Student Experience of Distance Learning During the Sars-cov-2 Pandemic and the Prospects of its Use in A Medical University

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Research Article

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Abstract

Background. Medical education involves not only mastering a large amount of theoretical knowledge, but also obtaining professional practical and communication skills, which requires intramural education. In the ongoing SARS-COV-2 pandemic, most medical universities had to transform their curriculum to remote education in order to ensure the safety of students and teachers and prevent the spread of SARS-COV-2. In order to improve remote education models and determine the future prospects for its application in medical education, we studied the setbacks and advantages of remote education at a medical university during the SARS-COV-2 pandemic through surveying and academic evaluation.

Methods. A survey was conducted amongst 272 first-year students at Sechenov University aged 17 to 23 years (18.47 ± 0.96 years). The work was carried out in February-March 2021 immediately after medical universities switched back to intramural studies, discontinuing remote education, which was introduced previously. The survey to assess student wellbeing, adaptive capabilities, educational preferences and burdens was developed by collaboration between Sechenov University and Moscow State University. Statistical analysis was carried out using RStudio.

Results. Almost all medical students possessed digital literacy skills and showed a high level of adaptation to online learning. Teacher technical skills defined successful interaction with students in real time. The main difficulties of remote education included technical difficulties and problems associated with self-discipline and organization of working day regimen that should be taken into account when developing models of online learning. Physical wellbeing became a worrisome factor for many students.

Conclusion. Remote education, though efficient in theoretical education, cannot completely replace the traditional intramural education, mainly due to hands-on training requirements. However, in the future, a transition to combined medical education, where digital technologies will find new prospects for application is anticipated.

Background

Medical training involves obtaining a large amount of theoretical knowledge, as well as professional practical and communication skills [1]. First-year medical students traditionally focus more on mostly theoretical subjects, such as human anatomy, histology and morphology [2, 3]. Most subjects studied in medical school, require a substantial amount of practical (hands-on) experience, which is not anticipated to become obsolete [4]. Pre-pandemic medical training and student experience involved substantial focus on clinical and practical training, as well as a large number of group electives, social programs and study groups, which served as a foundation for the students' collective study efforts [5].

The ongoing SARS-COV-2 pandemic forced most medical universities to switch to remote education, to insure the safety of it's staff and students [6-8]. Many Universities implemented remote technologies prior to the pandemic, as extracurricular opportunities, which significantly eased the transition to remote education [9]. Nonetheless, rapid transition to remote learning affected the organization of educational

activities, student management capabilities and complicated student assessment [10]. In order to define the positive and negative impacts of remote education, we evaluated students experience during the transition to a new format of education.

Material And Methods

272 first-year medical students aged 17 to 23 years (18.47 ± 0.96 years) were surveyed in February-March 2021 immediately after transition from remote education (March 2020 – January 2021) to intramural. The work was carried out in February-March 2021 instantly after medical universities switched back to intramural studies, discontinuing remote education, which was introduced previously. The survey to assess student wellbeing, adaptive capabilities, educational preferences and burdens was carried out according to the questionnaire developed and tested at Moscow State University. For a subjective assessment of knowledge and skills in information technology and the remote education quality, a scale from 1 to 5 was used, where 1 is the minimum score, and 5 is the maximum. This questionnaire also contained open text questions for students to write extensive comments, which were taken into account in the analysis [10]. The survey was administered to students via the Universities Unified Educational Portal.

RStudio software was used for statistical processing of the obtained results. The average values and their standard deviations were used as reporting standards. The reliability of changes in qualitative indicators was checked by Pirson's χ^2 and Fischer's criteria. Data was considered statistically significant at $p < 0.05$.

Results

Emergency transition to remote education during the period of rapid SARS-COV-2 spread was considered a relief by all students (100%). At Sechenov University, this became possible due to the presence of the Unified Educational Portal, created in 2018 on the basis of the foreign distance learning system Moodle, which is the leader in functionality and the number of users among open source platforms. Its scope includes the organization and management of e-learning, traditional and a combined education; testing of knowledge and skills; working out and development of abilities. This educational resource provides students with the opportunity to create an individual learning path and access to all teaching materials, lectures, electronic libraries and class schedules. For communication, students are offered forums, video conferencing, chats, blogs and a messaging system. Within the Unified Educational Portal teachers can post and structure the training material in the form of learning modules [11].

Majority of respondents were familiar with such remote education technologies (passing tests and using teaching materials, lectures, electronic libraries, student portal), and every fifth student applied to them regularly. Therefore, during transition to remote online education, almost all medical students had experience in using digital technologies for educational purposes. Almost half of all first-year students were familiar with the University's own remote education platform, and approximately the same number

of respondents previously worked with it. A very small portion of students had no experience with remote educational technologies. Most students ($p < 0.001$) rated their adaptation to remote education as excellent and good (**Figure 1**).

A fifth of respondents were worried that transition to remote education would have a negative impact on their education, while 4.4% of freshmen doubted the efficacy of remote education. A majority of students ($p < 0.001$) anticipated transition to remote education and claimed relief, since it significantly reduced the risk of infection with SARS-COV-2. The most popular electronic devices used by freshmen for remote education were mobile phones (**Figure 2**). Laptops, tablets and personal computers were less in demand. According to respondent answers, the most reliable tools in notification and organization of remote online education were social networks and messengers and electronic mail: WhatsApp ($83.8 \pm 2.23\%$), e-mail ($69.1 \pm 2.08\%$) and vKontakte ($55.9 \pm 3.01\%$).

Distance learning for first year students, like traditional, combined practical sessions, regular lectures, intermediate and final academic assessment. There were such subjects as Anatomy, Histology, Chemistry, Biology, Medicine history, Medical physics, Latin and English. Most practical sessions ($86.8 \pm 2.05\%$, $p < 0.001$) were held in real time in the form of video conferencing. For more effective interaction with students, teachers organized students into small subgroups, which allowed each student to actively participate in the seminar. A third of respondents ($32.4 \pm 2.84\%$) were given assignments to hand in via e-mail. And every fourth student prepared presentations ($25.0 \pm 2.63\%$) and essays ($22.1 \pm 2.52\%$).

For the implementation of collective video and audio communication, almost all students found Zoom to be the most convenient platform with the ability to visualize educational content, followed by Skype and Discord (**Figure 3**). In student's opinion, the corporate Team platform and Adobe Connect software turned out to be the least convenient for organizing seminars. Most of the students ($69.1 \pm 2.71\%$) rated the knowledge and skills of their teachers in the field of information technology as excellent and good (**Figure 4**).

The most commonly used materials were lectures posted on the university portal ($91.2 \pm 1.72\%$), followed by online lectures read in real time ($52.9 \pm 3.03\%$). More than a third of freshmen ($36.8 \pm 2.92\%$) additionally used open resource materials to prepare for classes. Sending the text of the lecture and presentation to students was done very rarely - only in $13.2 \pm 2.05\%$ of cases. About half of the survey participants ($52.9 \pm 3.03\%$) reported that the workload during remote education did not increase. A quarter of the respondents ($26.5 \pm 2.67\%$) noted that it became easier to study, about the same number of students ($20.6 \pm 2.45\%$) indicated that it became more difficult.

Intermediate academic assessment was performed through teacher-student interviews ($85.3 \pm 2.15\%$), test examination ($75.0 \pm 2.63\%$) and individual projects ($60.3 \pm 2.97\%$). When passing final examination, more than half of the respondents ($54.4 \pm 3.02\%$) noted that the session was easier than in traditional format, whereas $42.6 \pm 2.99\%$ of respondents did not find significant differences, and only for $3.0 \pm 1.03\%$ found exams to be more difficult.

The majority of students ($76.5 \pm 2.57\%$, $p < 0.001$) faced a number of difficulties during remote education, the most common of which were technical problems, namely low internet speed and image quality. Every third respondent ($33.8 \pm 2.86\%$) noted poor audibility of the participants in video conferencing and the illegibility of their speech. The lack of necessary equipment for studying and practical skills caused anxiety among $13.2 \pm 2.05\%$ of students. Self-organization difficulties ($35.3 \pm 2.89\%$) and low motivation ($38.2 \pm 2.94\%$) burdened remote education. $26.5 \pm 2.67\%$ of the respondents stated discomfort associated with being constantly at home. Every fifth student ($20.6 \pm 2.45\%$) believed that the volume of homework assignments increased significantly during online learning. Only $16.2 \pm 2.23\%$ and $11.8 \pm 1.95\%$ of freshmen, respectively, complained about poor organization of information support and insufficient feedback from teachers.

Generally, assessing the effectiveness of their own work in a distance format, about half of the respondents ($51.4 \pm 2.03\%$) emphasized that due it did not change or became more effective (**Table 1**). Almost the same number of students ($48.5 \pm 2.01\%$) indicated a decrease in the effectiveness of education. A smaller number of respondents noted a decrease in motivation and performance during the period of remote education ($44.1 \pm 1.99\%$ and $42.6 \pm 1.97\%$, respectively, $p < 0.05$). Only $22.1 \pm 1.51\%$ of freshmen felt a negative influence on creativity. Most students ($70.6 \pm 2.76\%$) rated the quality of remote education as good and excellent, with an average score of 4.03 ± 1.01 points.

All students saw the main importance of distance learning during the pandemic in that it allowed them to continue their education, while preserving the health of students and teachers during the period of the rapid increase in SARS-COV-2 incidence (**Figure 5**). Among the disadvantages of remote education, most freshmen named lack of direct contact with teachers, lack of personal communication and student life (**Figure 6**). Assessing the prospects of remote education at a medical university, only one sixth of the respondents were ready to completely switch to remote studying. Most students prefer a combined approach (**Figure 7**).

Discussion

The results of our study show that the emergency transition to remote education during the ongoing COVID-19 pandemic, was not burdened by significant difficulties. Importantly, a vast majority of students were integrated into existing online educational resources and did not experience any inconveniences associated with adaptation to remote education, which is consistent with other reports [12]. Good technical skills and previous education in remote technologies allowed teachers to actively organize the educational process and interact with students in real time.

The main difficulties of remote education faced by medical students included technical difficulties and problems associated with self-discipline and the organization of the working day regimen. It is suggested to take into account possible self-discipline modulations in future application of remote technologies [13]. Due to home confinement, physical exercise, practical skills acquisition were burdened significantly. This should not be considered an issue of remote education, as it is a results of self-isolation

requirements. Taken this into account, and according to the results of our evaluation, remote education generally offers greater liberty in the educational process, is less stressful for students and does not affect academic achievement. Despite this, practical lessons, crucial for medical education, cannot yet be transferred to remote education. It is suggested therefore to combined remote and intramural education modalities to create a comfortable and nourishing environment for student growth and study success.

Our study is limited by the single-center student evaluation via survey, which may have proved to be different in other specialized institutions. Nonetheless, the overall tendency of student perception of remote education is positive in terms of maintaining education while staying safe from the ongoing pandemic. Our results support the null hypothesis that remote education during the ongoing pandemic is beneficial to students, which suggest that further studies should focus on the efficacy of implementation of a combined approach (both remote and on-site training) in medical training.

Conclusion

The emergency transition of medical universities to remote education due to the SARS-CoV-2 pandemic was beneficial to both teachers and students. It provided a stimulus to discover new methods of medical education and was limited only by lack of hands-on training. Furthermore, this transition was supported by a vast majority of students, seen through students choosing isolation safety during the ongoing pandemic as a positive measure in their health preservation, while being able to continue their studies. Our results further show that technologies are anticipated to become a standard educational format where applicable, as most students favor a combined (remote and on-site training) approach.

Abbreviations

1. **COVID-19:** Coronavirus disease 2019
2. **SARS-CoV-2:** severe acute respiratory syndrome coronavirus 2

Declarations

Ethics approval and consent for publication: written informed consent was obtained from all study participants regarding publication of study results. Current research study was approved by the Ethics Committee of First Moscow State Medical University named after I.M.Sechenov (Sechenov University) under protocol №10-4-20. The study was carried out in accordance to relevant international and local regional guidelines.

Availability of data and materials: All data generated or analyzed during this study are included in this published article and its supplementary information files.

Informed consent was obtained from all subjects and/or their legal guardian(s).

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Tables

Table 1 - Student assessment of their own work efficiency during remote education

Indicator	Increased	Not changed	Decreased
Work efficiency	23,5±1,57%	27,9±1,72%	48,5±2,01%
Motivation	22,1±1,51%	33,8±1,87%	44,1±1,99%
Working capacity	36,8±1,92%	20,6±1,45%	42,6±1,97%
Creativity	33,8±1,87%	44,1±1,99%	22,1±1,51%

Figures

Figure 1

Student adaptation to remote education: scoring results.

Figure 2

Electronic devices used by students during remote education

Figure 3

Students ' choice of a platform for collective video and audio communication

Figure 4

Students' assessment of teachers' knowledge and skills in the information technology field

Figure 5

Positive aspects of remote education

Figure 6

Negative aspects of remote education

Figure 7

Prospects of remote education in a medical university

Supplementary Files

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