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Predicting the Specifics of Type 2 Diabetes in Patients with Non-Psychotic Mental Disorders

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Abstract: The method of logistic regression determines the prognostic significance of Psychosomatic factors, along with other factors (predictors), as well as the formation of Psychosomatic relationships in 203 patients with neurotic, affective and organic non-psychotic diseases and the features of the course of Type 2 diabetes (diabetes).development of a comprehensive program of secondary prevention and rehabilitation. The group at high risk of developing Ds are patients who experience psychosocial stress, with increased glycemic levels associated with depressive and anxiety disorders.

Keywords: type 2 diabetes, glucose tolerance disorders, non-psychotic mental disorders, anxiety disorders, depressive disorders, psychosocial stress, psychosocial factors.

Introduction. The prevalence of diabetes mellitus (dm), which increases from year to year, is reflected in the most important medical and social indicators that characterize the dynamics and working capacity of patients, life expectancy, death of the population, which in general is the result of the development of systemic vascular complications of diabetes mellitus [1, 2]. The preventive direction of modern medicine in relation to this pathology is especially relevant [3]. Many cultures and stereotypes accumulated in the process of urbanization are inevitably associated with the nature of nutrition and the lack of physical activity of the population. The main task of preventive measures is to identify risk factors (FR), assess the level of general cardiovascular risk and choose strategies to reduce it [4].

Scientific research in recent years has made it clear that it is necessary to study the psychosocial aspects of diabetes mellitus, the interdependence of stress factors (prolonged stay under acute stress or chronic stress) and the possibility of managing carbohydrate metabolism, both stress and diabetes. The importance of mental and psychosocial factors in SD is considered in terms of psychophysiological interaction, direct or indirect influence on metabolic processes, determining the need for psychological support and control of treatment [5-9]. Psycho-emotional stress, which leads to a violation of adaptive mechanisms, a violation of the regulation of metabolic processes, the functioning of the central nervous system, is one of the links in the pathogenetic relationship of diabetes mellitus and mental activity [10, 11]. The frequency of non-psychotic mental disorders in SD is higher than predicted in the general population. Previous studies of diabetes mellitus and mental disorders [12-15], including adaptation disorders, support conjugation of posttraumatic stress disorders [16].

More attention is paid to comorbidity of diabetes and depression [17-21] and anxiety disorders [22, 23]. According to epidemiological studies, depression is 3 times more common in patients with diabetes than in the population. The risk of developing depression in diabetes increases from 9% to 28.8% [24-27]. In 64% of cases a year before the onset of diabetes mellitus symptoms, patients experienced a depressive episode [28-42]. High prevalence of anxiety and depressive disorders due to psychosocial stress, negative consequences of their effects are associated with changes in the usual

lifestyle of patients, certain restrictions, risk of complications and disability, low adherence to treatment and other behavioral reactions, decreased quality of Life [43-57]. In this regard, the relevance of studying the relationship of mental disorders and SD manifestations, their prognostic significance for assessing the dynamics of comorbid States and the effectiveness of therapeutic and rehabilitation measures is increasing [58-75].

The purpose of the study is to look for factors to predict the specifics of Type 2 diabetes in patients with non-psychotic mental disorders.

Materials and methods. Subject to receiving informed consent to participate in the study, 203 patients (127 women and 76 men, average age (50,62 ± 8,07), of whom 77 were diagnosed with "Type 2 diabetes" (average age (51,34 ± 8,07))) and 126 patients were examined. - impaired glucose tolerance (average age (45,89 ± 8,64) years). The diagnosis was established according to the diagnostic criteria for SD and other glycemic diseases. To achieve the target level of plasma glucose and glyatsated hemoglobin, 54 patients with Type 2 diabetes used oral sugar reduction drugs, while 23 study participants were given combination therapy (tablet sugar reduction drugs and insulin therapy).

During the referral to a psychiatrist, in the case of patients previously observed in an endocrinologist or therapist, psychopathological symptoms associated with traumatic events prevailed. The mental state of patients with SD met the ICD-10 criteria. Clinical (Clinical-Physical, clinopsychopathological), catamnestic, paraclinic (clinical-laboratory, functional, instrumental), and experimental-psychological techniques have been used to assess somatic and mental state.

The study of the correlation of SD and mental disorders was carried out using multidimensional models of biostatistics. The study used dispersion, discriminant analysis methods, analysis of conjugation tables. In the analysis of conjugation tables, the value of Pearson's statistics was evaluated χ^2. The study of the relationship between blood glucose levels and mental disorders was carried out with a multi – factor dispersion analysis, and a quantitative indicator-blood glucose levels-was included in the study. In all procedures of statistical analysis, the critical level of P importance was 0,05. Average sample values of quantitative properties are given in the form m ± SD, where M is the average sample value, SD is the standard deviation.

In patients with non-psychotic mental disorders, a step-by-step logistic regression (LR) method was used to assess factors predicting the characteristics of the diabetes mellitus course. Logistic regression is an indispensable method of statistical analysis that allows you to generalize the results of many conjugation tables and statistically significant paired and multi-factor relationships of linear models, taking into account the many qualitative and quantitative indicators necessary for the formation of the spectrum of potential predictors-characters in logistic regression equations. The relative contribution of certain predictors (prognostic factors) is represented by the value of the Vald statistics χ^2, as well as the evaluation of the importance of the standardized regression coefficient by modulus (standardized Estimate). In constructing logistic regression equations, the coupling strength between a subset of predictors and a dependent variable as a criterion of consent to the Real distribution of observations in individual character and predictive gradations is determined by the Somers'd bond coefficient and the Concordant's correct reclassification value (the percentage of accurate prediction). The significance level of the Hosmer and Lemeshow consent test achieved in all equations was 0,7–0,9 which showed a high degree of correspondence of the models created to the actual data.

Results and discussion. Stressors (psychosocial stress) that lead to the development of mental adaptation and the formation of non-psychotic mental disorders predate the appearance of the first clinical signs of SD and its development. Medical, productive, negative interpersonal and family stressors were of individual importance to each patient according to the severity scale of psychotraumatic exposure.

The mental state in patients with diabetes mellitus is characterized by the presence of neurotic, stress-related and somatoform diseases in 44,3% of cases. Most often (59,5% of cases) women with nth were diagnosed with neurotic disorders, while women with Type 2 diabetes were diagnosed with 32,2% of

cases ($p < 0,01$). In the group of men with Type 2 diabetes, their share was 41,2%, while in NTG it was 28,6% ($p < 0,05$).

Neurotic disorders were mainly manifested by adaptation disorders (long – term depressive reaction, mixed anxiety and depressive reaction, nozogen and other severe stress reactions) - in 49,5 percent of observations. In other cases, at the same frequency, anxiety-phobic (panic, general anxiety, mixed anxiety and depressive) and somatoform disorders were detected.

Depressive spectrum disorders associated with various diagnostic rubrics, including neurotic (long – term depressive reaction, nosogenic depression) - 48 cases in 39.9% of observations in mental disorders in patients with Type 2 diabetes and ntg; affective disorders (depressive episode, dysthymia, recurrence disorder) - 20 cases, organic affective disorder-13 cases.

In 30% of patients, symptoms of organic asthenic disorder prevailed. The incidence of organic diseases in women was 29,1% and in men 55,3% ($p < 0,001$). In 6.9% of the observations, a diagnosis of personal pathology was made.

The current mental state of patients with CD and ntg was characterized by leading psychopathological symptoms identified during the examination: depressive – in 36,5% of cases, anxious – in 16,7%, anxious-depressive – in 10,3%, asthenic – in 20,0% of cases. Psychopathological syndromes have a complex structure, combined with hypochondriacal, dysphoric manifestations in patients with more severe diabetes who have received insulin therapy, which has shown the severity of the clinical signs of SD. In patients with Ntg and patients with Type 2 diabetes, psychopathological symptoms included more senestopathy, nozophobia (carcinophobia, cardiophobia), conversion disorders ($\chi 2= 29,505$; $p = 0,043$).

The use of multi-factor dispersion analysis allowed testing for the correlation of blood glucose levels and non-psychotic mental disorders ($df1 = 23$, $p = 0,0001$; $df = 7$, $p = 0,0001$). The results obtained showed clearly statistically significant differences in blood glucose levels in patients with SD depending on the structure of the identified mental disorders ($df = 14$; $F = 10,87$; $p = 0,0001$).

Thus, it was found that depressive disorders have the most negative effect on the course of diabetes mellitus. Maximum starvation glucose levels were found in patients with Type 2 diabetes with depressive disorders, with instability of averages (4,63 to 11,58 mmol/l) reaching 19,3 mmol/l during decompensation. type 2 diabetes requiring drug correction was first identified in 44 (21,7%) patients. In the border conditions Department of the Research Institute of mental health of the Russian Academy of Medical Sciences. These patients were then advised to follow up by an endocrinologist.

The logistic regression method analyzed the relationships between somatic, mental, psychosocial factors (predictors) to predict the characteristics of the type 2 diabetes mellitus course in patients with non-psychotic mental disorders.

Depending on the number and strength of the entries, the forecasting percentage ranged from 74,5 to 92,7, depending on the number of diabetics (155-203 people) examined. In addition, the structure and combination of predictors selected by the algorithm were changed, depending on the input to the equation or the elimination of the leading sign – glycemic level from it.

Logistic regression analysis from many independent features using standardized regression coefficients has allowed the selection of maximum predictors associated with a statistically significant and step-by-step algorithm that have been used as predictive factors to assess the likelihood of bringing each patient to a predicted state. An analysis of the results of about 10 final equations of regression showed that the number of characters selected in each of them ranged from 7 to 13.

Among predictors with significant indicators of somatic and mental state of patients with DS, the most important were glycemic levels ($p = 0,0001$); DS levels ($p = 0,0001$); duration of mental illness ($p = 0,0002$); body mass index ($p = 0,0001$);waist size ($p = 0,0001$); stress factors ($p = 0,0001$); vegetative disorders ($p = 0,005$); age of onset of mental illness ($p = 0,0001$); 0,0118); leading psychopathological syndrome ($P = 0,0029$); hypothymia ($p = 0,0002$); subjective attitude of the patient to his own disease

(p = 0,0046); dyslipidemia (p = 0,0001); fears of different composition (p = 0,0001); weight of family history by diabetes mellitus (p = 0,0437). The exclusion of the" glycemic level " sign from the equation did not lead to a significant decrease in the prognostic value of other signs.

Studies of the behavior of patients with SD have shown that most of them are characterized by a desire to reject Real somatic problems, to avoid difficulties associated with the disease. Anozognosia in relation to specific signs of somatic disease, excessive, undifferentiated anxiety in relation to health in general, fear of death, dissatisfaction with their condition and existing condition, combined in patients with decreased activity.

As an example in the table. 1 the results of the construction of one of the variants of the logistic regression equations are given, where the percentage of forecasting and the binding strength of the introduced properties:

Concordant = 80,5%; Somers'd = 0,656. Of the features chosen by the algorithm, the Predictor "pessimism" (p = 0,0002) is important for patients, reflecting a low assessment of their capabilities (p = 0,0046), dissatisfaction with its condition (p = 0,0158), decreased activity and mood, depressive state (p = 0,0029). The symbol "pessimism", one of the 10 predictors, provided 28,6 percent of the correct prediction of the probable development of diabetes mellitus from the first step ($\chi 2$ = 140,5; p = 0,0001). In the process of step-by-step selection, the Predictor "glycemic degree" at the maximum value of the regression coefficient (SE = 0,553227; p = 0,0001) is included in the equation given by the algorithm in the second step.

Among the differentiated prognostic signs that characterize current psychopathological disorder," hypothymia"," anxiety"," asthenia"," autonomic dysfunctions","depressive state" are the most identified.

The result of the step-by-step selection of predictors, their clinical and statistical significance, is the procedure for joining the regression equation.

The findings correspond to the results of an epidemiological study J. A. Hänninen et al., which found depression in 28,8 percent of patients with Type 2 diabetes, found that depression significantly worsened patients ' quality of life. P. J. Lustman et al., analyzing 26 previously published works, concluded that the exact relationship of depression to hyperglycemia was determined regardless of the type of diabetes mellitus.

Treatment of depression helped increase glycemic control levels. In another variant of the logistic regression equation, the algorithm included nine features, the totality of which was the maximum predictive percentage of SD development (Concordant 92,7%; Somers'd 0,881) in 176 patients with mental disorders. The most important characteristics for assessing the somatic and mental state of diabetics are glycemic level (p = 0,0001), duration of mental illness (p = 0,0002), body mass index (p = 0,0001), vegetative disorders (p = 0,0005),age of onset of mental illness (p = 0,0118), severity of family history for diabetes mellitus (p = 0,0437). The predictive value of the results obtained is that in this logistic regression equation, the glycemia rate from the first step was 89,6% of the prediction with a maximum regression coefficient value (SE = 2,694607; p = 0,0001) in SD patients experiencing psychosocial stress. In some cases, this was manifested by the development of clear clinical signs of CD decompensation against the background of affective disorders caused by large psychotraumatic phenomena in patients that require consultation with an endocrinologist and the appointment of insulin therapy. Thus, the results of the multicenter study confirm that levels of glycemia are associated with the severity of psychosocial stress and the need for insulin, but not with type diabetes mellitus.

Thus, the group at high risk of developing diabetes mellitus are patients with depressive disorders, in which the level of glycemia is associated with non-psychotic, stress-related disorders. Psychosocial stress, which caused mental deficiency in patients, contributed to a constant increase in blood glucose levels, the development of Type 2 diabetes, as well as the early development of diabetes in patients with impaired glucose tolerance.

Conclusion. Psychosomatic attitudes and forecasting characteristics of diabetes mellitus are determined by the manifestation and significance of its clinical manifestations, the duration and severity of the course, the age and gender of patients, their personal characteristics, the nature of psychosocial stress, as well as the characteristics of psychopathological symptoms contained in the leading syndrome at the time of examination.

Modern treatments (both medical and non-drug) aim to reduce the risk of cardiovascular complications of diabetes. The pessimistic attitude of patients and the anozognostic attitude to the disease significantly complicate the formation of compliance with the doctor and the implementation of rehabilitation measures.

Low tolerance for stressful, stressful situations in micro and macrosocium is closely related to eating disorders and disorders of weakly reinforced stereotypes to constructively overcome anxiety and hypothymia. In this regard, in order to optimize the psychosocial rehabilitation of patients with Type 2 diabetes, it is necessary to identify the psychological characteristics of patients, analyze psychosocial factors in the development of comprehensive programs for the treatment, prevention and training of self-control, which is especially important to consider when organizing dispensary monitoring of patients in the conditions of primary therapist, psychiatrist, psychotherapist.

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