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Medical interns' anxiety about their professional skills acquired during their internal medicine clerkship amid the COVID-19 pandemic

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ABSTRACT

Aims: The purpose of this study was to investigate the perceived anxiety status and related factors of Ege University Faculty of Medicine (EUFM) interns regarding the professional skills they acquired during their 4th year of Internal Medicine Clerkship (IMC) training during the Coronavirus disease-2019 pandemic.

Methods: This cross-sectional study was conducted between February and March 2022 with medical interns who received face-to-face (n=240) or online (n=120) IMC training at EUFM during the 2019-2020 academic year. The data were collected using a 38-item online survey questionnaire developed by a team of experts. Medical interns were asked to rate their anxiety status on a scale of 0-1 ("1" indicated anxiety "0" indicated no anxiety) for 22 diseases. The total score obtained from the list was labeled as the "medical interns' perceived anxiety total score" (minimum-maximum=0-22) which was also the primary outcome.

Results: Of the 90 study participants, 70.0% received face-to-face training during their internship in internal medicine. Demographic data revealed that 57.8% of participants were female, 20.0% expressed a desire to work abroad, and 52.2% reported feeling inadequacy in practicing their medical profession. Medical interns reported a mean perceived anxiety score of 13.1±5.0 out of 22 for managing various diseases. There was no significant difference in anxiety scores between the interns who received face-to-face (median=13.0) or online (median=14.0) training (p=0.482).

Conclusions: The study revealed that both online and face-to-face trained interns experienced similar levels of anxiety, with no significant difference in perceived anxiety scores between the two groups. Further research is required to assess the long-term effects of online education on the professional skills and anxiety of medical students, particularly in the context of its limitations in terms of practical skill acquisition.

Introduction

Anxiety is characterized by feelings of tension, worried thoughts, and physical changes like sweating, trembling, dizziness, rapid heartbeat, or increased blood pressure (1). The global prevalence of anxiety among medical students was

recently estimated to be 33.8% in a meta-analysis of 69 studies involving 40,438 medical students. This prevalence is higher than that in the general population (2).

Although a reasonable amount of anxiety and stress can enhance student creativity and achievement, the strong



expectations and unrelenting demands of medical education can cause higher anxiety levels, impair student behavior, limit learning, damage personal relationships, and eventually impact patient care (3).

The Coronavirus disease-2019 (COVID-19) pandemic has significantly affected teaching and learning activities at all levels of education in Türkiye as well as worldwide (4,5). The main challenges reported were transferring most of the training and assessment activities to online platforms, reducing contact hours for learners and a lack of consultation with teachers when facing difficulties in learning and understanding (6).

The preclinical and clinical phases of medical education. Although both phases are important and essential, clinical teaching is central to medical education (7). This is because it not only takes place in real clinical environments, such as outpatient and inpatient clinics, but also provides opportunities to apply procedural, clinical, and communication skills in real-life scenarios. Additionally, it allows students to observe and learn professional skills from faculty members, doctors, nurses, and peers (8).

During the COVID-19 pandemic, the clinical training phase and all other training activities were severely disrupted worldwide and in Türkiye. Medical students have been isolated from clinical environments and patient interactions, preventing them from experiencing, practicing, and reinforcing their knowledge, skills, and attitudes in the clinical environment. This deprivation is an additional source of stress and anxiety for medical students (9,10).

At the Ege University Faculty of Medicine (EUFM), educational activities followed the declarations and decisions of the Turkish health authorities during the COVID-19 pandemic. The faculty administration collaborated effectively with faculty committees, commissions, and student representatives. According to these decisions, almost all preclinical and clinical training was conducted online, particularly during March-June 2020, the first four months of the pandemic. Theoretical lectures, integrated sessions, and panels were delivered synchronously online using Microsoft Teams. To enhance skills training, relevant departments and faculty members added videos, presentations, and text documents to the EUFM learning management system. It is planned to offer elective programs during the students' internship period to make up for the 4th and 5th-year clinical clerkship training that could not be completed between March and June 2020 (11).

It is inconceivable that online education could improve the clinical skills of medical students to an adequate level. During the COVID-19 pandemic, being away from the clinical environment and clerkship training might have increased medical students' anxiety regarding the acquisition and application of clinical skills. Although numerous studies have been conducted on the

COVID-19 pandemic in Türkiye (4), few have investigated the pandemic's effects on medical education.

This study aimed to investigate the perceived anxiety levels and related factors among medical interns regarding the professional skills they acquired during their 4th year of Internal Medicine Clerkship (IMC) training during the COVID-19 pandemic.

Methods

Setting

This cross-sectional study was conducted with medical interns (6th year medical students) of EUFM who received their 4th year IMC training face-to-face or online in the 2019-2020 academic year at EUFM, which is the third public medical school established in Türkiye in 1955 and is currently carrying out a high standard six-year undergraduate curriculum for their students. The first three years of the program are the pre-clinical period, the next two years are the clerkships, and the last year is the internship period.

During the COVID-19 pandemic, two different groups of students received their IMC training, face-to-face and online. We aimed to reach the entire group of students who received IMC training either face-to-face (n=240) or online (n=120). Students who had received IMC training more than once or at another medical school were excluded. Ethical approval was obtained from the Ege University Faculty of Medicine Medical Research Ethics Board (decision no: 21-11.1T/5, date: 18.11.2021). The participation of medical interns was voluntary, and informed consent was obtained from all participants or, if participants were under 18, from a parent or legal guardian by approval on the landing page of the online survey.

Data collection tool

The data were collected using a 38-item survey questionnaire developed by a team of experts, including one public health specialist, one medical education faculty member, and three internal medicine specialists, based on relevant literature. Of the 38 items, 22 aimed to measure medical interns' perceptions of anxiety regarding their professional skills in certain diseases. This disease list was based on the EUFM IMC disease learning objectives list (12). The list was sent to nine internal medicine specialists who were asked to select diseases that could only be taught within the scope of an IMC. Diseases selected by seven or more specialists were included in the consensus list, resulting in 22 diseases. For each of these 22 diseases, the medical interns were asked to rate their anxiety status on a scale of 0-1, where "1" indicated anxiety and "0" indicated no anxiety. The total score obtained was labeled with the "medical interns' perceived anxiety total score" (minimum-maximum=0-22).

The remaining 16 items included in the survey questionnaire collected demographic data, including gender, age, career choice, healthcare professional in the family, economic level, place of residence, accommodation, internet availability, private room availability, technological tools used for online education during the pandemic, IMC training modality (face-to-face or online), extra course for National Medical Residency Entrance Exam in the past six months, student's first three years weighted grade point average (GPA) (GPA, out of 4.0), and the perception of professional competency.

The survey was conducted online using Google Forms and was sent to students via WhatsApp. The survey was available online for 45 days between February and March 2022, and two reminders were sent to the participants on the 2nd and 4th weeks after survey initiation. Participation was anonymous, and the authors had no access to the study data that could identify individual participants during or after data collection.

Statistical Analysis

The study data were analyzed using IBM Statistical Package for the Social Sciences statistics for Windows, version 25.0. Armonk, NY: IBM Corp. Categorical variables were presented as counts and percentages. Descriptive variables were presented as mean, standard deviation, quartile, or minimum and maximum values. A radar chart was used to record the medical interns' total perceived anxiety scores. Shapiro-Wilk test was used to evaluate whether the dataset was normally distributed. To compare medical interns' characteristics, the chi-square tests and independent samples t-test were used. Results showed that data were normally distributed. P values less than 0.05 were considered significant.

Results

Of the 360 medical interns who were invited to participate in the survey questionnaire, 90 responded, representing a response rate of 25.0%. Among the participants, 63 (70.0%) received their IMC training through face-to-face instruction, while 27 (30.0%) received it online. Of the respondents, 57.8% identified themselves as female, 40.0% as male, and 2.2% did not respond to the gender question. Of the medical interns, 20.0% expressed a desire to work abroad after graduation, and 74.4% indicated that they took extra courses to prepare for the National Medical Residency Entrance Exam within the past six months. Regarding their circumstances during the pandemic, 48.9% of the participants reported living in metropolitan areas, whereas 81.1% reported living with their families. In addition, 88.9% of participants reported having a private room during the COVID-19 pandemic, and 23.3% reported their family's economic status was good (Table 1).

Among the medical interns, 47 (52.2%) reported feeling incompetent in practicing the medical profession. Among those feeling inadequate, 66.7% received online and 46.0% received face-to-face IMC training. There was no statistically significant difference between these two groups regarding the perception of professional competency ($p=0.073$).

Regarding the participants' perception of anxiety toward their professional skills in managing various diseases, amyloidosis ($n=83$, 92.2%) was the most frequently cited disease in terms of eliciting anxiety among the students. This was followed by leukemia ($n=81$, 90.0%) and systemic vasculitis ($n=76$, 84.4%). In contrast, esophageal motility disorders, Cushing's disease, and megaloblastic anemia were the least frequently mentioned diseases, with 12 (13.3%), 14 (15.6%), and 30 (33.3%) participants indicating anxiety toward managing these conditions (Figure 1).

Table 1. Student characteristics

		Total (90)		Face-to-face (n=63)		Online (n=27)		p
		n	%	n	%	n	%	
Gender	Female	52	57.8	36	57.1	16	59.3	0.555
	Male	36	40.0	27	42.9	9.0	33.3	
	Not answered	2	2.2	0.0	0.0	2.0	7.4	
Career choice	Türkiye	71	78.9	51	82.3	20	74.1	0.377
	Abroad	18	20	11	17.7	7	25.9	
Taking extra courses for the National Medical Residency Entrance Exam in the past six months	No	23	25.6	16	25.4	7	25.9	0.958
	Yes	67	74.4	47	74.6	20	74.1	
Healthcare professionals in the family	No	60	66.7	42	66.7	18	66.7	1
	Yes	30	33.3	21	33.3	9	33.3	
Place of residence during the pandemic	Metropolitan	44	48.9	31	49.2	13	48.1	0.823
	City	24	26.7	18	28.6	6	22.2	
	District	20	22.2	13	20.6	7	25.9	
	Village	2	2.2	1	1.6	1	3.7	

Table 1. Continued

		Total (90)		Face-to-face (n=63)		Online (n=27)		p
		n	%	n	%	n	%	
Accommodation during the pandemic	With family	73	81.1	53	84.1	20	74.1	0.468
	With housemates	11	12.2	6	9.5	5	18.5	
	Alone	6	6.7	4	6.3	2	7.4	
Private room during the pandemic	No	10	11.1	7	11.1	3	11.1	1
	Yes	80	88.9	56	88.9	24	88.9	
Family economic level	Poor	5	5.6	1	1.6	4	14.8	0.142
	Fair	64	71.1	50	79.4	14	51.9	
	Good	21	23.3	12	19	9	33.3	
Internet connection problems during the pandemic	None	24	26.7	17	27	7	25.9	0.759
	Rarely	34	37.8	23	36.5	11	40.7	
	Sometimes	26	28.9	18	28.6	8	29.6	
	Frequently	6	6.7	5	7.9	1	3.7	
Tools used for online education	Computer	17	18.9	14	22.2	3	11.1	0.389
	Mobile devices	7	7.8	4	6.3	3	11.1	
	Both	66	73.3	45	71.4	21	77.8	
First three years weighted grade point average	60-70	23	25.6	16	25.4	7	25.9	0.597
	71-80	50	55.6	36	57.1	14	51.9	
	81-90	14	15.6	8	12.7	6	22.2	
	91-100	3	3.3	3	4.8	0	0	
Perception of professional competency	Inadequate	47	52.2	29	46	18	66.7	0.073
	Adequate	43	47.8	34	54	9	33.3	

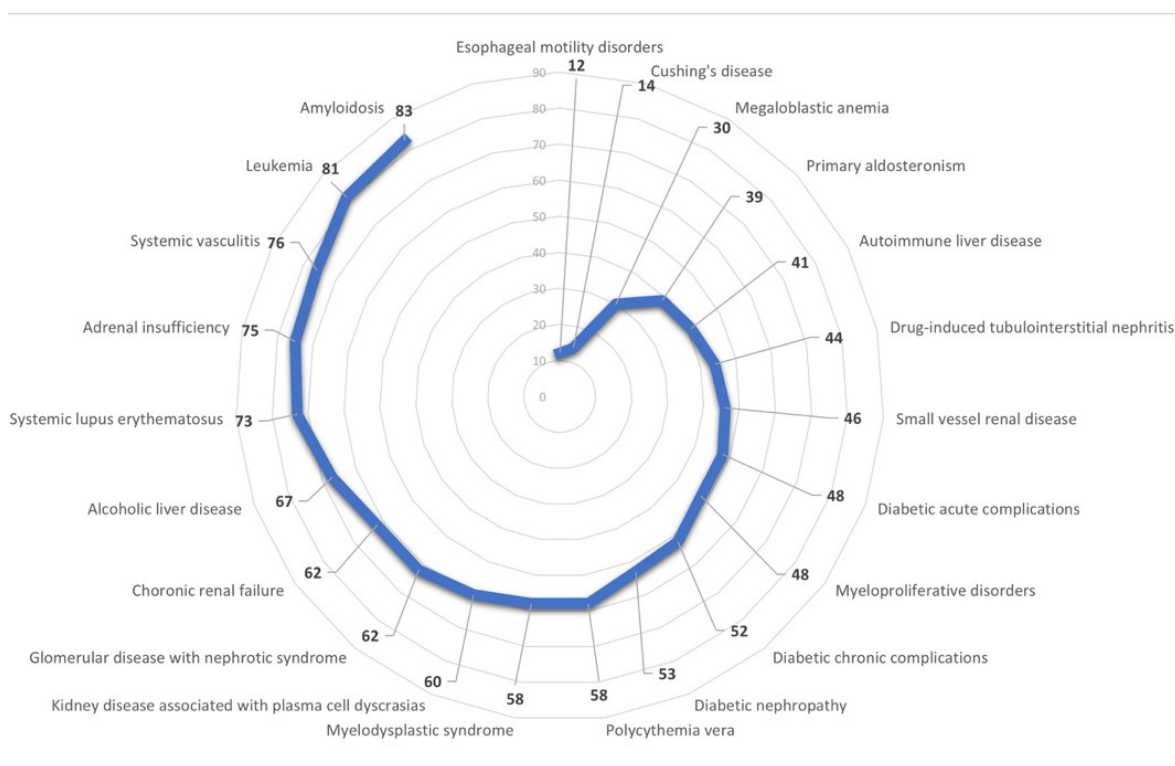


Figure 1. Medical interns' anxiety perceptions toward managing various diseases

Among the 22 diseases listed, medical interns' perceived mean total anxiety score was 13.1±5.0 [median 14.0, interquartile range (IQR)=7.2], 12.9±4.9 (median 13.0, IQR=7.0) in those who received face-to-face training and 13.7±5.4 (median 14.0, IQR=9.0) in those who received online training (p=0.482) (Figure 2).

As shown in Table 2, the total mean perceived anxiety score was 5.1 points higher in the group that did not consider themselves competent than in the group that was confident (p<0.001). The total mean perceived anxiety score was 2.7 points higher in students who declared that they would continue their professional careers abroad (p=0.038). Additionally, although not statistically significant, students who reported a lower economic level had 2.5 points higher anxiety scores than those who reported higher levels of economic status (p=0.981). In the group of students with low academic achievement (GPA scores 60-70), the anxiety score was 2.1 points higher than those with a higher GPA, but the difference was not significant (p=0.561).

Discussion

We found a relationship between medical interns' perceptions of anxiety toward their professional skills in specific diseases learned during their 4th year of IMC training at EUFM and their feeling of inadequacy in practicing medicine, particularly during the COVID-19 pandemic. Although no statistically significant difference was observed, medical students who received online training reported feeling more inadequate when practicing medicine than those who received face-to-face training. This finding is consistent with a national survey study in which 46.7% of students reported that online training was "not good" for their practical courses (13).

In our study, the perceived anxiety levels of medical interns regarding professional skills in managing certain diseases were high, mirroring findings from a systematic review of 47 different international surveys of medical students concerning COVID-19 and mental health, which revealed increased rates of anxiety and depression worldwide during the pandemic (5).

A recent meta-analysis estimated an overall prevalence of 28% of anxiety in medical students during the COVID-19

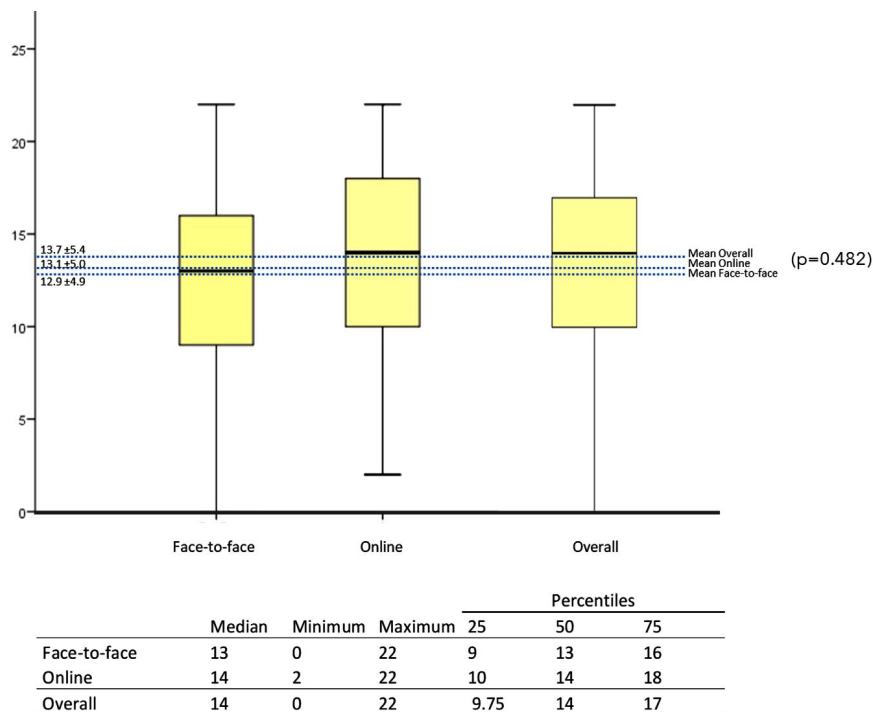


Figure 2. Medical interns' anxiety levels in face-to-face and online education

Variable		Mean 1	Mean 2	Mean difference	95% CI		p	
					Lower	Upper		
Perception of professional competency	No	15.6	Yes	10.5	5.1	3.2	6.9	<0.001
Career choice	Abroad	15.2	Türkiye	12.5	2.7	0.2	5.3	0.038

CI: Confidence interval

pandemic (14). A nationwide study conducted in the United States reported that the anxiety levels of medical students increased more than three times during the pandemic period than during the pre-pandemic period (15). Correspondingly, the findings of our research are congruent with these observations, demonstrating similar trends in the escalation of anxiety levels. The COVID-19 pandemic resulted in the suspension of conventional face-to-face education worldwide, including in Türkiye. To address this need, EUFM swiftly implemented internet-based distance learning in alignment with global trends. This proactive measure was taken to ensure the continuity of education during the pandemic (11).

The present unforeseen shift has resulted in associated adjustment challenges. Specifically, a significant proportion (52.2%) of our participants reported a perceived inadequacy in their ability to apply their acquired knowledge and skills to professional practice after graduation. Two studies conducted during the COVID-19 pandemic revealed similar results, in which 53.3% (16) and 49% (17) of the interns expressed anxiety due to perceived professional inadequacy.

Our findings are consistent with a study conducted at Hacettepe University Faculty of Medicine with 103 last-year medical students (18). The authors reported that over half of the participants were unable to complete some of their clinical rotations due to the pandemic and expressed concerns about performing certain medical procedures with their current knowledge and skills upon graduation. Another study reported significantly higher levels of professional anxiety among intern physicians who did not feel competent as primary care physicians compared to those who did. In this group, 59% of the participants perceived themselves as insufficient in their roles as physicians, a perception that was correlated with a significantly higher level of professional anxiety, a finding that aligns with the outcomes of our research (19).

In our study, we observed a higher rate of self-reported feelings of inadequacy in practicing medicine among students enrolled in online education than those attending face-to-face training. Similarly, a survey administered to 370 medical students in the last year at Hacettepe University Faculty of Medicine in 2017 revealed that their perceived professional competency was significantly lower than expected (20). Furthermore, a statistically significant positive association was found between the feeling of professional competence and practical experience in medicine. During their last year of training, medical students were expected to enhance their competencies by applying their knowledge and skills to real clinical situations. However, they expressed dissatisfaction with the amount of active participation in medical practices during this period, which led to feelings of professional inadequacy (20).

The stress and anxiety experienced during pre-graduation education may impact patient care in future professional life

(21,22). It has been reported that medical graduates nearing the end of their education express the greatest anxiety about professional practices related to their future professional careers (22).

One limitation of this study is its cross-sectional research design, which cannot capture changes in anxiety over time. In addition, no survey has been conducted before the COVID-19 pandemic to compare our results. Online surveys have become a crucial tool during the COVID-19 pandemic, allowing for the collection of real-time data despite the global restrictions implemented. Although the number of circulating surveys increased, response rates were lower during the pandemic era (23). The interns were reluctant to participate in our survey because they feared that the study's findings would lead to a mandatory clerkship to compensate for their lack of knowledge and skills. This also caused a small sample size in our study, which may limit the generalizability of the results.

Conclusion

Our investigation revealed a potential association between medical interns' anxiety regarding their professional skills in specific diseases learned during their 4th year of IMC training at EUFM during the COVID-19 pandemic and their self-reported inadequacy in practicing medicine. Notably, the study observed that interns trained online during the pandemic reported greater inadequacy feelings than interns trained face-to-face, highlighting the pandemic's substantial impact on medical education and student experiences. In light of our study and other related studies, the efficacy of online education during the pandemic on students' self-perceived professional competence and anxiety levels should be further evaluated, and more research should be conducted to identify necessary solutions.

Ethics

Ethics Committee Approval: Ethical approval was obtained from the Ege University Faculty of Medicine Medical Research Ethics Board (decision no: 21-11.1T/5, date: 18.11.2021).

Informed Consent: Informed consent was obtained from all participants or, if participants were under 18, from a parent or legal guardian by approval on the landing page of the online survey.

Authorship Contributions

Concept - Design - Data Collection or Processing - Analysis or Interpretation - Literature Search - Writing: B.C., R.C., U.B., S.D., S.A.Ç.

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

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