УДК 61:378.180.6
DOI: https://doi.org/10.17816/PAVLOVJ626321

Отношение студентов медицинских специальностей к образовательному процессу в период пандемии COVID-19

В. А. Решетников[1], И. Н. Каграманян[1], И. И. Якушина[1], В. В. Михайловский[1], М. С. Микерова[1] ✉, Е. А. Шустикова[1], В. Јаковљевић[1, 2], Т. Николић Турнић[1, 2], С. Мијаиловић[2], Ј. Димитријевић[2], Љ. Тасић[2]

[1] Первый Московский государственный медицинский университет имени И. М. Сеченова (Сеченовский Университет), Москва, Российская Федерация;
[2] Универзитет у Крагујевцу, Крагујевац, Србија

АННОТАЦИЯ

Введение. Переход в период пандемии COVID-19 (англ.: *Coronavirus Disease 2019*, коронавирусная инфекция 2019 г.) на дистанционный формат медицинского образования, которое предполагает, что большинство формируемых клинических компетенций будущего врача требует личного присутствия, стал особым вызовом. Изучение восприятия обучающимися нового формата образования представляется важным для получения обратной связи о процессе обучения, особенно во время глобальных пандемий.

Цель. Изучить отношение студентов медицинских специальностей к образовательному процессу в период пандемии COVID-19.

Материалы и методы. Проведено качественное поперечное обсервационное исследование с использованием опросника, разработанного на Факультете медицинских наук Крагуевацкого университета (Сербия). Анкетирование проводилось в онлайн-формате посредством ресурса anketolog.ru. Ссылка на опрос была размещена в системе «Университет-обучающийся». Участие в исследовании было добровольным и анонимным. В анкетировании приняли участие 694 студента Сеченовского Университета.

Результаты. В целом студенты положительно оценили адаптацию преподавателей к учебному процессу в сложившихся обстоятельствах, наличие учебных материалов, а также взаимодействие с преподавателями, в т. ч. в процессе экзаменов, отмечая в качестве положительных сторон обучения в дистанционном формате гибкость и возможность более рациональной организации собственного времени, а также снижение затрат в процессе обучения. Однако большинство студентов считают, что онлайн-образование не может полностью заменить традиционную форму обучения в процессе получения знаний, особенно в части приобретения клинических навыков, а также отмечают снижение мотивации и концентрации в период дистанционного обучения, неудобства в использовании существующей платформы для онлайн-обучения.

Заключение. Материалы исследования могут послужить основой для разработки рекомендаций для совершенствования механизмов онлайн-обучения.

Ключевые слова: *COVID-19; медицинское образование; онлайн-обучение; анкетирование студентов*

Для цитирования:
Решетников В.А., Каграманян И.Н., Якушина И.И., Михайловский В.В., Микерова М.С., Шустикова Е.А., Јаковљевић В., Николић Турнић Т., Мијаиловић С., Димитријевић Ј., Тасић Љ. Отношение студентов медицинских специальностей к образовательному процессу в период пандемии COVID-19 // Российский медико-биологический вестник имени академика И. П. Павлова. 2024. Т. 32, № 4. С. 557–568. DOI: https://doi.org/10.17816/PAVLOVJ626321

Рукопись получена: 02.10.2024 **Рукопись одобрена:** 23.10.2024 **Опубликована:** 31.12.2024

ЭКО•ВЕКТОР

DOI: https://doi.org/10.17816/PAVLOVJ626321

Attitude of Medical Students to the Education Process in the Period of COVID-19 Pandemic

Vladimir A. Reshetnikov[1], Igor' N. Kagramanyan[1], Irina I. Yakushina[1], Viktor V. Mikhaylovskiy[1], Mariya S. Mikerova[1] ✉, Elena A. Shustikova[1], Vladimir Jakovljević[1, 2], Tamara Nikolić Turnić[1, 2], Sara Mijailović[2], Jelena Dimitrijević[2], Ljiljana Tasic[2]

[1] I. M. Sechenov First Moscow State Medical University (Sechenovskiy University), Moscow, Russian Federation;
[2] University of Kragujevac, Kragujevac, Serbia

ABSTRACT

INTRODUCTION: The move of medical education that requires personal presence for formation of most clinical competencies of a future doctor, to the distance format in the period of COVID-19 (Coronavirus Disease 2019) pandemic, has become a challenge. A study of perception of the new education format by students seems important to obtain feedback on the learning process, especially in the time of global pandemics.

AIM: To study the attitude of medical students to the learning process in the period of COVID-19 pandemic.

MATERIALS AND METHODS: A qualitative cross-sectional observational study was conducted using a questionnaire developed at the Faculty of Medical Sciences of the University of Kragujevac Rectorate (Serbia). The survey was conducted online via the anketolog.ru resource. The reference to the survey was posted in the University-Student system. Participation in the study was voluntary and anonymous. A total of 694 students of Sechenov University took part in the survey.

RESULTS: In general, students positively assessed the adaptation of the teachers to the education process in the circumstances concerned, availability of the learning materials, as well as interaction with the teachers, among other things, at exams, noting the flexibility and possibility to more rationally organize their personal time in the distance education format, and also reduce of expenditures in the study process. However, most students believe that online education cannot completely replace the traditional form in terms of obtaining knowledge, especially in acquiring clinical skills, and also note a decrease in motivations and concentration in distance learning, and inconveniences of using the existing online education platform.

CONCLUSION: The research materials can serve as the basis for developing recommendations for improving the online education mechanisms.

Keywords: *COVID-19; medical education; online education; students' survey*

For citation:
Reshetnikov VA, Kagramanyan IN, Yakushina II, Mikhaylovskiy VV, Mikerova MS, Shustikova EA, Jakovljević V, Nikolić Turnić T, Mijailović S, Dimitrijević J, Tasic L. Attitude of Medical Students to the Education Process in the Period of COVID-19 Pandemic. *I. P. Pavlov Russian Medical Biological Herald.* 2024;32(4):557–568. DOI: https://doi.org/10.17816/PAVLOVJ626321

Received: 02.10.2024 **Accepted:** 23.10.2024 **Published:** 31.12.2024

ECO•VECTOR

LIST OF ABBREVIATIONS

COVID-19 — Coronavirus Disease 2019

INTRODUCTION

COVID-19 (*Coronavirus Disease 2019*) pandemic produced a considerable impact on the education system involving students and teachers all around the globe. In the spring 2020, both secondary and higher education systems faced the necessity of shifting to *distance* or *hybrid learning* format in the shortest time. In an attempt to bring the global COVID-19 pandemic under control, the governments of the countries around the world took a decision on the closure of educational institutions involving 94.0% (1.5 billion) of students [1, 2].

To minimize the negative consequences of closure of the educational institutions and to create conditions for uninterrupted learning, educational organizations have made much efforts to accelerate the modification of the learning process by a move from the classic to the distance learning format [3].

As a result of the move to electronic learning (e-learning) the volume of materials taught remotely has changed by an order of magnitude, the processes of introducing various e-learning methods have accelerated dramatically, and previously known digital technologies and their technical solutions have been tested for the adequacy of their application in conditions of a *multiply increased audience simultaneously accessing these resources* [4].

In the new conditions, the task of ensuring the continuity of the main activities has become relevant for universities: completion of the academic year, holding tests and exams, including defenses of final qualifying works, organizing the admission of applicants. As in the rest of the world, the experience in distance work and study in Russia has shown that the country's higher education system faces a number of serious challenges, the answers to which create conditions for the growth of global competitiveness and leadership of the Russian higher education system, but also require rethinking of education models in universities, which are traditionally based on a *face-to-face communication between a teacher and a student* [5].

COVID-19 pandemic has become a driver for rethinking the usual approaches in the education system and has put forward a number of new requirements for the work of education organizations, in particular, in the higher education system. Active use of the online format, the use of distance technologies, proctoring, and a digital educational environment have become part of the new educational reality where students, teachers, and heads of educational programs have found themselves during COVID-19 pandemic [5].

A particular challenge was a shift to a distance format of medical education, which assumes that most of the clinical competencies of a future doctor (for example, communication skills and practical manipulations) are inextricably connected with forms of training that require personal presence [6].

Studying students' attitudes toward e-education using various empirical and theoretical approaches seems very important for obtaining feedback on the learning process, especially during global pandemics [7–12]. In addition to centralized surveys initiated by the Russian Ministry of Education and Science, universities also conducted their own monitoring of the perception of changes in the working conditions by the target groups during the shift to a distance format [1].

Despite the existing theoretical and practical experience in organizing the educational process with application of digital technologies in a number of disciplines, Sechenov University, like other medical universities, faced the *impossibility of implementing classic students' learning 'at a patient's bedside'*. The most acute challenges of the pandemic for the university were the need to shift a significant contingent of students of all education levels (about 20 thousand people) to distance format at the shortest possible time, adapt traditional practice- and patient-oriented training programs to the self-isolation conditions, as well as provide the teaching personnel with the devices and technical support for distance work [13].

At Sechenovskiy University, since the onset of the pandemic, lectures and practical classes have been transformed to a remote format using the Unified Educational Portal of the University, various electronic platforms and cloud services; the opportunity for students to choose the skills to be mastered has been expanded and the proportion of independent work of students has been increased; an additional list of diverse and optional disciplines has been introduced into higher education programs, which permitted to develop additional competencies, in particular digital ones, for studying in a distance format [13, 14].

The **aim** of this study to attitude of medical students to the educational process in the period of COVID-19 pandemic.

DOI: https://doi.org/10.17816/PAVLOVJ626321

MATERIALS AND METHODS

To achieve the set goal, a qualitative cross-sectional observational study was conducted using the questionnaire developed at the Faculty of Medical Sciences of the University of Kragujevac (Serbia). The study protocol corresponds to the principles of the Declaration of Helsinki (2013 edition) and was approved by the Ethics Committee of the Faculty of Medical Sciences of the University of Kragujevac (Protocol No. 143/19). In the analysis of reliability, Cronbach's α coefficient of the questionnaire as a whole was 0.919, which indicates a high internal reliability of the questionnaire.

The questionnaire included 43 questions arranged in 7 blocks:

Block 1. Demographic characteristics of respondents.

Block 2. Experience in online learning.

Block 3. Organization of learning process.

Block 4. Issues of psychological functioning.

Block 5. Clinical skills.

Block 6. Technical issues.

Block 7. Quality of life.

The survey was conducted online via the anketolog.ru resource from February to May 2022. The link to the survey was posted in the 'University-student' system. Participation in the study was voluntary and anonymous. Of the total 694 students who took part in the survey, 24.2% were boys, and 75.8% girls; the mean age of respondents was 20.09 ± 2.4 years (from 17 to 44 years). The representativeness of this sample, according to the materials of K. A. Otdelnova, corresponds to the increased accuracy of the study at a significance level of p = 0.05, and therefore the data obtained can be used in the publication of scientific articles [15].

Inclusion criteria for respondents were as follows:

- studying at Sechenovskiy University during COVID-19 pandemic;
- the native language is Russian.

Exclusion criteria:

- not studying at Sechenovskiy University during COVID-19 pandemic;
- the native language is not Russian;
- refusal to participate in the survey.

A significant proportion of students who took part in the survey were studying in the 'general medicine' program (46.5%), 14.8% of respondents were studying in the 'medical and preventive care' program, 12.5% in the 'pediatrics' program, 4.2% in 'dentistry', and 1.4% in 'nursing' (Table 1).

The results obtained in the study were subjected to statistical processing using Excel (Microsoft Corporation, USA) and SPSS 26.0 (IBM Company, USA) software.

Table 1. Characteristics of Respondents

Parameter	n	%
Gender		
Male	168	24.2
Female	526	75.8
Training program		
General medicine	323	46.5
Medical and preventive care	103	14.8
Pediatrics	89	12.8
Dentistry	29	4.2
Pharmaceutical science	19	2.7
Nursing	10	1.4
Other	121	17.4
Course		
1	298	42.9
2	81	11.7
3	128	18.4
4	79	11.4
5	59	8.5
6	49	7.1

RESULTS

A considerable part of students assessed their level of skills in using various electronic devices (computers, smartphones, data tablets, etc.) as 'good' (25.3%), 'very good' (32.2%) and 'excellent' (32.0%). One third of respondents (31.3%) rated their pre-COVID-19 online learning experience as 'medium', 19.5% as 'good', and 17.7% as 'hot high'. A small number of students (12.7%) had 'excellent' online learning experience, while 18.8% reported no experience of online learning. Only 12.0% of surveyed students did not gain additional experience during online learning in the period of COVID-19 pandemic, while for the majority of students, the move to the new learning format provided an opportunity to 'significantly' (31.5%), 'to a moderate extent' (36.8%), and 'insignificantly' (19.7%) improve their experience.

The students were offered to indicate the forms of online learning with which they got acquainted at the university during COVID-19 pandemic. The most popular forms of online learning mastered by students were ZOOM/Teams/Webex/Google Meet meeting, which was the answer of 89.6% of respondents; 66.1% of respondents indicated pre-recorded videos; 53.9% presentations explaining the topic (Table 2).

Eighty-five-point one percent of surveyed students think that further improvement of the existing form of online learning is necessary.

Table 2. Frequency of Students' Responses on Online Learning Formats Used during COVID-19 Pandemic

Forms of online learning	n	%
ZOOM/Teams/Webex/Google Meet meeting	622	89.6
Pre-recorded video	459	66.1
Digital platforms (Moodle, et al.)	149	21.5
Presentations explaining the topic	374	53.9
Short online consultations in the written form (consultations in chat)	104	15.0
Test questions	272	39.2

Students were also asked which online educational methods would significantly improve the mastering of practical knowledge and skills in the field of biomedical sciences (Table 3). A significant proportion of respondents (71.3%) indicated such educational methods as clinical scenarios, virtual patients and clinical examples, half of respondents — the formation of practical skills through simulation training.

Next, students' answers to the question about the sphere in which it would be useful to have additional learning materials apart from the available online materials, were analyzed. The preclinical block included such disciplines as anatomy, physiology, histology, chemistry, etc., clinical block included subjects of clinical medicine, pharmaceutical science and clinical dentistry. A considerable part of students indicated their need for additional learning materials both on preclinical (65.9%), and clinical (62.1%) disciplines. Answers of respondents concerning their attitude to the educational process in the period of COVID-19 pandemic, are presented in Table 4.

Table 3. Frequency of Students' Responses on Online Educational Methods that would Significantly Improve Acquisition of Practical Knowledge and Skills in Biomedical Sciences

Online educational methods	n	%
Clinical scenarios, virtual patients, clinical examples	495	71.3
Formation of practical skills through a simulation training system	369	53.2
Multimedia content/educational multimedia streams	328	47.3
Virtual class	257	37.0
Learning games/gamification	234	33.7

Table 4. Frequency of Students' Responses on their Attitude to Various Aspects of Learning Process Organization during COVID-19 Pandemic

Question	I absolutely disagree		I rather disagree		I find it difficult to answer		I rather agree		I completely agree	
	n	%	n	%	n	%	n	%	n	%
Teachers have adequately adapted the educational process to new circumstances during the pandemic	22	3.2	77	11.1	150	21.7	306	44.2	137	19.8
Teachers possess necessary skills to conduct online learning	21	3.0	106	15.4	128	18.6	321	46.5	114	16.5
The learning materials were completely accessible during online classes	25	3.6	66	9.5	78	11.3	308	44.5	215	31.1
Teachers followed the lecture/ class schedule during online learning	20	2.9	52	7.5	53	7.7	257	37.1	310	44.8
Interaction with teachers during online learning was adequate	21	3.0	46	6.6	72	10.4	296	42.8	257	37.1
Teachers were available during online classes to consult on any doubts in the material	21	3.0	43	6.2	93	13.4	290	41.9	245	35.4
Feedback on student performance during online classes was satisfactory	32	4.6	66	9.5	184	26.6	259	37.4	151	21.8
Teachers adequately tested knowledge/administered exams during online classes	27	3.9	75	10.8	139	20.1	253	36.6	198	28.6
Combination of different forms of learning (online and traditional) is more successful than use of one form of learning (only online or only traditional form)	34	4.9	61	8.9	88	12.8	234	34.0	272	39.5
Online education can completely replace the traditional form of education in the process of acquiring knowledge	345	50.1	158	22.9	80	11.6	63	9.1	43	6.2

The results of the study demonstrated a positive attitude of students towards the organization of the learning process. Students highly appreciated the adaptation of the learning process during the pandemic, the availability of educational materials, and interaction with teachers. To note, half of respondents (50.1%) absolutely disagree that online education can completely replace the traditional form of education in terms of acquiring knowledge, and a third of respondents rather agree and absolutely agree that a combination of online and traditional forms of education is more successful than use of only one form of education (only online or only traditional) 34.0% and 39.5% respectively.

The next block of questions in the questionnaire was devoted to issues of psychological functioning (Table 5).

According to a significant portion of students, the new (online) learning model has reduced their motivation to learning (20.3% completely agree with this and 30.4% rather agree), and has contributed to a decrease in students' concentration (21.4% completely agree and 38.9% rather agree).

The survey results showed that more than half of respondents disagree that the online learning model has increased the level of stress among students (22.9% absolutely disagree and 30.0% rather disagree), contributed to depression (23.5% absolutely disagree

and 24.6% rather disagree), to anxiety (22.3% absolutely disagree and 26.9% rather disagree), and insomnia (29.3% absolutely disagree and 26.5% rather disagree).

At the next stage, students were asked to assess the development of clinical skills in the process of online learning during COVID-19 pandemic (Table 6).

Table 5. Frequency of Students' Responses on the Influence of Learning on their Psychological Well-Being during COVID-19 Pandemic

New (online) learning model used during pandemic	I absolutely disagree		I rather disagree		I find it difficult to answer		I rather agree		I completely agree	
	n	%	n	%	n	%	n	%	n	%
Caused a drop in students' motivation	60	8.7	122	17.7	158	23.0	209	30.4	139	20.2
Contributed to reduction in students' concentration	56	8.2	104	15.1	110	16.4	267	38.9	147	21.4
Impaired memorization of new learning material by students	91	13.2	169	24.6	160	23.3	169	24.6	99	14.4
Increased the level of stress among students	157	22.9	206	30.0	144	21.0	114	16.6	66	9.6
Contributed to depression in students	161	23.5	169	24.6	195	28.4	91	13.3	70	10.2
Contributed to the emergence of anxiety states in students	153	22.3	185	26.9	167	24.3	111	16.2	71	10.3
Contributed to the emergence of insomnia in students	201	29.3	182	26.5	155	22.6	89	13.0	59	8.6

Table 6. Clinical Skills Development during COVID-19 Pandemic

Question	I absolutely disagree		I rather disagree		I find it difficult to answer		I rather agree		I completely agree	
	n	%	n	%	n	%	n	%	n	%
Knowledge gained during online learning can be implemented in clinical practice	58	8.5	140	20.6	213	31.0	203	29.6	72	10.5
The learning materials used for online learning are adapted to acquiring clinical skills, taking into account the impossibility of communicating with a real patient	115	16.8	184	26.9	228	33.3	117	17.1	41	6.0
Missed clinical classes will negatively tell on skills after completing the training	16	2.3	47	6.9	114	16.6	259	37.8	249	36.4
A combination of different forms of learning (online and traditional) is more successful in acquiring clinical skills than one form of learning (only online or only traditional)	42	6.3	90	13.1	131	19.1	246	35.9	176	25.7
I believe that online learning can completely replace the traditional form in acquiring clinical skills	415	60.5	127	18.5	75	10.9	39	5.7	30	4.4
The teacher provides quality feedback during the discussion of practical (clinical) skills	22	3.2	49	7.2	245	35.8	236	34.5	133	19.4

A third of respondents found it difficult to answer the question if the knowledge acquired during online learning could be implemented in practice (31.0%), and if the learning materials used in online learning were adapted to acquiring clinical skills in conditions of the absence of communication with a real patient (33.3%).

To note, 36.4% of students completely agree and 37.8% rather agree that missed clinical classes will negatively tell on the skills after completion of the study. Sixty-point five percent of respondents absolutely disagree that online learning can completely replace traditional form in acquiring clinical skills, and 35.9% rather agree and 25.7% completely agree that a combination of different forms of learning (online and traditional) is more successful in acquiring clinical skills than one form (only online or only traditional).

When assessing the technical aspect of studying in the period of COVID-19 pandemic, a considerable number of students indicated problems with the existing online learning platform, which affected the quality of the learning process, upon that, just over a third of respondents noted that difficulties in the learning process arouse due to a poor Internet connection (Table 7).

The final block of questions was aimed at assessing the quality of life of students during their studies in the period of COVID-19 pandemic (Table 8).

Table 7. Frequency of Students' Responses on Technical Complexities of Learning during COVID-19 Pandemic

Question	I absolutely disagree		I rather disagree		I find it difficult to answer		I rather agree		I completely agree	
	n	%	n	%	n	%	n	%	n	%
Difficulties in the learning process arose due to a poor quality of the Internet connection	97	14.1	182	26.5	139	20.3	200	29.2	68	9.9
Problems with the existing online learning platform have affected the quality of the learning process	52	7.6	139	20.3	163	23.8	235	34.3	96	14.0
Electronic devices in the learning space were interfering with the online learning process	148	21.6	226	33.0	159	23.2	109	15.9	43	6.3

Table 8. Frequency of Students' Responses on Quality of Life during COVID-19 Pandemic

Question	I absolutely disagree		I rather disagree		I find it difficult to answer		I rather agree		I completely agree	
	n	%	n	%	n	%	n	%	n	%
Changes in teaching methods during the pandemic have negatively affected the quality of life	102	14.9	203	29.7	192	28.1	132	19.3	54	7.9
Online learning is more flexible than traditional learning and allows for better time organization	55	8.1	75	11.1	91	13.3	266	38.9	196	28.7
Conducting the educational process online has led to reduction in learning expenditures	60	8.7	54	7.9	153	22.3	224	32.7	195	28.4
Due to lack of self-discipline, I have problems with performing my school duties	138	20.1	137	20.2	96	14.0	183	26.7	131	19.1
Lack of interaction with other students has negatively impacted my academic performance during the pandemic	158	23.0	123	17.9	112	16.3	165	24.0	129	18.8

To note, more than half of the surveyed students believe that online learning is more flexible than the traditional form and allows for better organization of the time 38.9% of respondents rather agree with this statement, 28.7% completely agree. Besides, for many students, online education led to reduction of the education costs 32.7% rather agree and 28.4% completely agree with this.

In students' opinion, the move to online learning had an ambiguous effect on the quality of life in whole, on self-discipline required for fulfilling learning duties, and also on the academic success during the pandemics conditioned by communication with other students.

DISCUSSION

COVID-19 pandemic has significantly affected many social spheres, including the higher education system, which underwent noticeable transformations during the pandemic.

The emergence of new strains of SARS-CoV-2 virus, the wave-like course of the disease and the probability for other biological threats necessitate the development of not only effective anti-epidemic measures, but also of the mechanisms of implementation of distance learning using special training technologies in the education process, at medical universities as well.

COVID-19 has seriously challenged most aspects of the functioning of higher educational institutions, from the admission campaign and the admission procedure for applicants, effective teaching and learning, ensuring safety of students and teachers within the university, to the midterm assessments and exams, conducting research, developing academic mobility and admitting international students. In the ongoing expert discussions on the prospects of higher education, issues of digital development of universities and the move to hybrid forms of education are coming to the fore.

Despite the fact that training in medical specialties cannot be fully implemented in the online format, since many skills and abilities (performing various manipulations, operations, studies, examinations, communications with patients) cannot be fully acquired in any other way but at practical classes held face-to-face, the distance format can be used in the system of higher medical education to provide electronic educational courses and advanced training, access to data necessary for scientific research, and to professional communication systems and libraries of scientific and medical information [16–20].

CONCLUSION

The article presents the results of a study conducted among the students of Sechenovskiy University to elicit the attitude of medical students to the education process during COVID-19 pandemic.

Limitations with the conducted study include the lack of socio-economic information about respondents, their available technical resources, their academic performance data to be able to compare various categories of students and to identify factors that influence perception of online learning. The directions for further studies may be associated with eliciting the above characteristics, as well as comparison of learning effectiveness in traditional and novel online formats (for example, by comparing the results of exams, primary accreditation of specialists, etc.).

To improve the mechanisms of online learning, it seems appropriate that the educational departments of universities organize creating a pool of video materials for students, provide technical support for the educational process using digitalization methods; develop detailed instructions on using educational online platforms by students, and expand the range of educational methods used in online learning (clinical scenarios, virtual patients, etc.) using digital technologies.

Thus, further digitalization of medical education implies rethinking the aspect of methodological support of distance learning taking into account the need to combine various training formats for the successful implementation of the educational process.

ADDITIONALLY

Funding. The authors declare that there is no funding for the study.
Conflict of interests. The authors declare no conflicts of interests.
Contribution of the authors: *V. A. Reshetnikov, I. N. Kagramanyan* — concept and design of study, editing*; I. I. Yakushina, V. V. Mikhaylovskiy, M. S. Mikerova, E. A. Shustikova* — collection of data, writing the text; *V. Jakovljević, T. Nikolić Turnić* — concept and design of study, editing; *S. Mijailović, J. Dimitrijević, L. Tasic* — statistical processing of data. The authors confirm the correspondence of their authorship to the ICMJE International Criteria. All authors made a substantial contribution to the conception of the work, acquisition, analysis, interpretation of data for the work, drafting and revising the work, final approval of the version to be published and agree to be accountable for all aspects of the work.

Финансирование. Авторы заявляют об отсутствии внешнего финансирования при проведении исследования.
Конфликт интересов. Авторы заявляют об отсутствии конфликта интересов.
Вклад авторов: *Решетников В. А., Каграманян И. Н.* — концепция и дизайн исследования, редактирование; *Якушина И. И., Михайловский В. В., Микерова М. С., Шустикова Е. А.* — сбор материала,

написание текста; *Јаковљевић В., Николић Турнић Т.* — концепция и дизайн исследования, редактирование; *Мијаиловић С., Димитријевић Ј., Тасић Љ.* — статистическая обработка данных. Авторы подтверждают соответствие своего авторства международным критериям ICMJE (все авторы внесли существенный вклад в разработку концепции, проведение исследования и подготовку статьи, прочли и одобрили финальную версию перед публикацией).

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ОБ АВТОРАХ

Решетников Владимир Анатольевич, д.м.н., профессор;
ORCID: https://orcid.org/0000-0002-7853-7356;
eLibrary SPIN: 4016-2059; e-mail: reshetnikov_v_a@staff.sechenov.ru

Каграманян Игорь Николаевич, д.м.н., доцент;
ORCID: https://orcid.org/0000-0002-2139-6847;
e-mail: kagramanyan_i_n@staff.sechenov.ru

Якушина Ирина Ивановна, к.м.н., доцент;
ORCID: https://orcid.org/0000-0002-6818-0840;
eLibrary SPIN: 5666-3696; e-mail: yakushina_i_i@staff.sechenov.ru

AUTHORS' INFO

Vladimir A. Reshetnikov, MD, Dr. Sci. (Med.), Professor;
ORCID: https://orcid.org/0000-0002-7853-7356;
eLibrary SPIN: 4016-2059; e-mail: reshetnikov_v_a@staff.sechenov.ru

Igor' N. Kagramanyan, MD, Dr. Sci. (Med.), Associate Professor;
ORCID: https://orcid.org/0000-0002-2139-6847;
e-mail: kagramanyan_i_n@staff.sechenov.ru

Irina I. Yakushina, MD, Cand. Sci. (Med.), Associate Professor;
ORCID: https://orcid.org/0000-0002-6818-0840;
eLibrary SPIN: 5666-3696; e-mail: yakushina_i_i@staff.sechenov.ru

Михайловский Виктор Викторович, к.м.н.;
ORCID: https://orcid.org/0000-0003-0001-4202;
eLibrary SPIN: 2315-2651; e-mail: mikhaylovskiy_v_v@staff.sechenov.ru

*** Микерова Мария Сергеевна**, к.м.н., доцент;
ORCID: https://orcid.org/0000-0003-2718-1895;
eLibrary SPIN: 1539-2594; e-mail: mikerova_m_s@staff.sechenov.ru

Шустикова Елена Анатольевна;
ORCID: https://orcid.org/0009-0009-9850-1869;
e-mail: shustikova_e_a@staff.sechenov.ru

Јаковљевић Владимир, MD, PhD;
ORCID: https://orcid.org/0000-0002-0071-8376;
e-mail: yakovlevich_v@staff.sechenov.ru

Николић Турнић Тамара; MD, PhD;
ORCID: https://orcid.org/0000-0002-9105-1350;
e-mail: nikolich_t_t@staff.sechenov.ru

Мијаиловић Сара;
ORCID: https://orcid.org/0000-0003-4204-9606;
e-mail: saramijailovic212@gmail.com

Димитријевић Јелена;
ORCID: https://orcid.org/0000-0003-4710-7529;
e-mail: jelena.dimitrijevic10@gmail.com

Љиљана Тасић, MD, PhD;
ORCID: https://orcid.org/0000-0001-9584-0341;
e-mail: ljiljana.tasic@pharmacy.bg.ac.rs

Viktor V. Mikhaylovskiy, MD, Cand. Sci. (Med.);
ORCID: https://orcid.org/0000-0003-0001-4202;
eLibrary SPIN: 2315-2651; e-mail: mikhaylovskiy_v_v@staff.sechenov.ru

*** Mariya S. Mikerova**, MD, Cand. Sci. (Med.), Associate Professor;
ORCID: https://orcid.org/0000-0003-2718-1895;
eLibrary SPIN: 1539-2594; e-mail: mikerova_m_s@staff.sechenov.ru

Elena A. Shustikova;
ORCID: https://orcid.org/0009-0009-9850-1869;
e-mail: shustikova_e_a@staff.sechenov.ru

Vladimir Jakovljević, MD, PhD;
ORCID: https://orcid.org/0000-0002-0071-8376;
e-mail: yakovlevich_v@staff.sechenov.ru

Tamara Nikolić Turnić, MD, PhD;
ORCID: https://orcid.org/0000-0002-9105-1350;
e-mail: nikolich_t_t@staff.sechenov.ru

Sara Mijailović;
ORCID: https://orcid.org/0000-0003-4204-9606;
e-mail: saramijailovic212@gmail.com

Jelena Dimitrijević;
ORCID: https://orcid.org/0000-0003-4710-7529;
e-mail: jelena.dimitrijevic10@gmail.com

Ljiljana Tasic, MD, PhD;
ORCID: https://orcid.org/0000-0001-9584-0341;
e-mail: ljiljana.tasic@pharmacy.bg.ac.rs

* Автор, ответственный за переписку / Corresponding author