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AFFECTIVE DISORDERS ASSOCIATED WITH EDUCATIONAL STRESS AMONG FOREIGN MEDICAL STUDENTS
(Dynamics over a 6-year period of study)

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Abstract:
Introduction. Students who go to study in other countries experience emotional difficulties in terms of initial adaptation to the norms and values of the host culture. High educational load and language barrier are also significant. In connection with migration and educational stress, many of them have anxiety and depressive disorders, suicidal thoughts.
This study aimed to develop recommendations for the prevention of affective disorders associated with educational stress among foreign medical students.
Material and methods. A continuous sample of 287 medical students (1-6 years of education) at the age of 17-30 (21.9 ± 2.3) years from the countries of the Middle East and India was examined using the medical sociological and psychometric methods. All students do not speak Russian and were trained in the mediator language (English).
Results. It was found that more than half (57.1%) of first-year students experienced serious difficulties in adapting in the first months of education in Russia. The greatest difficulties were created by the language barrier (73.1-75.7%), unusual food and climate conditions. Migration and educational stress in the first months caused emotional depression and suicidal thoughts in 44% of students. More than 40% of first-year students experienced average difficulties in mastering the educational material with a decrease in this figure by 2 - 3 - 4 courses, respectively to 28.9% and 21.6% and 18.8%. The third part of first-year students (31%) had depression: 19.1% – the subclinical level, and 11.9% – clinical level. In the second year, there was a decrease in the number of students with depression almost twice and on the third – to a minimum, with a subsequent increase in 4 and 5 courses and a sharp decrease by 6. The learning stress manifested by affective and psychosomatic symptoms. Symptoms of generalized anxiety were found in more than half (56%) of 1st year students with a decrease in the second year to 31% and a slight increase in the third (40.5%) and fourth (39.6%). The fifth (36.2%) and sixth (11.5%) courses had a statistically significant decrease in comparison with the first.
Conclusion. The development and implementation of «Time Management» and «Stress Management» programs are required in order to prevent the of anxious, depressive and psychosomatic disorders associated with educational stress. In case of formed border mental disorders, in the presence of voluntary informed consent, psychotherapy and psychopharmacotherapy in the student polyclinic are reasonable.
Key words: *foreign medical students, educational stress, anxiety, depression, social phobia.*

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INTRODUCTION:
Students who go to study in other countries experience emotional difficulties in terms of initial adaptation to the norms and values of the host culture [1]. In addition, stress is caused by changing living conditions, directly the educational process [2] and the need to learn Russian. Migration stress associated with the lack of familiar environment and support for relatives also plays a significant role [3]. The high level of educational stress among first-year students leads to the emergence of thoughts about suicide in most (83%) of them [4]. In addition, many students are diagnosed with a high level of anxiety and depression [5], especially among girls [6, 7].

An assessment of the incidence of affective disorders among medical students in India showed that the prevalence of depression was 8.7% -71.3%, of anxiety was 10.1% -58.9% and of stress was 42.8% - 59.8% [8]. Moreover, these indicators were higher in females than in men.

First-year students had symptoms of somatoform autonomic dysfunction after 3 or 4 months of study in 12.6% of cases. This disease was polymorphic in nature and consisted of disorders of the cardiovascular, respiratory, digestive system and, more rarely, of the urinary system [9, 10, 11].

The aim of the study is to develop recommendations for preventing anxiety and depressive disorders as a result of migration and educational stress among foreign students who do not speak Russian during the period of study at a Medical institute in Russia.

MATERIAL AND METHODS:
A continuous sample of 287 medical students (1-6 years of education) at the age of 17-30 (21.9 ± 2.3) years from the countries of the Middle East and India was examined using the medical sociological and psychometric methods. All students do not speak Russian and were trained in the mediator language (English).

The methods of research that we used were:
1. **Medical-sociological method** (anonymous questioning using an author's questionnaire that includes social-demographic information, questions about the features of adaptation to new living and learning conditions, and attitudes toward the chosen specialty).
2. **Psychometric method**:
   - The Test for Learning Stress [12];
   - The questionnaire «GAD-7» [13];
   - The Depression Anxiety Stress Scale – DASS-21 [14];
   - Social Phobia Inventory Scale [15];
3. **Statistical method**. We used methods of non-parametric statistics (descriptive statistics, median, interquartile range, criterion χ^2 with Yates correction for continuity, Spearman rank correlation coefficient, factor analysis by the principal components method with varimax rotation of the factor).

RESULTS OF THE STUDY AND DISCUSSION:
The students' point of view on the level of complexity of adaptation to studies in the first months after their arrival in Russia is shown in Table 1. Table 1 shows that the subjective perception of stress and frustration decreases over time, which is due to the gradual adaptation to the new place of residence, climatic and geographical and social features of the territory: differences among the students of the second (U=1132.5 p=0.017) and third year (U=906.0 p=0.0002) are obtained in comparison with the first course.

Table 1: **Degree of difficulty of adaptation in the first months of stay in Russia**

1st course		2nd course		3rd course		4th course		5th course		6th course	
Me	**Q$_{25}$-$_{75}$**	**Me**	**Q$_{25}$-$_{75}$**	**Me**	**Q$_{25}$-$_{75}$**	**Me**	**Q$_{25}$-$_{75}$**	**Me**	**Q$_{25}$-$_{75}$**	**Me**	**Q$_{25}$-$_{75}$**
50.0	30-70	40.0	20-50	30.0	20-40	30.0	20-55	50.0	30-60	50.0	20-60

The greatest difficulties were created by the language barrier (73.1-75.7%), unusual food and climate conditions. Much easier students perceived the lack of information in their native language, household problems and the unfamiliar territory of the city. These problems were solved with the help of a special instructor from among the teachers. Nevertheless, 44% of first-year students in the first months of study had emotional problems and suicidal thoughts related to migration and educational stress.

Factor analysis (Table 2) revealed 5 significant learning stress factors for 1st-year students (60.7% of variance).

*Table 2:***Factor analysis of the degree of significance of educational stress factors for 1st year students (The Test for Learning Stress)**

#	Factors	Components	r=	Eigen-value	% of the variance
1	*Complexity of studying*	Necessity of working out passes	0.709	5.1	26.8
		Incomprehensible textbooks	0.704		
2	*Confusion*	Disappointment in the profession	0.780	2.2	11.6
3	*Strict requirements*	Strict Teachers	0.881	1.7	8.8
		Great training load	0.874		
4	*Personal problems*	Longing for parents	0.727	1.3	7.1
		Lack of money	0.719		
5	*Difficulty in the mode of the day*	Unreasonable class schedule	0.811	1.2	6.4

Factor analysis (Table 3) of the symptoms of educational stress in first-year students revealed 2 significant factors (58.1% of the variance).

*Table 3:***Factor analysis of the symptoms of educational stress**

#	Factors	Components	r=	Eigen-value	% of the variance
1	*Anxiety-subdepressive states*	Extraneous thoughts	0.829	6.8	42.3
		Lack of time	0.822		
		Feeling helpless	0.799		
		Anxiety	0.775		
		Attention breakdown	0.736		
		Loss of confidence	0.733		
		Bad mood	0.717		
2	*Psychosomatic symptoms*	Tachycardia	0.861	2.5	15.8
		Difficulty breathing	0.795		
		Dyspepsia	0.832		
		Headache	0.728		

A study of the severity of depression, anxiety, and stress (DASS-21) showed that the greatest number of students with depression was in the first year. Among the six-year students, depression was virtually unknown (Table 4).

*Table 4:***The results of the DASS-21 test**

Degree of severity	1st course n	1st course %	2nd course n	2nd course %	3rd course n	3rd course %	4th course n	4th course %	5th course n	5th course %	6th course n	6th course %
Depression												
Normal	58	69.0	37	82.2	33	89.2	40	83.3	38	80.8	26	100.0
Mild	10	11.9	3	6.7	2	5.4	5	10.4	5	10.6	–	–
Moderate	14	16.7	5	11.1	1	2.7	2	4.2	2	4.3	–	–
Severe	2	2.4	0	0.0	1	2.7	1	2.1	2	4.3	–	–
Anxiety												
Normal	42	50.0	29	64.4	24	64.9	32	66.7	30	63.8	26	100.0
Mild	15	17.9	8	17.8	4	10.8	12	25.0	12	25.5	–	–
Moderate	10	11.9	5	11.1	5	13.5	1	2.0	2	4.3	–	–
Severe	6	7,1	2	4.4	2	5.4	3	6.3	3	6.4	–	–
Extremely Severe	10	11.9	1	2.2	2	5.4	0	0.0	0	0.0	–	–
Stress												
Normal	59	70.2	38	84.4	33	89.2	39	81.3	39	82.9	26	100.0
Mild	9	10.7	3	6.7	1	2.7	3	6.2	6	12.8	–	–
Moderate	14	16.7	4	8.9	2	5.4	3	6.2	2	4.3	–	–
Severe	2	2.4	0	0.0	1	2.7	3	6.2	0	0.0	–	–

The highest incidence of depression was observed in first-year students - 31% (Figure 1): the subclinical level was 19.1% and the clinical level was 11.9%. In the following courses, the prevalence of depression decreased almost twice in the second year and to 10.8% in the third. Reducing of depressions in the second year due to a decrease of the educational stress after the date of "the most difficult exams" on the human anatomy and histology. Decrease in the number of depressions in the third year is associated with the beginning of the study of clinical disciplines with a gentler mode of study. The fourth and fifth courses again noted an increase in the frequency of depression to the level of 2 courses, which is associated with high training load. At the 6th year students denied the presence of depression and described their emotional state as "euphoria" in connection with the upcoming graduation.
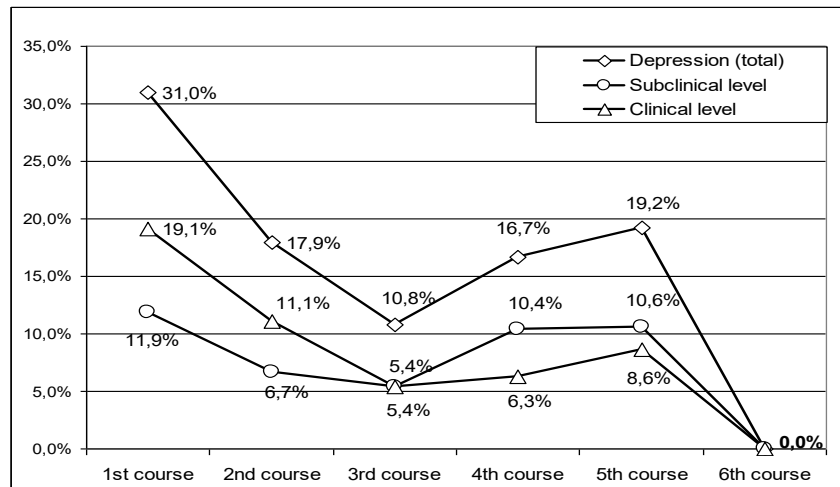

Figure 1. Frequency and severity of depression among foreign medical students

The prevalence of anxiety among students was maximum in the first year (50%), then gradually decreased by 2-5 courses (33-36%), and disappeared to the 6th course (Figure 2). The curve of the prevalence of stress (Figure 3) actually repeats the depression prevalence curve: the highest frequency of stress is inherent in 1st year students with a decrease in 2 and 3 courses. Then there was an increase in the frequency of stress in the fourth and fifth courses, which is associated with an intensive study of clinical disciplines, the need for communication with patients with poor or weak knowledge of Russian.

Correlation analysis revealed a high level of direct correlation dependence of the dynamics of depression and anxiety for 6 years (r=0.943 p=0.005) and the dynamics of depression and stress (r=0.829 p=0.042).
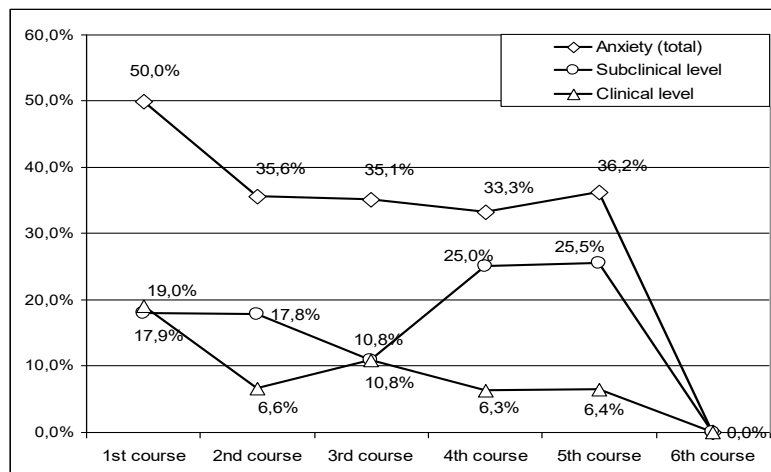

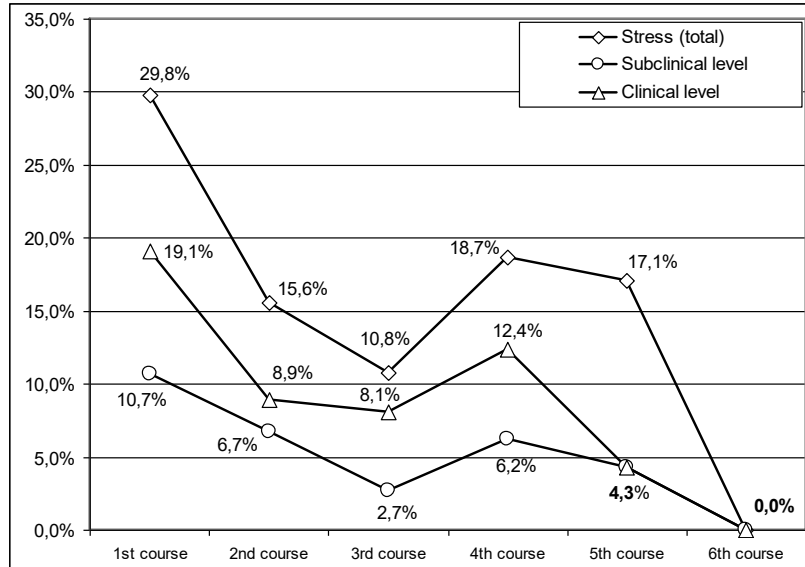**Figure 2. Frequency and severity of anxiety among foreign medical students**

Figure 3. Frequency and severity of stress among foreign medical students
The results of the GAD-7 test are presented in Table 5.

Table 5: **The results of the GAD-7 test**

Degree of severity	1st course		2nd course		3rd course		4th course		5th course		6th course	
	n	%	n	%	n	%	n	%	n	%	n	%
Normal	37	44.0	31	69.0	22	59.5	29	60.4	30	63.8	23	88.5
Mild	34	40.5	11	24.0	10	27.0	13	27.0	11	23.4	3	11.5
Moderate	12	14.3	3	7.0	5	13.5	3	6.3	5	10.6	–	–
Severe	1	1.2	0	0.0	0	0.0	3	6.3	1	2.1	–	–

As can be seen from Table 5, the symptoms of generalized anxiety were recorded in more than half of 1st year students (56%) with a decrease in the second year to 31% (χ^2=6.292 df=1 p=0.013; OR=2.8 95%CI=1.2-6.5). Subsequently, there was again a slight increase in the third (40.5%) and fourth (39.6%) rates. In the fifth year (36.2%) and sixth (11.5%) there was a statistically significant decrease compared to the first year, respectively: (χ^2=3.962 df=1 p=0.047; OR=2.2 95%CI=1.0-5.0) and (χ^2=14.056 df=1 p=0.0008; OR=9.7 95%CI=2.5-44.3). This was due to work on the clinical departments and the need to communicate with patients and poor knowledge of Russian language. The odds ratio indicates that the probability of a high frequency of a significant level of anxiety among first-year foreign students is more than 9 times higher than that of the sixth.

The results of the SPIN-test for social phobia are presented in Table 6

Table 6: **The results of the SPIN-test for social phobia**

Degree of severity	1st course		2nd course		3rd course		4th course		5th course		6th course	
	n	%	n	%	n	%	n	%	n	%	n	%
Normal	46	54.8	30	66.7	30	81.1	37	77.1	34	72.3	24	92.3
Mild	27	32.1	10	22.2	4	10.8	5	10.4	6	12.8	2	7.7
Moderate	10	11.9	5	11.1	2	5.4	4	8.3	5	10.6	–	–
Severe	0	0.0	0	0.0	1	2.7	2	4.2	2	4.3	–	–
Extremely Severe	1	1.2	0	0.0	0	0.0	–	–	–	–	–	–

The greatest number of subclinical and clinically pronounced symptoms of social phobia was among 1st-year students. Symptoms of social phobia were detected by 45.2% of first-year students, and 13.1% - in moderately and expressed degree. In sophomores, there was a decrease (statistically insignificant) in the frequency of social phobia to 33.3%, and in third-year students, up to 18.9% compared to the first

$(\chi^2=8.724$ df=1 p=0.004; OR=4.1 95%CI=1.5-11.5). The odds ratio indicates that the probability of having symptoms of social phobia in first-year students is more than 4-fold higher than in the third year. A similar trend was observed in students 4-6 courses. Characteristically, the symptoms of an easily expressed social phobia among the sixth-year students were registered only in 7.7% in connection with the upcoming graduation.

Clinically significant symptoms of social phobia (moderately and more pronounced) were observed from 8.1% in third-year students to 14.9% in the fifth. These data, from our point of view, reflect the real spread of symptoms of social phobia among foreign medical students.

CONCLUSION:

It was found that more than half (57.1%) of first-year students experienced serious difficulties in adapting in the first months of education in Russia. The greatest difficulties were created by the language barrier (73.1-75.7%), unusual food and climate conditions. Migration and educational stress in the first months caused emotional depression and suicidal thoughts in 44% of students. More than 40% of first-year students experienced average difficulties in mastering the educational material with a decrease in this figure by 2 - 3 - 4 courses, respectively to 28.9% and 21.6% and 18.8%.

The most significant stressful learning factors in the first year were "learning complexity", "hard training requirements", "day regime difficulties" (42% of the variance in total). These factors caused students a sense of confusion, frustration in the profession, contributed to the actualization of "personal problems". Educational stress was manifested by anxiety-subdepressive disorders and psychosomatic symptoms.

The highest frequency of depression was observed in first-year students (31%). At the same time, the subclinical level was 19.1% and the clinical level was 11.9%. In the second year, there was a decrease in the prevalence of depression almost to half and to a minimum of the third, with a subsequent increase in 4 and 5 courses and a sharp decrease of 6 (due to the upcoming end and the associated optimism).

The highest frequency of anxiety was also observed in first-year students (50%) with a decrease in 2-5 courses to 33-36% and to "0" - in the sixth. The curve of the prevalence of stress actually repeats the curve of the prevalence of depression. Symptoms of generalized anxiety were recorded in more than half (56%)

of 1st year students with a decrease in the second year to 31% and a slight increase in the third (40.5%) and fourth (39.6%). The fifth (36.2%) and sixth (11.5%) courses had a statistically significant decrease in anxiety as compared to the first. Symptoms of social phobia were detected by 45.2% of freshmen, followed by a decrease in the second and third courses and a slight increase in 4 and 5 courses.

The development and implementation of «Time Management» and «Stress Management» programs is required in order to prevent the of anxious, depressive and psychosomatic disorders associated with educational stress. In case of formed border mental disorders, in the presence of voluntary informed consent, psychotherapy and psychopharmacotherapy in the student polyclinic are reasonable.

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