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## **Modification of teaching during the COVID-19 pandemic at the Department of Medical Education of Jagiellonian University Medical College**

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**Abstract:** The SARS-CoV-2 pandemic contributed to the implementation of changes in the methodology of conducting many courses at medical universities. Achieving learning outcomes was associated with self-discipline and an increased portion of students' independent work. The aim of the study is to analyze the adaptation of teaching methods to the requirements of the COVID-19 pandemic at the Department of Medical Education of Jagiellonian University Medical College. The university authorities, instructors and students made every effort not to neglect their education. The Microsoft Teams platform allowed for the efficient organization of remote classes. Lectures, activities based on dialogue, brainstorming and role-playing were conducted via the Internet. Presentations and short films were made available to students. The safety of individuals participating in classes was guaranteed by password access and an invitation sent prior to an online meeting. Remote learning allowed for the synthesis and deepening of students' knowledge, improvement of communication skills and development of clinical thinking as future doctors. The disadvantages of online education was the inability to improve practical skills, especially on phantoms, under the direct supervision of a trained instructor.

**Keywords:** medical didactics, medical education, distance learning, education during the COVID-19 pandemic, Department of Medical Education, Jagiellonian University Medical College.

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## Background

The COVID-19 pandemic has significantly disrupted the teaching process at universities. At the Department of Medical Education (DME) of Jagiellonian University Medical College (JUMC), teaching continued in all years of study with some modifications. In accordance with the recommendation by Ahmad Al Samaraee, the impact of the pandemic on teaching at medical universities should be assessed [1]. This article refers to the publication which describes selected didactic methods used in the education of medical students at the DME JUMC [2]. The authors of this study focus mainly on the changes introduced in the subjects taught only at the Department of Medical Education of Jagiellonian University Medical College.

The curriculum and names of some of the courses presented in the article changed in 2018 [2]. Nursing, described at the time, was replaced by First Aid 1/2 in the first year of the medical program. Currently, it is a subject that includes lectures and practical classes, during which students learn about the principles of cardiopulmonary resuscitation, providing first aid to a patient and selected nursing procedures.

In the second year, the subject of Introduction to Clinical Sciences is conducted using the Problem Based Learning method, based on the independent identification of medical and epistemic problems, their explanations and their solutions in order to understand physiological and pathological mechanisms in the human body.

From the second to the fifth year, as part of the Laboratory Training of Clinical Skills courses (LTCS 1/4 to 4/4), students learn the principles of the subjective and objective examinations, while learning techniques to improve their skills in the field of medical communication.

At DME JUMC, in cooperation with other departments, subjects related to the field of surgery, paediatrics and emergency medicine are also conducted; they have not been discussed in this article.

## Aim of the study

An analysis of educational adaptations to the challenges presented by the COVID-19 pandemic at the Department of Medical Education of Jagiellonian University Medical College.

## Methods

A discussion of the modifications to teaching in individual courses in the Faculty of Medicine conducted by the Department of Medical Education of Jagiellonian University Collegium Medicum.

## **First Aid 1/2**

The practical portion resulted in the exclusion of select nursing procedures from the First Aid 1/2 course due to the pandemic. During remote learning, the students were taught to measure blood pressure by auscultation, to collect blood and to establish access to peripheral veins. As part of the practical exercises in blood pressure measurement conducted on the Microsoft Teams platform, during meetings with students the procedure and equipment requirements necessary to perform the measurement in accordance with the currently applicable guidelines were discussed in detail. Then, short films with a recorded mercury sphygmomanometer and Korotkoff sounds heard during the measurement were presented. The students were asked to independently estimate the audible values of systolic and diastolic blood pressures, and then the results were discussed together in the group, explaining, for example, which sounds should be considered the correct Korotkoff sounds, and which are turbulence. Additionally, on the online platform students were provided with a PowerPoint presentation with recorded explanations from the instructor, which the student could turn on and play back any number of times, on each slide. There were also 20 short recordings of sphygmomanometers along with the sounds that a student normally hears when applying a stethoscope to the artery while measuring blood pressure.

The practical teaching of blood collection and peripheral venepuncture consisted of presenting the students with films with recorded procedures and discussing them together, clarifying students' doubts. In addition, a room at DME JUMC was made available for those interested, where students could individually practice the procedure on prepared trainers. The classes were self-taught, through the use of films (using the "practice while watching" method) and did not require the presence of an instructor. Students came according to a predetermined schedule in order to minimize contact and risk of infection by the SARS-CoV-2 virus. These exercises were very popular among students; they however, as they later indicated, lacked feedback from an instructor on how well the procedures were performed, and had many questions, such as for example, "What was my mistake when I failed to collect blood using the vacuum method?" for which they would have liked to get answers for while practicing on the simulator.

## **Laboratory Training of Clinical Skills from 1/4 to 4/4**

The program of the course, covering the education of students of the Faculty of Medicine from the second to fifth year, strives to implement the following goal: to acquire theoretical knowledge and provide practical training in safe, laboratory conditions, which valued by students [2]. During the COVID-19 pandemic, efforts were still made to combine communication skills with a biomedical model, and where

possible, skills were gradually introduced based on their complexity and difficulty. During distance learning, students were taught the modified Calgary-Cambridge model by Kurtz and Silverman, as has been the case in years past, which assumes the existence of a finite number of learned skills, which are useful during medical consultations [2, 3].

### **Laboratory Training of Clinical Skills 1/4, i.e. teaching the subjective and objective examinations**

The COVID-19 pandemic resulted in an urgent need to modify the previously planned method of teaching history taking and the physical examination as part of the LTCS 1/4 course (also conducted by the DME JUMC), which involved role playing and, above all, practical exercises under safe, laboratory conditions [2, 4].

It is difficult to achieve the most important goal of the course, which is to prepare future doctors for a history and physical examination of patients in clinical wards using distance learning. Education was transferred to the Microsoft Teams platform, where online classes were held. All groups of participating students met with their assigned instructors at specific times to go over the material. The tutors tried to maintain a safe atmosphere, which allowed them to appropriately guide students' thinking and correct any mistakes.

On the Microsoft Teams platform, it was possible to share presentations from a personal computer with all participants of the classes, which enabled lectures to be conducted. After getting acquainted with the theory related to history taking (including communication skills and techniques), the students took turns playing the roles of the patient and the doctor. Before each class, students were required to prepare a medical history of an imaginary patient, using an internal medicine handbook, while also including the hidden patient perspective. During all remote classes, two scenes were usually played, during which a pair of students played the roles of the doctor collecting the interview and the patient. The rest of the participants actively listened to the interview and then discussed the following tasks according to their assigned tasks: the structure of the interview, the communication skills used, with particular emphasis on the patient's perspective. Students acted appropriately and showed respect for each other.

Participants in the online meetings during an interview after the end of the course expressed positive opinions on distance learning of the subjective examination (i.e. history taking). On the other hand, the attempt to teach the objective examination (i.e. physical examination) via the Internet was not well received by students. It involved watching movies with instructors, discussing the problems and the more challenging aspects of the physical examination. Students were asked to improve their physical examination technique by examining family members during the pandemic. They also had the opportunity to consult any films they may have recorded of them-

selves performing the physical examination at home with an instructor, but few utilised this opportunity. They explained this by stating that family members did not agree to being recorded.

Auscultatory findings from the respiratory and circulatory systems were made available to students online.

Summing up the opinions of students, obtained during a discussion at the end of each class, with regards to remote learning of the physical examination, they clearly indicated the need for improvement under the supervision of an experienced instructor. Students were informed about the possibility of practicing individual elements of the physical examination and more intimate tests on phantoms at the beginning of the next academic year under the supervision of an instructor (an experienced doctor), as part of the LTCS 2/4 subject, which is a continuation of LTCS 1/4.

The COVID-19 pandemic did not allow students to experience physical examination training on different people, which allows them to learn about different variants of the norm, in an environment that is safe for themselves and their examinees [5]. Unfortunately, there was no chance for professional feedback while practicing at home. During the online classes we did not use Peyton's four-step method, which was appreciated by students in learning how to auscultate the heart [6, 7].

Due to the high risk of infection with SARS-CoV-2 virus at that time, the OSCE (Objective Structured Clinical Examination) examination following the second year was abandoned, which was a standard tool for verifying the skills of future doctors after completing LTCS 1/4. This course has been credited to students on the basis of attendance during online classes.

### **Laboratory Training of Clinical Skills 2/4 and 3/4 — a continuation of teaching medical communication**

In line with the design of the program, the LTCS course in the third and fourth year, in addition to improving medical communication skills, aims to shape the future doctor's attitude towards the patient, with respect for them, their experiences, beliefs and emotions. LTCS 2/4 was carried out prior to the COVID -19 pandemic, and all LTCS 3/4 classes were conducted remotely during the initial lockdown.

The objectives of the course for the fourth year (LTCS 3/4) are primarily the improvement and development of skills learned at the earlier stages of the program and communication exercises in difficult situations (delivering bad news and cases related to aggression from the patient).

The coordinator of LTCS 3/4 made every effort to adapt the lessons to the challenges presented by the pandemic. Part of the material was obtained by students via the Internet, where their task was to read the material related to the topic of the classes, watch the previously prepared short films (patient-doctor interactions), send

their thoughts and comments to their respective instructors in relation to the knowledge they had assimilated. Subsequently, on the Microsoft Teams platform, class participants practiced and improved their communication skills in safe, laboratory conditions. Students played the role of a doctor (they received information of the scenario prior to the lesson), with standardized patients, i.e. healthy people prepared to play the role of a patient [8].

The classes started with a short presentation by the instructor on the Microsoft Teams platform, a short discussion with the students, and then (at a predetermined time) a prepared and trained standardized patient joined the group [8]. The standardized patient enabled the students to have contact with a stranger to the group during the classes, which made it possible to create a learning environment under remote conditions similar to those present in a real consultation (i.e. an element of surprise, an unfamiliar patient). In the third year, students take on the roles of both the patient and the doctor. In the fourth year, the standardized patient displays anger, surprise and other emotions that are often difficult to convey by many students participating in the classes. After each scene, a discussion took place, the method of communication between the doctor and the patient was thoroughly analysed, and other communication solutions that could have been implemented in individual scenarios were discussed. After the end of the course, instructors asked students for their opinions on the didactic methods used in the course and the way it was conducted. The vast majority of participants expressed positive opinions about the organization in a distance learning format, including instructors, standardized patients and, most importantly, students.

### **Laboratory Teaching of Clinical Skills 4/4**

The last part of the course as part of the Laboratory Teaching Clinical Skills (LTCS 4/4) course, which in the pre-COVID-19 pandemic was held in high-fidelity simulation rooms. Fifth-year students from the Faculty of Medicine played the roles of individual members of a trauma team saving a patient's life in an emergency department [2]. It is not possible to transfer such activities that use high-fidelity phantoms to a platform for remote learning. An attempt to achieve the goals of the LTCS 4/4 subject was to create a substitute for simulated conditions in Microsoft Teams. Thanks to the implementation of narrative medicine to remote classes and the presentation of various parameters indicative of the patient's clinical condition (e.g. heart rate in the form of an electrocardiogram, saturation, blood pressure, the number of breaths per minute) on a simulated monitor displayed to participants, the students made their own decisions, under safe conditions. The instructor conducting the classes, based on a previously prepared scenario, was able to control the parameters depending on the decisions made by the students, such as treatments implemented [2, 9–11]. After-

wards, the instructor discussed in detail with the students how best to proceed in a selected clinical scenario, in relation to the case being conducted. The advantage of online classes was the ability to summarize the approach of the students as members of the team saving the patient's life during the debriefing [2, 9–10]. Particular attention was paid to the weaknesses observed in activities performed by all participants, with an aim to improve upon them (including both technical and soft skills, i.e. communication). They were also praised for their objectively correct approach and method of thinking.

### **Introduction to Clinical Sciences (ICS)**

The course relies on the synthesis and integration of knowledge from basic science courses such as anatomy, histology, physiology and pathophysiology, with clinical knowledge. Second-year students have, for the past few years, been reviewing appropriately prepared clinical cases using the Problem Based Learning method at the Department of Medical Education of Jagiellonian University Medical College [12, 13]. During the COVID-19 pandemic, the method of conducting classes within the ICS course has not changed. Instead of classrooms at the DME, the Microsoft Teams platform was the meeting venue for instructors and students. The participants of the course were still obliged to prepare selected topics and present them to the group (usually in the form of a presentation) to the group of students with an ensuing discussion. The task of the instructor is to motivate students to be active and expand their clinical knowledge related to the topic of a given class (the prepared case), for example, by repeatedly asking "why" questions, and mobilizing them to think analytically. Participants of the classes, independent in action and decision making, were actively looking for answers to questions. The subject, always valued by students in the past, was also positively assessed by participants during the pandemic in a survey following the end of the course.

### **Summary**

The COVID-19 pandemic has unearthed the enormous self-discipline of students, a huge amount of patience with the new education system, and a desire to acquire and deepen knowledge. It demonstrated that university authorities, as well as instructors and students themselves made every effort not to neglect their education. It was a trial where the system could fail, but it did not due to the will of everyone involved to keep going. To educate students! To acquire knowledge! To persevere during this difficult time. Everyone, from instructors to students, are now stronger and we know that through continuing our teaching in the challenging beginning of the SARS-CoV-2 pandemic, through modifying our methods of education, it will be easier with these

valuable experiences to prepare for possible further adversities. To summarise, the appropriately prepared Microsoft Teams platform allowed for the efficient organization of distance learning. Lectures, activities based on dialogue, brainstorming and role playing were conducted online. One could share their presentations and short films, for example, by sharing their computer's desktop. The disadvantage of online education was the inability to improve practical skills, especially on phantoms, under the direct supervision of a trained instructor. Students did not have the opportunity to practice using high-fidelity simulations. It is important to note that not anyone could participate in online meetings, as access was limited to only specific individuals invited to the courses. This guaranteed the safety of all participants in the lessons. Distance learning allowed for the synthesis and deepening of students' knowledge, improvement of communication skills and development of clinical thinking of future doctors. In conclusion, I quote Catherine R. Lucey and S. Claiborne Johnston, "There may be no better time in history to learn what it means to be a physician." [14]

### Conflict of interest

None declared.

### Abbreviations

- DME — Department of Medical Education  
ICS — Introduction to Clinical Sciences  
JUMC — Jagiellonian University Medical College  
LTCS — Laboratory Training of Clinical Skills  
OSCE — Objective Structured Clinical Examination

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