

## Specialty-Training Program During COVID-19 Pandemic: A Single Center Survey on over 300 Trainees and Trainers

COVID-19 Pandemisinde Uzmanlık Eğitim Programı: 300 Asistan ve Eğitimcinin Değerlendirildiği Tek Merkez Sonuçları

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### ABSTRACT

**Objective:** COVID-19 pandemic caused significant modifications in education of trainees who are in medical speciality training programs. Limiting the number of residents in the clinics, cancelling elective surgical procedures, stopping face to face practical education, and transforming theoretical education into distance learning platforms resulted in alterations in the curriculum. Limited number of studies in the literature surveyed the impact of the COVID-19 pandemic on specialty training in various medical disciplines.

**Methods:** We addressed to assess the situation of trainees' education using an online questionnaire from the trainees' and directors' perspective during the pandemic. The survey platform SurveyMonkey® was used to distribute the survey and to collect responses. We generated a list of multiple-choice questions about how social distancing affected the delivery of medical education, potential compromise in core training and difficulties in conducting clinical research for the thesis.

**Results:** A total of 364 trainees among 552 (65.9%) under training at our university hospital and 90% of the directors (37 of 41) responded the survey. Almost 78 percent of the trainees claimed that they have been negatively affected during the pandemic. Although majority of the trainees (60.3%) reported that extension of their education program is not necessary, most of the program directors were in tendency of extending the duration of the speciality training period. The participants predominantly considered that online training would keep on being a part of the training program after the pandemic.

**Conclusion:** Education programs are negatively affected during pandemics. However, authorities should manage this deficiency by a new perspective since present trainees are familiar to use technology-driven virtual sources for their education. After the pandemic, computer-assisted online learning and web-based programs should be integrated into educational curriculum.

**Key words:** COVID-19, specialty training, trainers, trainees, online learning

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### ÖZET

**Amaç:** COVID-19 pandemisi tıpta uzmanlık eğitimi alan uzmanlık öğrencilerinin eğitim programında belirgin değişikliklere neden olmuştur. Kliniklerde asistan sayıları azaltılmış, elektif ameliyatlara ertelenmiş, yüz yüze pratik eğitim sonlandırılmış ve teorik eğitim uzaktan eğitime dönüştürülerek müfredat düzenlenmiştir. COVID-19 pandemisinin farklı tıp disiplinlerinde uzmanlık eğitimi nasıl etkilendiğine ait çalışma sayısı sınırlıdır.

**Yöntemler:** Pandemi döneminde eğitimin sorgulanması için uzmanlık öğrencilerine ve anabilim dalı başkanlarına yönelik "online" bir anket hazırlanmıştır. Anket "SurveyMonkey®" programında hazırlanmış ve dağıtılmıştır. Sosyal mesafe kurallarının tıp eğitimi nasıl etkilediği, çekirdek eğitim müfredatının nasıl yürütüldüğü, tez çalışmalarının ve klinik araştırmaların durumunu sorgulayan çoktan seçmeli sorular hazırlanmıştır.

**Sonuçlar:** Üniversite hastanemizde eğitim alan toplam 552 uzmanlık öğrencisinden 364'ü (%65.9) ve anabilim dalı başkanlarının %90'ı (41'den 37'si) anketi cevaplandırmıştır. Uzmanlık öğrencilerinin %78'si pandeminin eğitimlerini olumsuz yönde etkilediğini bildirmiş, ancak, çoğunluk (%60.3) uzmanlık eğitim süresinin uzamasını istememiştir. Tersine, anabilim dalı başkanlarının çoğunluğu sürenin uzatılması gerektiğini bildirmiştir. Katılımcıların çoğu uzaktan "online" eğitimin pandemiden sonra da eğitim programına dahil edilmesi gerektiğini bildirmiştir.

**Tartışma:** Pandemi döneminde eğitim olumsuz etkilendi. Ancak, eğitim sorumluları günümüz uzmanlık öğrencilerinin teknolojinin kullanıldığı uzaktan eğitim modellerine daha yatkın olmalarından yararlanarak, eğitim sistemlerini yeni bir bakış açısı ile güncellemelidir. Pandemi sonrasında, bilgisayar temelli eğitim kaynakları uzmanlık eğitim müfredatına yerleştirilmelidir.

**Anahtar Sözcükler:** COVID-19, uzmanlık eğitimi, uzmanlık öğrencileri, eğitim sorumluları, "online" öğrenme

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## INTRODUCTION

The novel coronavirus infectious disease (COVID-19) was declared a pandemic by the World Health Organization (WHO) on March 11, 2020. Since then, the pandemic caused a dramatic challenge in the healthcare systems. This pandemic became a milestone in medical education as training programs shifted towards competency-based medical education, globally. We have been urged to modify educational activities significantly, by decreasing the mobility within hospitals, such as limiting the presence of residents in the clinics, cancelling elective surgical procedures and face to face practical education, and withdrawing lectures as well as educational conferences to adhere to social distancing recommendations. There is a growing number of reports about the modifications in the training program of medical sciences during pandemic period in different countries (1-3).

In Turkey, physicians are matched to the related departments as a trainee after a medical specialty exam. The core training processes are conducted and monitored according to relevant regulations of the Ministry of Health. The curriculum of training in surgical and internal medical fields and basic medical sciences is defined as a program that introduces the knowledge, skills, and attitude models required for a medical specialist to perform his/her job. In many medical specialties, basic and advanced skills are documented with a logbook which created by corresponding specialty society in our country. In all departments trainee's education is carried out in a theoretical and practical manner. Theoretical trainings are conducted in the form of journal clubs, case-based discussions, multidisciplinary training hours and seminars. Practical trainings are held in clinics under the supervision of an instructor (specialist physician or consultant senior physician). The mentoring system formed between trainees according to their seniority is also important in education. In basic medical sciences, laboratory education is given by trainers. Together with specialists, trainees evaluate internal and external quality controls, validate the test results, comment and make recommendations when necessary. All trainees prepare a thesis on a subject they decide with the advisor trainer during the residency training process. They have to finish and defend this thesis at the end of their training period. The specialization training is completed with the graduation exam. This constructed training program had been significantly modified during pandemic.

Quite a few studies are available in the literature about the impact of the COVID-19 pandemic on specialty training in various medical disciplines (4,5,6). However, the influence of different departments including basic, surgical and internal medicine were not compared before. Also, the literature lacks information about the trainers' perspective. In lieu of the aforementioned studies, this piece of work addressed the impact of the COVID-19 pandemic on specialty training programs of different disciplines, assessed the progression of trainees with online education, and also characterized the trainers' perspective during the pandemic.

## METHOD

This paper describes the results of a survey distributed among trainees and also among head of the departments as trainers in basic medical sciences, internal and surgical medicine in Gazi University Hospital located in Ankara. A written permission was taken from the Dean as a core training program director of the faculty to conduct the study. Trainees were initially contacted by the head of the departments to inform them of the survey and were given the opportunity to decline.

The survey platform *SurveyMonkey*® was used to distribute the survey and to collect responses. The majority of questions were multiple choice but also included a section for free text comments and feedback. Nominal data are presented as percentage of responses per category.

To learn more about how COVID-19 is affecting trainers and trainees, we conducted four different online surveys related to impact of COVID-19 on postgraduate and residency training. First one was for the trainees composed of 18 questions, 2 open-ended questions. The other three were for the head of the departments in surgical medicine composed of 13 questions, in internal medicine composed of 9 questions, and in basic medical science composed of 19 questions. Survey was circulated via e-mail and smart phones to the head of the departments from the Dean's office. The invitation e-mail contained an

encouragement to spread the trainees' survey to all the postgraduate students and residents.

In our Medical School, internal medicine (n: 18) departments include Emergency Medicine, Forensic Medicine, Child and Adolescent Psychiatry, Pediatrics, Dermatology, Infectious Diseases, Physical Medicine and Rehabilitation, Chest Diseases, Public Health, Internal Diseases, Cardiology, Neurology, Nuclear Medicine, Radiation Oncology, Radiology, Psychiatry, Medical Pharmacology, and Medical Genetics. Surgical medicine (n: 13) departments include Anesthesiology and Reanimation, Neurosurgery, Child Surgery, General Surgery, Heart and Vessel Surgery, Thoracic Surgery, Eye Diseases, Gynaecology and Obstetrics, Ear, Nose, Throat Diseases, Orthopedics and Traumatology, Plastic, Reconstructive and Aesthetic Surgery, Medical Pathology, Urology. Basic medical science departments (n: 10) include Anatomy, Biophysics, Medical Biology, Medical Education and Informatics, Medical Ethics and History, Immunology, Physiology, Histology and Embryology, Medical Microbiology, and Medical Biochemistry.

The questionnaires were developed by 10 faculty members, who have been also assigned in the Post-Graduate Education Council of the faculty. We generated a list of multiple-choice questions to evaluate the pandemic related various aspects of the residency training including challenges experienced, how social distancing affected the delivery of medical education, potential compromise in core training and difficulties in conducting clinical research for thesis. A sampling of the responses we received is shown in Table-1, and additional responses are presented in the supplementary appendix. Questionnaires can be found in Appendix 1, 2, 3, 4 available with the full text of this article. The study was approved from the institutional review board of Gazi University Ethics Committee (Approval Number: 2021-276).

### Statistical analysis

The counting data was described by percentage, while the descriptive data were expressed as median and interquartile range. Data processing and statistical analysis were performed using the <https://www.openepi.com>. Since the data did not conform to a normal distribution, the inter-group difference analysis was performed by using one-way ANOVA module comparing the means of two or more independent samples. Entering sample size, percentage and standard deviation of each sample group were tested for significant difference among the sample means. The confidence intervals for each individual mean were also displayed.  $p < 0.05$  was considered as statistically significant.

## RESULTS

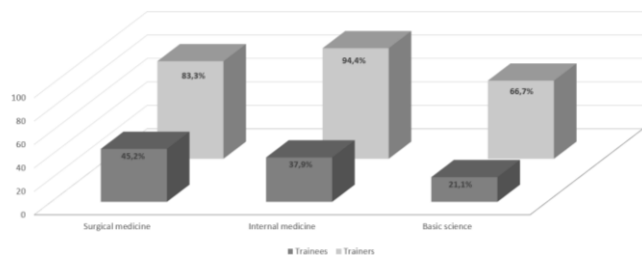
Responses were received from 364 trainees among a total of 552. A proportion of 65.9% of the trainees answered the survey. For trainees' survey, confidence level was 99% and margin of error was  $\pm 5\%$  of the surveyed value. The other three questionnaires were answered by head of the departments (12 among 13 surgical medicine, 92.3% / 18 among 18 internal medicine, 100% / 7 among 10 basic medical sciences, 70%). A proportion of 90% of the directors (37 of 41) answered the survey. The survey for the head of the departments were answered with a confidence level of 99% and margin of error  $\pm 5\%$  of the surveyed value.

According to the survey results, 47.6% and 44.4% head of the departments in internal medicine and basic science respectively reported that first year residents were mostly negatively affected. However, 16.7% head of the departments in surgical medicine reported that first year residents were negatively affected. Due to pandemic regulations 72.7% of elective surgeries were postponed, only emergency cases were operated. In parallel to this reduction, number of operating tables decreased 90.9% and the number of the operations markedly decreased when compared to the previous year's numbers. During the pandemic, 22.2% of the internal medicine wards were closed. The number of inpatients for reasons other than COVID-19 pneumonia decreased 94.4% in internal medicine clinics and 83.3% in surgical medicine clinics. Departments of medical biochemistry and medical microbiology reported that their routine diagnostic test numbers were decreased 50% during pandemic. All basic science departments reported that 57.1% of their research projects were postponed.

The proportion of trainees who confirmed the need for extension of the education period was 39.3%. Majority of them are in the departments of surgical medicine. Head of the departments confirmed the need for extension of the

education period as well. The proportions of trainees and trainers who confirmed the need for extension of the education period are shown in figure 1.

**Figure 1:** The proportions of trainees and trainers who confirmed the need for extension of the education period



Platforms for distance-learning are already in use for training education programs. In the survey, we asked the difficulties in accessing to any online system. A proportion of 16.7% among internal medicine, 30% among surgical medicine, and 42.9% among basic science departments had no difficulty in accessing or getting used to the online platforms for education. Rest of the participants reported that they have faced some difficulties. In our survey we asked whether in-training exams were held during the pandemic. A total of 359 residents answered the question; 39.6% of them said that they have continued the exams regularly, 38.7% of the trainees said that the exams did not take place. Majority (86.8%) of the in-training exams were performed on-line. Answers to the common questions in the four different surveys are shown in Table 1.

Answers	Trainers' perspective			Trainees' perspective (n:364)	p value
	Surgical medicine (n:13)	Internal medicine (n:18)	Basic medical sciences (n:10)		
<b>Able to complete the core training curriculum</b>	50%	44.4%	33.3%	60.3%	<0.001
<b>Most negatively affected subject of the education</b>	54.6% Hands-on surgical training	94.1% Interventional procedures	88.9% Hands-on training	37% Theoretical training	<0.001
<b>The demand for extension of the training period</b>	83.3%	94.4%	66.7%	39.3%	<0.001
<b>Continuation of the theoretical education (seminars, literature, etc.) as before pandemic</b>	41.7% Continued as before	38.9% Continued as before	55.6% Continued as before	47.4% Continued as before	<0.001
<b>Kind of theoretical training hours</b>	25% face to face 75% completely online or/and hybrid	11.1% face to face 88.9% completely online or/and hybrid	100% online or/and hybrid	N/A	<0.001
<b>Considering using online training in the education program after the pandemic</b>	41.7%	55.6%	88.9%	82.6%	<0.001

**Table 1:** Answers to the common questions in the four different surveys.

Majority of the trainees (75.9%) were assigned to the COVID-19 service and/or laboratory for a while during the pandemic and 37.8% of them were infected. We did not survey anxiety level of the trainees, however answers to open ended questions showed that most of the trainees had various problems while they were working in pandemic clinics.

## DISCUSSION

Postgraduate training programs in medicine utilize a person-to-person model for delivery of educational didactics, journal clubs, and workshops as a traditional model. These traditional models were disrupted during COVID-19 pandemic. Given the social distancing recommendations the training programs of residents were markedly affected in all over the world. The COVID-19 global pandemic had a major impact in medical education of trainees in our country, since the nature of medical education largely should be face-to-face. We cancelled educational sessions involving more than 10 people, such as lectures, journal clubs, and training activities violating physical distancing including multiheaded microscope activities. We moved on online learning such as using online lectures, we encouraged and facilitated self-directed learning, we organised late afternoon sessions, even night sessions for on-line lectures.

One year passed under pandemic regulations. Therefore, we aimed to assess the actual status in the medical education as well as in speciality training programs to establish future recommendations.

In this study, we compared the perspectives of the directors and the trainees about educational methods used to overcome the difficulties in the training program during pandemic.

This is not a comparison between e-learning and traditional teaching methods. In fact, this kind of comparison is difficult since the comparison groups are heterogenous, lack uniformity, and have numerous confounders that defy adjustment (7).

Numerous platforms have been used for this purpose, including ZOOM™, MICROSOFT TEAM™ and many others. During the social distancing period, both the trainees and the academic staff have improved themselves by learning these programmes. These meetings gave the opportunity to learn and discuss many topics between the trainees and academic staff. This period facilitated and increased to reach webinars from third party organisations such as medical societies and scientific meetings and congresses. Distance or online learning is not a new method in medical education. Physicians, particularly academic physicians have been using distance-learning as a teaching model for trainees instead of traditional classroom education (8). However, the predominance in the curriculum has increased during pandemic. A systematic review was conducted by Dedeilia et al. about the medical and surgical education challenges and innovations in the COVID-19 era (9). They concluded that there is a need for qualitative and quantitative studies on the long-term impact of the pandemic on the educational gaps of medical students and residents.

Medical training during the COVID-19 pandemic under UK trainees' perspectives was published. In this study, the authors conclude that three

aspects that trainers could focus on during the outbreak; preparation of revision materials for trainees who were preparing for their professional examinations, facilitating practical skills such as operations and clinical procedures, supplemented by simulation and technologies such as augmented or virtual reality, encourage trainees to reflect on what we have learned in this crisis and move forward (10).

Our survey showed that 16.7% internal medicine departments, 30% surgical medicine departments, 42.9% basic science departments had no difficulty in accessing or getting used to the online education system. Kaul et al. listed key challenges faced in medical education during COVID-19 and relevant mitigation strategies in a pre-proof paper published in *Chest Journal* (11). They were focused on distance learning for the alteration of training for residents according to our survey results. Trainees enjoyed from distance learning in the other surveys as well and were satisfied with distance-learning. For example, in one survey among 101 orthopaedic trainees overall, 93% (93/101) of respondents attended at least one weekly online webinar, with 79% (79/101) of trainees rating these as useful or very useful (12). Distance-learning has already settled in our education programs.

In a review article published by Giordano et al., the methods used to overcome the difficulties in the training courses medical students and post-graduate medical trainees during pandemic were compared and evaluated (13). In that review, it was concluded that all universities suspended their frontal teaching, providing online lecture to guarantee students' teaching and their right to study. The internet has represented the keystone to produce online-training. Pre and post surveys were provided to the residents to evaluate the utility of the exercise, self-reported resident questionnaires were used as an assessment method.

The transition to online medical education has also encouraged changes in the methods of final examinations. In our survey we asked whether residency exams held during the pandemic and revealed that majority (86.8%) of the residency exams had been performed on-line. Cancelled educational activities, postponed examinations were subjected in Sneyd et al' paper. They evaluated the impact of the COVID-19 pandemic on anaesthesia trainees and their training (4). They concluded that COVID-19 will continue in the near future therefore the new balance should be initiated in a sensitive way to avoid further frustration amongst trainees.

During the pandemic, in accordance with international guidelines, elective surgery was suspended in our university hospital, and only emergency cases and urgent operations which could not be postponed for more than a few days have been performed for at least a 6-month period of time. In all surgical specialties, the sharp decrease in the number of basic surgical procedures, which were exactly the postponed elective procedures, seem to cause a lack in gaining experience and self-confidence of the trainee.

Meanwhile, 22.2% of the internal medicine wards were closed and the number of beds used for hospitalization of non-COVID patients in clinics has been reduced by more than 80%. Most of the time, whenever possible, the procedures were performed by no more than a single faculty and a single resident to limit exposure. According to our results, most of the surgical departments (83.3%) reported that negative effect of pandemic on surgical education increased in parallel with seniority of the trainee. Khan et al., aimed to assess the impact of COVID-19 pandemic on core surgical training. They conducted a survey among 28 trainees. Twenty trainees (71.4%) felt that their confidence performing surgical skills had been negatively impacted by the pandemic. Eighteen trainees (64.3%) had found it difficult to demonstrate progress in their portfolio (14).

Pang et al., provided recommendations on smart learning to reduce the impact on the learning curve of urology residents (5). They pointed out that adoption of smart learning is critical to keep the effects of pandemic on resident training in minimum. The provision of formal teaching and training of surgeons has been negatively impacted during this pandemic. In our university hospital, majority of trainees (78%) thought that the pandemic affected their education negatively. Hands-on surgical training was disrupted according to 33% of the trainees' opinion.

Basic medical science laboratories were also affected from pandemic regulations. In an article, Pambucian has discussed the measures for cytology laboratories during pandemic, to minimize the risk to their personnel, trainees, and pathologists, besides to continue to educate trainees during the COVID-19 pandemic (15).

They have used universal precautions in laboratory. For educational measures they have canceled educational session involving over 10 people, limited face to

face activities, stopped "double-head" scoping, moved online learning. Our basic medical science departments had also adopted them into a "new normal". Almost all (94%) of residents answered the question in the survey as: online education should continue after the pandemic is over.

Lack of a question about the feelings of anxiety and vulnerability among trainees is the limitation of our survey. Our aim was to evaluate speciality training programs. Besides, answers to open ended questions in our survey showed that majority of the trainees were anxious during their healthcare services. We learned from other surveys in the literature, that students and trainees feel anxious about and vulnerable to COVID-19 and that these fears are amplified for trainees serving on the pandemic's front lines (16).

Alvin et al., evaluated the radiology trainees and proposed potential solutions (17). They finished their paper by mentioning that it is important to stay informed and compliant without complacency or panic. We can create sustainable solutions to ensure safety, promote education, and encourage wellbeing during pandemic. Present trainees are familiar to approach user-friendly, technology-driven virtual sources for their education. During pandemic, technology-based platforms had a real and growing place in medical education. Also in the future, computer-assisted learning, online learning, and web-based programs should be permanently integrated into educational curriculum (18,19).

We have to accept that COVID-19 will not go away any time soon. Thus, lecturers should consider this unique opportunity to build long-term plans for how to educate residents and maintain continuing medical education (CME) as a specialty.

#### Conflict of interest

No conflict of interest was declared by the authors.

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