

# Medical Education in Times of Pandemic: To Practice or to Protect?

## Pandemi Döneminde Pediatri Eğitimi: Korunmak mı? Öğrenmek mi?

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### Abstract

**Introduction:** In the beginning of March 2020 with first case of COVID-19 reported in Turkey, measures that were assumed to decrease the spread of SARS-CoV-2 were taken quickly. Use of personal protective equipments and limiting number of people contacting with the patients were some of the most important precautions. Although these precautions protected medical student from risk of infection, they limited their practical learning opportunities and probably negatively effected their education. Aim of our study was to measure the effect of pandemic on medical education of grade 6 medical students.

**Materials and Methods:** We had 6<sup>th</sup> grade medical students that finished their education between July 2020 and June 2021 fill out a questionnaire that measures their self-esteem on evaluation and procedural practice in pediatric patients and presents their subjective opinions on this period and their solution suggestions with closed and open ended questions.

**Results:** Forty nine grade 6 student was included in the study. Their self-esteem was average (general competency in pediatric patients was  $2.31\pm 0.94$  and general self reported competency in clinical practices was  $2.65\pm 1.42$ ). The practice they feel most confident was hand washing ( $4.44\pm 1.16$ ), and the practice the feel least confident was establishment of vascular access ( $1.94\pm 1.09$ ). When they were asked to evaluate their self-competency in pediatric patients from 1 to 5, the procedure they most frequently observed was establishment of vascular access (74%) and least frequently observed was lumbar puncture (12%). Most frequently performed procedure was urinary catheterization (20%). 80.9% them stated that they felt unlucky to be 6<sup>th</sup> grade in COVID-19 pandemic and they would like to have more opportunities to contact with the patients with personal protective equipment (PPE).

**Conclusion:** Education of 6<sup>th</sup> grade medical students affected negatively with decreasing number and diversity of patients and limited opportunity to evaluate patients and observe and perform procedures. Improvements should be made in pediatric departments to increase possibility of student to encounter patients and continue hands on learning with the right precautions.

### Keywords

COVID-19, infection, pandemic, medical education, clinical practice, pediatrics

### Anahtar kelimeler

COVID-19, enfeksiyon, pandemi, tıp eğitimi, klinik pratik, pediatri

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### Öz

**Giriş:** Mart 2020 itibarıyla COVID-19 salgının Türkiye’de de görülmeye başlamasıyla beraber tüm sağlık merkezlerinde enfeksiyon bulaşını engellemeye yönelik yoğun önlemler alınmıştır. Özellikle kişisel koruyucu ekipman kullanımı ve hastaya olabildiğince az personel ile müdahale edilmesi bu tedbirlerin başında gelmektedir. Bu önlemler tıp öğrencilerini de olası enfeksiyon riskinden korumakta ancak pratik imkanını azaltarak eğitim sürecine olumsuz etkisi de olabilmektedir. Çalışmamızın amacı, pandemi döneminin dönem 6 tıp fakültesi öğrencilerinin pediatri eğitimine etkisini değerlendirmektir.

**Gereç ve Yöntem:** Temmuz 2020-Haziran 2021 arasında dönem 6 tıp eğitimini almış olan kişilerin anket metodu ile kapalı ve açık uçlu sorular sorularak pediatrik hastaları değerlendirme ve girişim yapma konusunda kendine güvenleri değerlendirilmiştir ve çözüm önerileri öğrenilmiştir.

**Bulgular:** Kırk dokuz dönem 6 tıp fakültesi öğrencisi çalışmaya dahil edilmiştir. Öğrencilerin genel yeterlilik algıları ortalama düzeydedir (Pediatri hastalarını değerlendirmedeki yeterlilik 5 üzerinden  $2,31\pm 0,94$  ve klinik uygulamalar konusunda yeterlilik  $2,65\pm 1,42$ ). Çeşitli pratik uygulamalarda kendilerini ne kadar yeterli hissettikleri 5 üzerinde değerlendirildiğinde, en yeterli hissettikleri alanın el yıkama ( $4,44\pm 1,16$ ), en yetersiz hissettikleri alanın ise damar yolu açma ( $1,94\pm 1,09$ ) olduğu görülmüştür. En sık gözlemedikleri işlem damar yolu açma (%74), en sık yaptıkları işlem idrar sondası takmadır (%20), en az gözlemedikleri işlem ise lomber ponksiyondur (%12). Öğrencilerin %80,9'u bu dönemde internlik yaptıkları için kendilerini şanssız hissettiklerini belirtmişlerdir. Açık uçlu sorularda hasta sayısı ve çeşitliliğindeki azalmanın eğitimlerini olumsuz etkilediğini belirtmişler ve çözüm önerisi olarak gerekli koruyucu ekipmanlar sağlanarak daha fazla hastanın tanı ve tedavisine müdahil olmayı gerekli bulduklarını belirtmişlerdir.

**Sonuç:** Tıp fakültesinin 6. yıl eğitimine pandeminin olumsuz etkisi olmuş, hasta sayısının azalması, hastaları değerlendirme ve pratik işlemleri uygulama imkanları azalmıştır. Öğrencileri hastalardan uzak tutmak yerine kişisel koruyucu ekipman sağlanarak hasta ile ilgilenmelerini sağlamak bu zorluğun aşılmasında en önemli adım olarak görülmektedir.

## Introduction

In the beginning of March 2020 with a global warning of COVID-19 pandemic by WHO and concurrently first case of COVID-19 reported in Turkey, measures that were assumed to decrease the spread of SARS-CoV-2 were taken quickly. One of the first cautionary measures was shut down of schools completely including universities and complete transition to online education (1). Medical school curriculum was also converted into online form in a short time (2,3). However even if theoretical sessions can be completely converted to online format, it was not possible to switch to online completely for practical sessions therefore cancellation of many clinical rotations severely limiting hands-on learning opportunities (4,5). It was especially troublesome for 6<sup>th</sup> grade students of medical school, as their complete year was dedicated for face to face contact with patients as interns and evaluation of patients and practice procedures under supervision (4,6). However protective measures for COVID-19 in hospitals hindered that as personal protective equipment was scarce especially at the beginning of pandemic and it was advised to be as little person as possible to be with the patients to lessen to spread of virus (6). That resulted in much less contact of interns with the patients. At first these measures seem very reasonable as students would not get the risk of infection by contact with patients or be vectors for the spread of it and it was expected to fill in these educational gaps after pandemic slowing down in a couple of months (6). However, this period

first thought to be short got longer, it become less possible to fulfill the object of hands-on learning with patients (7,8).

The aim of our study is to find out the effect of COVID-19 pandemic on the education of 6<sup>th</sup> grade medical students.

## Materials and Methods

This study was designed as single-centered cross-sectional descriptive survey study. 6<sup>th</sup> grade medical students that completed their internship between July 2020 and June 2021 were included in the study. The students that do not want to be involved were excluded. All students were reached face to face or by email; a detailed description of the study and our aims were told then each student was asked to fill out the questionnaires.

The questionnaire was composed of four parts. The first part included demographic characteristics, and general information about pediatric rotation. Second part that included questions of self-evaluation is about student performance in pediatric patients both in general and in various specific subjects (febrile child, child with convulsions, child with respiratory problems, vital signs, radiographic and electrocardiographic findings) and practices (pediatric life support, hand washing, vascular access, nasogastric and urinary catheter placement and injection). The aim of the third part of the questionnaire was the specification of clinical procedures each student has observed or performed. The fourth part was composed of open-ended questions and the aim was the general evaluation

of pediatric internship in the COVID era, problems in education, and possible solutions.

The study protocol was approved by Baskent University Ethics Committee (approval number: KA21/447, date: 22.11.2021) and carried out by the Declaration of Helsinki.

### Statistical Analysis

Data analysis was performed using SPSS 17.0 statistical program. Descriptive analysis presented frequencies and percentages for discrete variables and mean and standard deviation for continuous variables.

### Results

A total of 450 medical students were included in the study. The mean age of the students was  $23.87 \pm 0.66$ ; 70% were girls. Medical school was their first choice in the university entrance examination in 96%.

The pediatric emergency department (PED) was one of the most frequently visited rotation departments in Pediatrics, 30% of them studied in PED. Out of all students, 40% worked in the pediatric ward and 24% in the pediatric intensive care unit (PICU). Of all students, 58% of them stated that they evaluated less than 60 pediatric patients in pediatric rotation. When they were asked about clinical procedures they observed or performed in pediatric rotation, the procedure they most frequently observed was the establishment of vascular access (74%), and the least frequently observed was lumbar puncture (12%). The most commonly performed procedure by interns was urinary catheterization (20%), and the least often performed was a lumbar puncture; none of them performed that procedure (Table 1). When they were asked to evaluate their self-competence in pediatric patients from 1 to 5, self-reported general competency in pediatric patients was  $2.31 \pm 0.94$ , and general self-reported competency in clinical practices was  $2.65 \pm 1.42$ . The practice they felt most confident was hand washing ( $4.44 \pm 1.16$ ), and the practice they felt least confident about was the establishment of vascular access ( $1.94 \pm 1.09$ ) (Table 2).

80.9% of them stated that they felt unlucky to be an intern during the COVID-19 pandemic. In open-ended questions, they expressed that a decrease in the number and diversity of patients negatively impacted their education. They had very limited time with patients and less opportunity to practice the clinical procedures.

They found protective measures very beneficial for them; however, if they had the opportunity, they would step in and evaluate every patient referred to PED or outpatient clinics and patients in wards and PICU if necessary personal protective equipment was provided. When asked to offer a solution for the current situation, they noted they would feel more confident if they had the opportunity to have necessary personal protective equipment (PPE) and evaluate more pediatric patients.

Table 1. Frequency of procedures observed or performed by 6<sup>th</sup> grade medical students

Clinical procedures	Observed (%)	Performed (%)
Airway placement	16 (32)	1 (2)
Bag and mask ventilation	20 (40)	3 (6)
Intubation	22 (44)	1 (2)
Cardiac compression	10 (20)	1 (2)
Vascular access	37 (74)	3 (6)
Intraosseous access	8 (16)	1 (2)
Nasogastric tube placement	14 (28)	3 (6)
Urinary catheterization	25 (50)	10 (20)
Lumbar puncture	6 (12)	0
Suture placement in simple wounds	8 (16)	4 (8)

Table 2. Average self evaluation of students about clinical practices in a scale of 1 to 5

	Mean $\pm$ standard deviation
General competency in evaluation of pediatric patients	$2.31 \pm 0.94$
Evaluation of febrile child	$3.02 \pm 0.83$
Evaluation of child with convulsions	$2.86 \pm 1.07$
Evaluation of respiratory disorders	$2.90 \pm 1.05$
Evaluation of vital signs	$3.38 \pm 1.16$
Evaluation of radiographic findings	$2.94 \pm 1.15$
Evaluation of electrocardiography	$2.74 \pm 1.06$
Competency in clinical practices	$2.65 \pm 1.42$
Competency in pediatric basic and advanced life support	$2.26 \pm 1.29$
Competency in hand washing	$4.44 \pm 1.16$
Competency in urinary catheterization	$3.46 \pm 1.37$
Competency in nasogastric tube placement	$2.82 \pm 1.32$
Competency in establishing intravascular access	$1.94 \pm 1.09$
Competency in injection	$2.80 \pm 1.41$

## Discussion

COVID-19 pandemic affected different aspects of medicine in unexpected and sometimes conflicting ways. Especially at the beginning of the pandemic, an effort to prevent the spread of the virus overwhelmed every area, which had some consequences we later observed. Education is one of the most affected areas in that way (6,7,9). Although online learning is a good alternative for theoretical lessons, they still suffer from a lack of face-to-face contact with the educator (5,9-11). Practical sessions such as case presentations and bedside practices suffered more as such replacements do not exist for clinical training. Students should gather and contact and communicate with patients (and parents in pediatrics) for such learning (4,9,11).

Unpreparedness for a pandemic on such a scale was the biggest obstacle at the beginning, shortage of personal protective equipment naturally limited the number of persons that could contact patients (6). The necessity for social distancing and working in shifts decreased the number of physicians in clinics (4). Patients referring to outpatient clinics and emergency departments also dropped sharply, reducing the number of different patients medical students can come in contact with as a result (6,12-14). Supervision and role modeling at the bedside also suffered from the limited contact with the patients as usually a more senior staff member performs examination and procedures alone (5,6,9).

This is an important finding in our study as well. The number of patients each student evaluated is less than expected. As our research showed, this resulted in low self-esteem in evaluating patients and applying procedures to patients. The number of methods they had the chance to observe had also dropped with decreasing patients and the limited number of people contacting patients. Therefore, it is not surprising for them to feel “unlucky”. Although the preventive measures were necessary at the beginning of the pandemic, students missed education opportunities and would have consequences as time passed. Therefore, recommendations to withdraw students from the clinical environment were reversed (7,15). Today shortage of PPE is a less bothering issue. Therefore, it is easier to supply PPE for students as well. Also, vaccination for COVID-19 is available now for this age group with great effectiveness (16).

## Implications for Practice

Now it is understood that COVID-19 is not a temporary pandemic but a disease that will be seen in years ahead; it is better for doctors of the future to come into contact with these patients as well, and even the whole medical curriculum can gain a new perspective with COVID-19 pandemic by putting public health, infectious diseases and epidemic management into focus again (4,8,10). It is also better for medical students, especially internship students, to feel like part of a medical team that combats a disease if they voluntarily would like to participate with supervision (5,6,14,17). Creative solutions can be found for students with medical conditions that keep them from evaluating these patients. As innovative solutions: COVID research is one of the fields that these students can study for their future professional life (11,14). Another creative solution is; that they can participate in telehealth teams or public awareness efforts on social media or community services (5,6,14).

Improvements in virtual learning and haptic simulation can also help students and educators. Case presentations, electrocardiographic and radiographic discussions can be continued on digital platforms, and physical examination and communications skills can be enhanced by standardized patients and virtual-haptic simulations (5,6,11,15,18). Many different specialties can gather on the same platform, increasing the ability to learn and the sense of being in a community (11).

The results of our study helped us to improve medical education in our department. We stopped working in shifts one year ago, and every staff member is ready at the department. We increased the number of PPE enough for the student to examine patients. Every student now has the opportunity to examine and evaluate patients and observe procedures. We also supplied more advanced manikins and studied every procedure on them routinely with every student. We also improved our virtual platforms, and case-based learning sessions were added to the curriculum.

## Study Limitations

Our study has some limitations. First, it is a single-centered study that prevented different effects of different measures on education. Second, we only evaluated one year and could not see the impact of improvements in education on students. An

interventional study can be planned to measure each intervention's effect on students' education.

### Conclusion

Our study results showed that the education of 6<sup>th</sup>-grade medical students was affected negatively by decreasing number and diversity of patients and limited opportunity to evaluate patients and observe and perform procedures. Considering that COVID-19 may have changed medical education permanently and it is difficult to replace clinical hands-on learning, pediatric departments should improve the possibility of a student encountering patients and continuing hands-on learning with the proper precautions.

### Ethics

*Ethics Committee Approval:* The study protocol was approved by Baskent University Ethics Committee (approval number: KA21/447, date: 22.11.2021) and carried out by the Declaration of Helsinki.

*Conflict of Interest:* No conflict of interest was declared by the authors.

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