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Multifactor Regression Models of Adherence to Treatment in Patients with Schizophrenia and Schizophrenic Spectrum Disorders and Their Relatives

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RESEARCH

Summary

Objective: the formation of multivariate regression models of adherence to treatment of patients with schizophrenia and schizophrenic spectrum disorders and their family members in order to identify its relationship with socio-demographic, clinical, psychological characteristics, family environment factors and the quality of mental health care in order to develop measures to improve the compliance of these groups. **Patients and methods:** the study included107 patients (44 men and 63 women) with diagnoses of schizophrenia (F.20), schizoaffective (F.25) and schizotypal disorders (F.21), who met ICD-10 criteria, and 105 their relatives (27 men and 78 women). The following methods were used: clinical-psychopathological, psychometric, statistical (correlation and regression analysis), system analysis methods, hierarchy analysis method. **Results:** regression models were built and factors were identified that positively or negatively affect adherence to treatment in groups of patients and their relatives, formed depending on gender differences, awareness of the disease or its denial, as well as on the clinical characteristics of patients. Factors affecting adherence to treatment in men include social functioning, educational attainment and income; in women — the motivation for treatment and features of family relationships. In the groups of patients and their relatives, identified depending on the awareness of the disease or its denial, the dominant factors influencing compliance were the duration of the disease, the frequency of hospitalizations, the level of education of relatives, patients' disability, forgetfulness, etc. In groups, depending on the clinical characteristics of patients for compliance patients and relatives were influenced by the age of the patient, the level of motivation to treat patients and their relatives, the employment of patients and the level of their social functioning, conflict, hostile relations in the family and a number of other factors. **Conclusions:** knowledge of the factors that positively or negatively affect the adherence to treatment of schizophrenic patients and their families contributes to the development of measures in practice to increase it. Psychosocial interventions have been proposed to increase treatment adherence in patients with schizophrenia and schizophrenic spectrum disorders and their families.

Keywords: schizophrenia; adherence to treatment; compliance; regression models, factors; awareness of the disease.

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There is no conflict of interests

INTRODUCTION

Failure to adhere to the drug treatment regimen in schizophrenic patients is widespread and leads to an aggravation of the course of the disease, an increase in the frequency of hospitalizations, patient disability and, ultimately, to a deterioration in the quality of life [1, 2].

A common reason why patients do not adhere to treatment is false, misconceptions about disease and treatment. Incomplete awareness of the disease and the need for treatment can be associated with both clinical and psychopathological (lack of criticism) and psychological factors [5]. Low motivation has been shown to negatively affect adherence to treatment [6], manifesting in the absence of the patient's motivation to get involved in the treatment process, continue to participate in it and adhere to a certain strategy of behavior aimed at overcoming the disease. A psychological factor that weakens compliance is the use of non-constructive coping strategies using various mechanisms of psychological defense, which are aimed not at changing a stressful situation or trying to solve a problem, but at avoiding it [7]. In the studies of domestic and foreign authors, it was found that among the many factors associated with adherence to treatment of patients with schizophrenia, an important place is taken by the characteristics of the patient's family: features of relationships in it, understanding of the need for treatment, views of the family on the risks and benefits of treatment, the presence of social and family support, stigma and other family factors, which largely shape the patient's attitude to treatment [8, 9].

The patient's family is considered as the most important factor that forms and supports the compliant

behavior of the sick relative. Acceptance of a family member's illness goes through a series of stages and is often accompanied by painful emotional experiences such as denial of the illness, guilt, anger and des Acceptance of a family member's illness goes through a series of stages and is often accompanied by painful emotional experiences such as denial of the illness, guilt, anger and despair.

Living by relatives of each stage of awareness and acceptance of the illness of a loved one lays the main vectors of interpersonal interaction with a sick family member, which either strengthen compliant behavior or weaken it [10]. Stable and adequate family support provides a higher level of compliance, and the negative attitude of relatives towards treatment is the reason for the patient's subsequent non-compliance [11].

Research shows that adherence to treatment should be viewed as a complex, multidimensional, dynamic, clinical and psychological phenomenon, that requires consideration of a large number of factors affecting it. The multidimensionality of the phenomenon of adherence to treatment requires a systematic approach to solving the indicated problem [12]. Therefore, researchers remain interested in this issue, especially in the search for approaches to improving compliance. Further study of the problem of adherence to treatment of patients with schizophrenia and schizophrenic spectrum disorders contributes to the identification of new ways to optimize and plan care for patients with schizophrenia, improve its quality and effectiveness.

PATIENTS AND METHODS

The study was conducted in 2013–2017. The basis for collecting the material was the psychoneurologic dispensary No. 18, which is a branch of the Moscow City N.A. Alekseev Clinical Hospital No. 1. The study included patients who met the following criteria: compliance of diagnoses with ICD-10 criteria; age from 18 to 60 years old; dispensary observation; the presence of relatives (parents or spouses). The following people were not included from the study: patients with disorganized behavior and thinking; being treated in a psychiatric hospital; with severe somatic diseases in the acute stage; who did not consent to the study.

As a result, a sample was formed, which included 107 patients (44 males, 63 females) with diagnoses of schizophrenia (F.20), schizoaffective (F.25) and schizotypal disorders (F.21) and 105 of their relatives (27 men and 78 women). All subjects signed informed consent to participate in the study. The study was carried out in accordance with the 1964 Declaration of Helsinki and its 2000 revised version and was approved by the Local Ethics Committee of the MHRC. Clinical-psychopathological method was used to diagnose and assess the mental state. In the socio-psychological research, a battery of the following psychological and psychomentric tools was used: questionnaires of attitudes towards drugs (Hogan T. et al., 1983), awareness of illness in psychosis (Birchwood M. et al., 1994), motivation "Assessment of changes in the University Rhode Island" (URICA, McCoimaughy E.N., Prochaska J.O. and Velicer W.F., 1983), the questionnaire "Indicator of coping strategies" (Amirkhan J., 1990, adapted by N.A. Sirota and V.M. Yaltonsky), the questionnaire of interpersonal problems (Horowitz L., 2000, adapted by S.N. Enikolopov, A.I. Tsapenko in the Department of Clinical Psychology, 2009), the scale of social functioning (SAS-SR, Weissman M. and Bothwell S., 1976, adapted into Department of Clinical Psychology of the MHRC RAMS S.N. Enikolopov, A.I. Tsapenko, 2009), questionnaires for assessing satisfaction with treatment and doctor-patient relationship, developed in the department of organization of psychiatric services of FGBNI MHRC.

Socio-demographic characteristics of patients and their relatives, clinical and clinical-epidemiological information, indicators of the patient's social activity and a number of other issues were entered into the "Card of a patient observed in a psychoneurologic dispensary" and "Card of a relative of a patient observed in a psychoneurologic dispensary" developed in the department the organization of mental health services. To process the data obtained in clinical and socio-psychological research, the method of hierarchy analysis was used, which allowed converting ordinal scales into the scale of relations (based on the fundamental scale of the hierarchy analysis method) [13]. Then, a correlation analysis was carried out to select the characteristics of patients and relatives that are significant for the compliance indicator. More than 50 clinical, socio-demographic, psychological and other parameters were studied, including gender, education, employment, social activity, duration of illness, number of hospitalizations, motivation, attitude to illness and drugs of patients and relatives, etc. At the final stage for the indicator compliance, which was considered an indicator that determines the attitude of a patient and a relative to drugs (based on the Hogan T. et al., 1983, scale) and converted to a scale of relationships, factor regression models were formed.

RESULTS

Socio-demographic characteristics of patients. The studied sample included 44 males (41.1%) and 63 females (58.9%); the average age of patients was 42.4 ± 8.4

Table 1. Clinical characteristics of the examined patients

Diagnosis	Abs. (*n* = 107)	%
Paranoid schizophrenia (F20), including:	**80**	**74.8**
Paranoid schizophrenia, continuous course, incomplete remission. F20.004	3	2.8
Paranoid schizophrenia, continuous course, no remission. F20.006	12	11.2
Paranoid schizophrenia, episodic course, incomplete remission. F20.014	44	41.1
Paranoid schizophrenia, episodic course, lack of remission. F20.016	17	15.9
Paranoid schizophrenia, episodic course, with a stable defect, incomplete remission. F20.024	3	2.8
Paranoid schizophrenia, observation period up to a year. F20.09	1	0.9
Residual schizophrenia. F20.524	**3**	**2.8**
Simple schizophrenia. F20.606	**2**	**1.9**
Schizotypal disorder (F21), including:	**10**	**9.3**
Schizotypal disorder, psychopathic schizophrenia. F21.	7	6.5
Schizotypal disorder, neurosis-like schizophrenia. F21.4	3	2.8
Schizoaffective disorder, depressive type. F25.11 5, including:	**12**	**11.2**
Schizoaffective disorder, depressive type. F25.11	5	4.7
Schizoaffective disorder, mixed type. F25.21	7	6.5

years. Persons of working age predominated: patients from 20 to 30 years old accounted for 18%; the largest proportion (35%) were persons aged 31 to 40; patients aged 41–50 years — 21%, 51–60 years old — 26%.

Only 23% of the surveyed patients worked: 8% in a regular institution part-time, 7% of patients were self-employed, 8% worked sporadically as a courier, promoter, or doing home work. Most of them received a disability pension (80.8% of patients), 7% received material assistance from relatives.

A significant part of the patients (66%) were not married; the majority lived with their parents or other relatives (64%), only 7% lived alone, 29% of patients lived with their families. A low level of social contacts was noted in 21% of patients (they had no friends at all), 47% reported that they had only one or two friends, and 32% noted that they had more than 3 friends. A decrease in social functioning was also detected in terms of daytime activity: in one third of patients it was low (33%), in 21% — below average, and average in 17% of patients. A high degree of social activity was noted in one third of the examined patients (29%).

75% of patients believed that they received the support of family members, 14% of patients indicated conflicts and disagreements in the family, 11% of patients noted criticism, rejection by family members, or, conversely, indicated overprotection.

The socio-demographic portrait of relatives was represented by the following characteristics. In the studied group of relatives, there were 27 men (25.7%) and 78 women (74.3%). Parents of patients accounted for 67.6%, other relatives — 32.4%. Among the relatives, persons aged 51 to 70 prevailed — 63%. Relatives aged 40 to 50 accounted for 23%, 71 and older — 14%. Relatives were characterized by a fairly high educational level: 41% of relatives had higher and incomplete higher education, 35% had secondary specialized education, and 24% of relatives had secondary and incomplete secondary education. 38% of relatives worked regularly, 59% were in retirement

Table 2. Distribution of patients by major syndromes in the studied sample

Syndrome	Abs. (*n* = 107)	%
Psychotic syndromes, including:		
affective-delusional	16	15.1
hallucinatory delusional	10	9.4
paranoid	18	17.0
Asthenic deficiency syndromes, including:		
apatho-abulic	13	12.1
adynamic	3	2.8
apato-adynamic	7	6.5
asthenic	5	4.6
asthenic-depressive	9	8.4
Non-psychotic schizotypal states:		
neurosis-like syndrome	3	2.8
psychopathy-like syndrome	7	6.5
Others:		
hypochondriacal, hypomanic, depressive, senesto-hypochondriac, residual catatonic, affectively mixed, polymorphous, combination of symptoms	16	14.8

age or disability pension, the remaining 8% included occasional workers and students.

Analysis of the clinical and epidemiological characteristics of the examined patients showed that the average age of the onset of the disease was 20.5 ± 4.8. In half of the patients (54.2%), the duration of the disease was more than 10 years; persons with a disease duration of 6 to 10 years reached 29.9%; from 1 to 5 years — 15.9%. Patients of the studied sample were characterized by a significant number of hospitalizations: three quarters of them were hospitalized more than 10 times, had from 6 to 10 hospitalizations, 15.9%, only 7.5% of patients were hospitalized from 1 to 5 times.

The clinical characteristics of the studied group of patients are shown in Table 1. As can be seen from the data presented, patients with a diagnosis of paranoid schizophrenia predominated in the sample, accounting for three quarters of all patients (74.8%). To a much lesser extent, there were patients suffering from schizoaffective disorder (11.2%) and with schizotypal disorder — 9.4%. Residual and simple form of schizophrenia, met only as isolated observations. In general, the surveyed group of patients includes all diagnostic forms of schizophrenia and is close to the structure of patients with PND No. 18, as well as other psychoneurologic dispensaries [14]. The indicators of the number of patients with schizotypal disorder were slightly different (9.3% in the studied sample versus 20% in the PND), which is probably due to the low attendance of the PND of patients with this diagnosis. Evaluation of the variants of the course of the disease in patients of all diagnostic categories showed a noticeable predominance of dynamics in the form of a sequential alternation of psychotic episodes with a significant increase in the severity of symptoms and remissions of various qualities. Data on the syndromic structure of the examined patients are shown in Table 2. *As you can see, the most common syndromes were of the psychotic register*: the proportion of patients who had these syndromes during the course of the illness reached 41.5%, including paranoid syndrome

Table 3. Distribution (%) of the studied patients and relatives in their attitude to the disease and treatment (according to the questionnaire of awareness of illness in psychosis, Birchwood M. et al., 1994)

Scales of psychosis awareness questionnaire	Patients *n* = 107				Relatives *n* = 105			
	Complete* awareness		Incomplete awareness		Complete* awareness		Uncomplete awareness	
	Abs.	%	Abs.	%	Abs.	%	Abs.	%
Attribution of external causes of symptoms or disease	31	29.0	76	71.0	60	57.1	45	42.9
Illness awareness	39	36.4	68	63.6	71	67.6	34	32.4
Awareness of the need of treatment	62	58.0	45	42.0	76	72.4	29	27.6

*Full awareness when typing on each subscale — 4 points.

noticed in 17.0%, affective-delusional — in 15.1% and hallucinatory delusional — in 9.4% of the surveyed persons. Disorders within a fairly wide range of asthenic deficits were second in terms of representation: from mild manifestations of mental weakness to severe astheno-anergic defect (34.5% of the examined) with increased fatigue, apathy, hypobulia, a decrease in all types of activity and motivation.

Thus, it can be stated that the studied group of patients is characterized by nosological forms, the developmental stereotype of which tends to a long, long-term course with a sequential increase in deficit changes, personality deformations, manifested by a decrease in social adaptation. Such patients are often characterized by violations of drug compliance in the form of refusal or non-compliance with the prescribed treatment, including self-withdrawal, which was confirmed by the assessment. The significant representation in the studied sample of patients with a deficit range of symptoms also suggested a low compliance in these patients.

As can be seen from Table 3, 58% of patients realized the need for treatment according to their self-assessments, which is close to the objective assessments of the attending physician and relatives (no more than 50% of the surveyed patients followed the treatment regimen according to their assessments). 3.6% of patients were not fully aware of their disease, and 71.0% attributed its occurrence to external causes and character traits. It should be noted that almost a third of relatives (27.6%) also did not fully realize the need for treatment. The study found that 42.9% of the patients' relatives did not regard the symptoms of their loved one as a manifestation of a mental disorder, explaining the symptoms as a consequence of other reasons, conjecture, attribution of unusual features to patients, simplification and misinterpretation of symptoms, they were characterized by both external and internal attribution of symptoms. 32.4% of relatives denied a mental disorder and did not agree that their relative was mentally ill.

The obtained results of clinical and socio-psychological examination of patients and their relatives were used to form multifactorial regression models of compliance, allowing to identify the most significant factors affecting their adherence depending on gender differences, acceptance of the disease, the presence of psychotic or deficient symptoms in patients. As shown below, each of the developed models includes factors related to patients and their relatives, which confirms the complexity and multidimensionality of the compliance phenomenon, which requires a systematic approach to study.

Male Compliance Indicator Model (M1)

The resulting linear regression model (M1) connects the compliance indicator of male patients with the factors indicated in the model with reliability $R^2 = 0.607$ (i.e. explains the variation in the compliance value by 60.7%):

$M1_{\text{Set p-husband}} = -3.306 + 0.886\ X1 + 0.059\ X2 + 0.166\ X3 + 0.574\ X4 - 0.031\ X5 + 2.385\ X6 - 0.608\ X7.$

The resulting linear regression model (M1) links the compliance score of male patients with the factors specified in the model with reliability $R^2 = 0.607$ (i.e., explains 60.7% of the variation in the compliance value): 60.7%):

$M1_{\text{Male patient compliance}} = -3.306 + 0.886\ X1 + 0.059\ X2 + 0.166\ X3 + 0.574\ X4 - 0.031\ X5 + 2.385\ X6 - 0.608\ X7.$

The following factors have a positive effect on the level of compliance of a male patient: X1 — income; X2 — older age of the patient; X3 — satisfaction from doctor-patient communication; X4 — patient's awareness of the need for treatment; X6 — awareness of the disease by relatives. The negative impact is associated with the following factors: X5 — low satisfaction of relatives with help; X7 — denial by relatives of the need for drug treatment.

Female Compliance Indicator (M2)

The linear regression model (M2) links the compliance rate of female patients with the factors indicated in the model with a reliability $R^2 = 0.504$:

M2 $_{\text{Female patient compliance}}$ = –0.984 – 1.322 U1 + 0.110 U2 – 0.039 U3 + 1.034 U4 + 0.043 U5 – 1.579 U6 + 0.894 U7 + 0.511 U8.

Positive influence on the level of compliance of female patients is exerted by: U2 — satisfaction of patients with help; U4 — their awareness of the need for treatment; U5 — their high level of motivation for treatment; U7 — acceptance of the disease by a relative; U8 — a relative's awareness of the need for treatment. The negative influence is associated with the following factors: U1 — conflict, hostile relations in the family, overprotection; U3 — low level of social functioning of patients; U6 — non-compliance of patients (objective assessment by a doctor).

Male Relatives Compliance Indicator Model (M3)

The linear regression model (M3) links the compliance indicator of male relatives with the factors indicated in it with reliability $R^2 = 0.639$:

M3 $_{\text{Male patient compliance}}$ = –4.014 + 0.085 Z1 – 0.873 Z2 + 0.259 Z3 + 0.095 Z4 – 0.070 Z5 – 3.257 Z6.

From the above ratio it follows that the following factors have a positive effect on the level of compliance of a male relative: Z1 — older age of the relative; Z3 — the patient has problem solving skills; Z4 — higher level of social functioning of the male relative. The negative influence is associated with the following factors: Z2 — low level of education of a male relative; Z5 — low satisfaction of a male relative with psychiatric care provided to his loved one; Z6 — non-recognition of mental illness in a family member.

Female Relatives Compliance Indicator Model (M4)

The linear regression model (M4) links the compliance indicator of female relatives with the factors specified in the model with the reliability $R^2 = 0.534$:

M4 $_{\text{Female patient compliance}}$ = 4.694 + 0.020 W1 – 0.461 W2 + 1.423 W3 + 0.067 W4 + 0.052 W5 – 0.014 W6 – 0.024 W7– 2.413 W8.

It was found that the following factors have a positive impact on the level of compliance of a female relative: W1 — older age of a female relative; W3 — positive attitude of patients towards drug therapy; W4 — patients have problem-solving skills; W5 — satisfaction of a relative with the provided psychiatric help to his loved one. The following factors have a negative impact: W6 — the presence of stress in patients from problems in interpersonal communication; W7 — the presence of stress in relatives from problems in interpersonal communication; W8 — denial by relatives of a family member's mental illness.

Taking into account the incomplete awareness of the disease in some patients and relatives (according to the subscales of the disease awareness scale, Table 3), further formation of compliance models was carried out for patients and relatives taking into account this factor. For this purpose, 2 groups of patients and two groups of their relatives with full and incomplete awareness of the disease were identified.

Compliance indicator model for patients with full awareness of the disease (M5)

The linear regression model (M5) links the compliance indicator with the factors specified in the model with reliability $R^2 = 0.72$:

M5 $_{\text{Pt. Compl.}}$ = 12.697 + 0.091 X1 – 0.134 X2 + 1.073 X3 – 0.016 X4.

The model shows that with an increase in the duration of the disease (X1) and the frequency of hospitalizations (X3), the degree of adherence to treatment in this group of patients also increased. Compliance was negatively affected by the patient's young age (X2) and codependency on the part of relatives, their overprotection, and emotional involvement of a loved one in the illness (X4).

Compliance indicator model for relatives with full awareness of the disease (M6)

The regression model (M6) links the compliance indicator with the factors specified in the model with reliability $R^2 = 0.74$:

M6 $_{\text{Rel. comp.}}$ = 1.938 + 0.482 X1 + 1.059 X2 – 0.002 X3.

Adherence to treatment in this group of relatives increased with a higher level of the patient's social functioning (X1) and the patient's disability (X2). The negative factor was a low level of social functioning of the patient, his lack of work, his own family, friends (X3, according to SAS-SR).

Compliance indicator model for patients with incomplete awareness of the disease (M7)

The linear regression model (M7) links the compliance indicator with the factors specified in the model with reliability $R^2 = 0.95$:

M7 $_{\text{Pt comp.}}$ = 4.453 – 3.383 X1 + 0.141 X2 – 0.744 X3.

The model showed that the patient's forgetfulness when taking medications (X1), low level of education of relatives (X3) had a negative effect on the adherence of this group. Adherence increased in patients with age (X2), i.e. it was higher in older patients.

Compliance indicator model for relatives with incomplete awareness of the disease (M8)

The linear regression model (M8) links the compliance indicator with the factors specified in the model with reliability $R^2 = 0.98$:

M8 $_{\text{Rel. comp.}}$ = 10.359 – 0.103 X1 – 1.026 X2 – 0.615 X3.

Low compliance of relatives with incomplete awareness of the disease was determined by the following significant factors: lack of employment of relatives (X1), their low educational level (X3), as well as non-compliance by patients with the therapy regime due to forgetfulness of taking medications (X2).

Separately, groups of patients were identified based on syndromic characteristics and, depending on this, compliance models were formed for patients and their relatives.

Compliance index model for patients with a predominance of psychotic register syndromes (paranoid, affective-delusional, hallucinatory-delusional syndromes) (M9)

The following linear regression model (M9) was obtained, linking the compliance indicator with the factors indicated in the model with reliability $R^2 = 0.99$:

$M9_{Pt.\ compl.} = -24.743 + 5.011\ X1 + 4.844\ X2 + 0.264\ X3.$

Patient compliance increased with higher motivation (X1), with an increase in the frequency of hospitalizations (X2) and with an increase in the patient's age (X3).

Model of the compliance indicator for relatives of patients with a predominance of psychotic register syndromes (paranoid, affective-delusional, hallucinatory-delusional syndromes) (M10)

The following linear regression model (M10) was obtained for the relative's compliance indicator depending on the indicated factors with a reliability $R^2 = 0.88$:

$M10_{R.\ Comp.} = 1.512 + 1.072\ X1 + 1.212\ X2 - 0.082\ X3.$

Compliance increased with increasing motivation of the patient (X1) and relative (X2), and decreased with a low level of social functioning of the relative (X3, SAS-SR).

Compliance score model for patients with deficiency syndromes (M11)

The following linear regression model (M11) was obtained for the relative's compliance indicator depending on the factors indicated in the model with a reliability $R^2 = 0.99$:

$\mathbf{M}11_{Pt.\ Comp.} = -13.182 + 2.557\ X1 - 1.555\ X2 + 0.186\ X3.$

Compliance increased in the presence of the patient's employment (X1) and a high level of social functioning of relatives (X3, SAS-SR); forgetfulness of patients and missed medication as a result had a negative effect on maintaining compliance (X2).

Compliance model for relatives of patients with deficiency syndromes (M12)

Linear regression model (M12) for the compliance indicator of relatives depending on the factors indicated in the model with reliability $R^2 = 0.94$:

$M12_{Pt.\ Comp} = 9.530 - 0.975\ X1 - 0.166\ X2 + 1.036\ X3.$

Compliance decreased with low motivation for treatment in a relative (X1), a young age of patients (X2) and improved with an increase in the patient's level of social activity (X3).

DISCUSSION

The developed regression models allow us to analyze the characteristics of compliance inherent in each selected group of patients and their relatives, expand the understanding of the factors affecting adherence to therapy, their interrelationships and explain their influence, as well as propose measures to improve compliance. Analysis of gender stereotypes of adherence to treatment revealed the following features. Compliance of male relatives depends on the level of their social functioning, while in male patients it depends on the availability of income from work, which is explained by the need for men to fulfill traditional gender social roles, such as work for earnings, social life and leisure, marital relations, support for their elderly parents, etc. These factors, along with others — the awareness of the need for treatment by male patients, with an increase in satisfaction with the care provided, with an increase in the age of male relatives — maintained their compliance at a higher level.

The revealed differences in significant factors of adherence to treatment in women showed that their compliance was influenced to a greater extent by the emotional and motivational components of the psyche. A higher level of motivation for treatment, as well as satisfaction with the help provided and communication with a psychiatrist, had a positive effect on the compliance of female patients. The factors that reduced compliance in female patients and female relatives were the peculiarities of relationships: compliance was reduced by conflict, hostile relations in the family, overprotection, increased distress from problems in interpersonal relationships, revealed by the questionnaire of the study of interpersonal problems (Horowitz L., 2000). For female relatives, among whom most of the patients were mothers (82%), increased general interpersonal distress was recorded, as well as distress on the scales of "self-sacrifice" (excessive care and tolerance, obedience to the patient), "excessive compliance" (difficulties in expressing disagreement with others, fear of loss of approval), "insecurity" (lack of self-confidence, low self-esteem, feelings of guilt, etc.), which can lead to negative patterns of behavior towards the patient, inability to build relationships with him, excessive care, control or his rejection. From the point of view of a psychodynamic approach, this may also indicate the symbiosis of mothers with their adult children. Mothers are emotionally involved in their illness, taking on the role of "victim", thus filling their inner emptiness. Such relationships can be the result of misperceptions of painful manifestations, low awareness of treatment, and also indicate the need

to provide family members with depth psychotherapy [15]. Therefore, the most important task is to create conditions for the patient's relatives to minimize behavior that has a destructive effect on the patient's condition, if any, and can also realize their resource of helping the patient, including in maintaining full-fledged drug treatment.

The association of mothers' compliance with increased general interpersonal distress in patients and high distress on the scales of "insecurity", "excessive compliance", "social depression" (patients with anxiety, timidity, difficulties in establishing social relations, expression of feelings, etc.) confirmed the presence of dysfunctional systemic disorders in families of patients with schizophrenia and their impact on reducing adherence to treatment in female relatives. The factors obtained during the formation of the models can be explained by the sphere of relations that is significant for female relatives, their emotional component in female patients, in particular, the dependence of the attitude to treatment on warm, trusting, approving relationships with relatives and a doctor.

For female patients, the gender characteristics that support their adherence to treatment include a more attentive attitude to their health [16, 17], as evidenced by their higher motivation for treatment: recognition of the problem and the intention to resolve it, the desire to maintain positive changes in the state, the need for psychotherapeutic help to consolidate the results obtained during treatment. It is known that one of the typical symptoms in the structure of psychopathological disorders, characteristic specifically for schizophrenia, is a decrease in the ability to critically assess one's condition. Patients' understanding of their condition and the need for treatment have a significant relationship with adherence to medical recommendations [5]. With this in mind, we analyzed the factors influencing the compliance of patients and their relatives, depending on their acceptance of the disease or its denial.

In the group of patients with an awareness of the disease, compliance increased with the duration of the disease and the frequency of hospitalizations, which, apparently, is associated with an increase in the degree of understanding of the need for long-term treatment, an adequate understanding of one's disorder and its symptoms, and the relationship between hospitalizations and discontinuation of therapy. This is confirmed by the low compliance in younger patients. In the relatives of patients in this group, compliance increased a high level of social functioning of patients and the presence of disability in patients, and the codependency of relatives reduced compliance. In the group with incomplete awareness of the disease, the compliance of patients also increased with age, and decreased when the drug was missed due to forgetfulness, which indicates their formal attitude to treatment, or the presence of cognitive deficit. A group of relatives with incomplete awareness of the disease is alarming. Among the factors that reduce their compliance, there is a low level of education of relatives, their lack of employment, a formal attitude to treatment, and the lack of control over the use of drugs by patients, as evidenced by the factor that they miss taking drugs due to forgetfulness. For patients with a predominance of psychotic syndromes (paranoid, affective-delusional, hallucinatory-delusional) and for their relatives, significant factors increasing compliance were the specificities of the course of the schizophrenic process, frequent and prolonged hospitalizations associated with the continuity of the process or the frequency of exacerbations, the presence of motivation of patients and their relatives to treatment, age and frequency of hospitalizations. With an increase in the frequency of hospitalizations, as well as in the group of patients with an awareness of the disease, an attitude towards adherence to the therapy regimen was formed, an understanding of the relationship between the termination of maintenance therapy and a deterioration in mental state and hospitalizations in a psychiatric hospital appeared.

With a decrease in the severity of the condition and an increase in deficiency symptoms, the compliance factors of patients and their relatives to a greater extent depended on social and psychological characteristics — the patient's social and physical activity, the patient's employment, social adaptation of relatives, and their motivation. The obtained models of compliance and the factors influencing it made it possible to determine the priority areas of measures to improve adherence to treatment, individualize approaches to therapy, which is provided by psychosocial interventions that are effective for this problem. It should be noted that in the surveyed group 85% of patients did not participate in rehabilitation programs (psychoeducation, psychotherapy), and among relatives this figure reached 88%. Therefore, it can be assumed that their own experience in understanding and accepting the disease and the need for treatment, acquired over the years of illness of a loved one (the duration of the illness for more than 70% of patients exceeded 10 years), adaptation over time to a difficult life situation, obtaining the necessary information and support from the attending psychiatrist on an individual basis. The results obtained confirm the need to include psychosocial work at the earliest stages of the patient's illness, since this work is a significant factor in improving compliance, reducing disease recurrence, and reducing the burden of disease in the family. The comprehensive approach developed by us, aimed at increasing adherence to treatment and the formation in patients with schizophrenia and their relatives of the skills of voluntary and responsible adherence to the psychopharmacotherapy regimen, includes compliance therapy for patients that integrates the principles,

provisions and techniques of cognitive-behavioral psychotherapy, psychoeducation and motivational interviews, motivational training, cognitive and social skills training, and psychoeducation for their family members, trainings on managing their psycho-emotional sphere, developing communication skills in the family and with specialists of psychiatric institutions, family psychological counseling. A comprehensive approach is aimed at identifying the reasons for insufficient adherence to drug therapy, forming more favorable ideas about the disease and treatment, motivating patients and relatives for long-term therapy, developing behavioral skills that contribute to maintaining the mental health of family members, carrying out rehabilitation work in an environment of respect and equality [18].

CONCLUSION

Formation of multivariate regression models and their analysis made it possible to identify factors influencing adherence to treatment of patients and their relatives, depending on gender and clinical characteristics, as well as on the awareness of the disease. With the help of the obtained data, it is possible to individualize psychosocial approaches to patients and their relatives and thereby improve the quality of the provided psychiatric care. In psychosocial interventions, different measures should be taken depending on the causes of the violation of adherence, and the identified patterns can help in choosing personal strategies for each patient. Thus patients who are not sufficiently aware of the disease due to a lack of awareness, a psychoeducational approach is useful. For patients who are ambivalent about drug therapy, a combination of psychoeducational and motivational approaches is recommended. he most important task is to create conditions for the relatives of a mentally ill person to minimize behavior that has a destructive effect on the patient's condition, if any, and also to be able to realize their resource for helping the patient, therefore, when working with relatives, psychoeducation, family counseling and trainings of skills are used, that are necessary for relatives. The proposed multivariate regression models and the approach to their formation opens up prospects for obtaining integrated compliance assessments, as well as calculating the individual compliance indicator of patients and relatives and shows that to solve the problem of assessing compliance, it is necessary to use the methods of system analysis of information [19]. This is also of interest from the point of view of the formation of predictors of the effectiveness of psychosocial, rehabilitation and psychotherapeutic measures, which forms the basis for optimizing the process of treating patients.

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