
Regression coefficient R					.887
Determination coefficient R <sup>2</sup>					.787
Adjusted R <sup>2</sup>					.778
Fisher F-test					87.86, p < .0001

Table 5

**Best predictor regression model for emotional compliance in TB patients (N = 800)**

Independent variables	Non-standardised coefficients		Standardised coefficients	t-value	p-value
	B	Std. Error	Beta		
(Intercept)	18.77	2.66		7.04	.000
Neurasthenic TATD	0.39	0.05	0.53	7.29	.000
Positive emotions (WHOQOL)	-0.39	0.17	-0.19	-2.35	.021
Anosognosic TATD	-0.17	0.04	-0.29	-3.88	.000
Omnipotence-devaluation (DSQ-88)	2.64	0.69	0.26	3.80	.000
Environment (WHOQOL)	-0.46	0.18	-0.22	-2.57	.012
<b>Summary of model</b>					<b>Value</b>
Regression coefficient R					.740
Determination coefficient R <sup>2</sup>					.548
Adjusted R <sup>2</sup>					.524
Fisher F-test					22.75, p < .0001

The regression model for *social compliance* (SC) explains 77.8 % of the variation of this dependent variable (Table 4) in the TB patients. The model showed that affiliation as the defence mechanism (DSQ-88) and negative emotions in the structure of quality of life (WHOQOL) are negative predictors, while fantasy (DSQ-88) and the neurasthenic TATD are a positive predictors of SC. Based on the model, we set up the following formula:

$$SC = 0.39 \times \text{negative emotions} + 2.07 \times \text{affiliation} - 1.18 \times \text{fantasy} - 0.18 \times \text{neurasthenic TATD} + 15.69.$$

The regression model for *emotional compliance* (EC) explains 52.4 % of the variation of this dependent variable (Table 5) in the TB patients. The model showed that omnipotence-devaluation as the defence mechanism (DSQ-88) and neurasthenic TATD are positive predictors, while positive emotions and environmental influences (WHOQOL) are a negative predictors of EC. Based on the model, we set up the following formula:

$$EC = 2.64 \times \text{omnipotence-devaluation} - 0.17 \times \text{anosognosic} + 0.39 \times \text{neurasthenic} - 0.39 \times \text{positive emotions} - 0.46 \times \text{environment} + 18.77.$$

## Conclusion

The study of TB patients in the Russian Federation revealed decreased *quality of life* indicators in all areas of life, especially in social relationship, psychological and spiritual spheres. The TB patients were reported to be most dissatisfied with their physical and material condition, lifestyle in general and professional activities. Of all the TB respondents, 68% showed a moderate level of *social frustrations*.

Characteristic features of the TB patients were *disorders* in the digestive system, cardiovascular system, impaired general sensitivity, sleep and motility disturbances, mental exhaustion, increased irritability and affective instability, decreased working capacity, unmotivated fear, low self-esteem, disturbed social contacts and social maladaptation.

The TB patients tended to use more maladaptive psychological *defence mechanisms* that impeded the formation of both adequate perceptions of the disease and adaptive behaviours in the disease. “Search for social support” and “Acceptance of responsibility” were identified as the leading *coping ways* for the TB patients.

The examined TB patients showed the diffuse *type of attitude towards the disease*. The prevailing types of response to the disease were characterised by an intrapsychic orientation, causing impaired social adaptation of patients. The vast majority (86%) of the TB respondents were aware of the severity of the disease and the need for treatment; it was possible for them to develop an active position regarding the diagnostic and treatment process and persistent treatment compliance. The remaining respondents constituted a risk group in terms of the unauthorised termination of treatment, lack of adherence to treatment and, as a result, the development of drug resistance and complications, increased duration of treatment and a high risk of mortality. At least 14% of the studied patients do not have treatment compliance and therefore constitute a risk group.

The results obtained in general confirm and supplement the results other international and Russian authors described in the introduction.

Based on the results of the study, we were able to construct linear mathematical models of behavioral, social, and emotional compliances in order to predict the behaviour of TB patients in a disease situation and determine strategies for their psychological support.

The results of the study, as well as the constructed models, can be used for training professional personnel in the field of medicine, clinical psychology, social work and social pedagogy in order to optimise the provision of medical, social, psychological and pedagogical assistance to TB patients at all stages of the treatment, diagnostic and rehabilitation processes. The methodology for constructing and conducting the study and the obtained mathematical models can be used by colleagues from other countries involved in the identification, diagnosis, treatment and rehabilitation of patients of this category, since many factors affecting treatment compliance are similar in TB patients in different countries, regardless of their geographical location, level of economic development and cultural characteristics.

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**Исследовательская статья**

## **Психосоциальные характеристики больных туберкулезом в России и факторы формирования приверженности лечению**

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**Аннотация.** В статье проводится анализ подходов к лечению туберкулеза, получивших распространение в разных странах мира. Учеными разных стран предпринимались попытки исследования влияния психологических, социальных, культуральных, этнических, географических факторов на распространение туберкулеза и эффективность его лечения. Но пока мало известно о личностных, социально-культурных факторах, которые приводят к нарушению приверженности лечению, что существенно актуализирует проблематику, заявленную в данной статье. Актуальность исследования также обусловлена тем, что все применяемые в настоящее время меры по борьбе с туберкулезом не приводят к его полному искоренению и устранению эпидемии в мире, в том числе в РФ. Целью настоящего исследования явилось изучение психосоциальных характеристик больных туберкулезом в России и их взаимосвязи, что обеспечит возможность прогнозировать поведение пациента в ситуации болезни и его приверженность лечению (комплаентность). В исследовании приняли участие 1600 респондентов в возрасте 19–60 лет: 800 женщин и 800 мужчин, жители г. Самара (Россия), из которых 800 человек больны туберкулезом, 800 – условно здоровы. Используются следующие психодиагностические методики: опросник качества жизни WHOQOL (ядерный модуль) Всемирной организации здравоохранения, «Уровень социальной фрустрированности», «Опросник невротических расстройств» (ОНР), опросник структуры психологических защит (тест СПЗ), опросник «Стратегии совладающего поведения», методика для психологической диагностики типов отношения к болезни (ТОБОЛ), опросник «Уровень комплаентности». Выявлено, что у больных туберкулезом выражено снижение качества жизни, особенно

в сферах социальных отношений, психологического состояния и духовности. Для больных туберкулезом в Российской Федерации характерны расстройства пищеварительной и сердечно-сосудистой систем, нарушения сна и моторики, аффективная неустойчивость, истощаемость, возбудимость, нарушение работоспособности, страхи, социально-психологическая дезадаптация. Респонденты используют в большей степени неадаптивные, слабо эффективные способы психологической защиты. В качестве ведущих стратегий совладающего поведения у больных туберкулезом выявляются «Поиск социальной поддержки» и «Принятие ответственности». Преобладают типы реагирования на болезнь, характеризующиеся интрапсихической направленностью, обуславливающей нарушения социальной адаптации больных. На основании полученных результатов исследования построены регрессионные модели комплаентности, позволяющие прогнозировать поведение пациентов в ситуации болезни и определять стратегии психологического сопровождения больных туберкулезом. Результаты исследования, а также разработанные авторами модели могут быть использованы для подготовки профессиональных кадров в области медицины, клинической психологии, социальной работы и социальной педагогики с целью оптимизации оказания медико-социальной и психолого-педагогической помощи больным туберкулезом как в России, так и в других странах мира: как показывают исследования, факторы, выявленные и проанализированные в данной статье, сходны у больных туберкулезом в разных странах вне зависимости от географического положения, уровня экономического развития и культурных особенностей.

**Ключевые слова:** больные туберкулезом, качество жизни, социальная фрустрированность, психологические защиты, стратегии совладающего поведения, тип отношения к болезни, комплаентность

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