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Software Implementation the Methodology for Calculating Integral Indicators Rehabilitation Potential of Patients with Schizophrenia.

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ABSTRACT

The paper presents a mathematical, algorithmic and software for calculating the integral index of rehabilitation potential using methods priori ranking and expert assessment
Keywords: integral index, rehabilitation potential, a priori ranking, expert evaluation, scores, numerical estimates of concordance coefficient, schizophrenia

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INTRODUCTION

Relevance and purpose of the study:

Mental diseases are accompanied by a significant violation of social and labor functioning, violation of personal relationships, separation from society and family, each destabilization of activities habitual forms. Social and labor disadaptation often leads to the loss of young people's ability to work, healthy in physical terms, which leads to significant economic costs. Therefore, more attention is being paid to the aspects of their social and labor rehabilitation.

Dealing with this, the identification of patient with a significant rehabilitation potential and the use of a comprehensive resocial approach is of high significance.

In solving problems of assessing the degree social and labor rehabilitation of individual patients, specialists have to deal with a multitude of different components that affect the rehabilitation potential level. These factors include not only medical characteristics, but also a number of social, labor, family and other signs. At the same time, the quantitative evaluation and the individual influence degree of the signs have not been developed.

The aim of this study was to develop a system for assessing the rehabilitation potential level of schizophrenic patients for the subsequent creation on its basis of individual rehabilitation programs

On the precinct department basis of the psycho-neurological dispensary, a survey of patients with schizophrenia was conducted. To collect information about patients, the "Questionnaire for assessing the social functioning and quality of life of patients with schizophrenia" was developed at the Institute of Social and Clinical Psychiatry. The inclusion criteria were: able-bodied age, absence of disability group. The study did not include patients with the presence of another psychiatric or severe somatic pathology.

MATERIALS AND METHODS

At the first stage of information processing, the structure of medical and patients social characteristics was studied. In the second stage, a priori ranking method was used, using expert information for each value characteristic rank evaluation.

When collecting a priori information, experts (8 doctors of psychiatrists with a work experience of 3 to 20 years) were asked to fill out questionnaires from 16 indicators, in their opinion, the most influencing the level of rehabilitation potential. The indicators are ranked from 1 (the most significant sign) to 16 (the least important attribute). (Table 1)

Table 1: Assessments of eight experts

Index	Assessments of eight experts							
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**
X1 (Age)	2	8	8	9	2	11	2	5
X2 (Duration of the disease	1	9	1	1	3	1	1	4
X3 Frequency of stays	9	10	9	2	9	8	6	6
X4 Maintenancetherapy	11	1	2	4	4	2	7	7
X5 Conversion to HDPE	10	2	10	5	8	4	8	16
X6 Education	3	11	4	16	12	9	11	1
X7 length of service	4	12	11	15	16	10	14	13
X8 Characteristic of work, work	8	13	14	10	14	15	3	12
X9 Physical working capacity	5	14	12	8	10	12	9	11
X10 Intelligence Productivity	6	1	3	13	6	5	12	2

X11 Occupation by the household	12	15	13	3	13	13	4	14
X12 Occupation by the household	13	4	5	6	5	6	13	8
X13 Housing property requirements	16	16	16	12	16	16	15	15
X14 Maritalstatus	7	5	6	11	11	7	16	9
X15 Mutual relationship with relatives	14	6	15	7	1	3	5	10
X16 Nature of relationship with the environment	15	7	7	14	7	10	10	3

For each indicator, a system of score scores from 1 to 5 was developed.

Consistency of opinions of experts was determined by the calculation of the concordance coefficient, which amounted to 0.84, which confirms the hypothesis of the consistency of experts.

According to the ranking matrix, the weights wi of the individual indicators were determined, which affect the level of the rehabilitation potential.
Wi were calculated using the formula:

$$W_i = \frac{m \cdot n - \sum_{j=1}^{m} r_{ij}}{n \cdot m \cdot \left(n - \frac{m-1}{2}\right)}, \, i = \overline{1, n},$$

where m is the number of matrix columns (in this case, the number of experts),
n - number of rows (number of indicators),
rij is the estimate of the jth expert. Table. 2.

Table 2: Expert estimates and the sum of ranks

INDEX	Assessmentsofeightexperts									
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	AMOUNT OF RANGES	wi
X1 (Age)	2	8	8	9	2	11	2	5	47	0,050625
X2 (Duration of the disease	1	9	1	1	3	1	1	4	21	0,06687
X3 Frequency of stays	9	10	9	2	9	8	6	6	59	0,04312
X4 Maintenancetherapy	11	1	2	4	4	2	7	7	38	0,05625
X5 Conversion to HDPE	10	2	10	5	8	4	8	16	63	0,04063
X6 Education	3	11	4	16	12	9	11	1	67	0,03813
X7 length of service	4	12	11	15	16	10	14	13	96	0,02
X8 Characteristic of work, work	8	13	14	10	14	15	3	12	89	0,02438
X9 Physical working capacity	5	14	12	8	10	12	9	11	81	0,02938
X10 Intelligence Productivity	6	1	3	13	6	5	12	2	48	0,05
X11 Occupation by the household	12	15	13	3	13	13	4	14	87	0,02563
X12 Occupation by the household	13	4	5	6	5	6	13	8	60	0,0425
X13 Housing property requirements	16	16	16	12	16	16	15	15	122	0,00375
X14 Maritalstatus	7	5	6	11	11	7	16	9	72	0,035
X15 Mutual relationship with relatives	14	6	15	7	1	3	5	10	61	0,04188
X16 Nature of relationship with the environment	15	7	7	14	7	10	10	3	73	0,03438

The integral indicator of the level of rehabilitation potential was defined as

$$\Pi_{_{3}} = \sum_{i=1}^{n} w_i \cdot X_i^{\delta}$$

wherewi is the weight (significance) of the i-th indicator,
XiB - score of the i-th indicator.

RESULTS AND DISCUSSION

According to the results of calculations, the integral index is from 1.3 to 1.7. (Table 3). Thus, a quantitative assessment of the rehabilitation potential can be presented in the form of intervals:

Table 3: The values of rehabilitation potential

Rehabilitation potential	Good	Satisfactory	bad
IP	1,7 – 1,64	1,64 – 1,40	1,40 - 1,30

CONCLUSIONS

An indicator has been developed that makes it possible to comprehensively evaluate the status of the rehabilitation potential of patients with schizophrenia and apply appropriate rehabilitation programs.
In the course of the study, a computer program was developed that allows calculating an integral index for assessing the condition of patients.

All the results were a scientifically grounded basis for the development of practical recommendations to health care organizers.

REFERENCES

[1]   Alekseev NY, Sudakov OV, KuzmenkoNY,Fursova EA, Sviridova TN.Reseaech Journal of Pharmaceutical, Biological and Chemical Sciences. 2017; 8(2): 2693-2697.
[2]   Esaulenko IE, Petrova TN, Kolesnikova EN, Sudakov OV.Reseaech Journal of Pharmaceutical, Biological and Chemical Sciences. 2017; 8(3): 1368-1374.
[3]   Petrova TN, Popov VI, Kolesnikova EN, Sudakov OV,Alekseev NY.Reseaech Journal of Pharmaceutical, Biological and Chemical Sciences. 2017; 8(6): 713-717.
[4]   Kolesnikova EN,Petrova TN,Sudakov OV, Krasnorutskaya ON, Alekseev NY, Gubina OI.Reseaech Journal of Pharmaceutical, Biological and Chemical Sciences. 2017; 8(6): 713-717.
[5]   Esaulenko IE,Shtankov SI, Gladskikh NA, Krijanovskayay YA. System Analysis and Management in Biomedical Systems. 2014; 13(3):683-687.
[6]   EsaulenkoIE, GladskikhNA,ShtankovSI, JeleznyakovMA. System Analysis and Management in Biomedical Systems. 2011; 10(4): 864-869.
[7]   EsaulenkoIE, ShiryaevOY, ShtankovSI,GladskikhNA.System Analysis and Management in Biomedical Systems. 2014; 13(3):522-525.