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Distance Education Experience by Health Science Students During COVID-19 Pandemic: A Questionnaire-Based Study

Sağlık Bilimleri Öğrencilerinin COVID-19 Pandemisi Sürecinde Uzaktan Eğitim Deneyimleri: Bir Anket Çalışması

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Abstract

Aim: This study aimed to evaluate distance education experience by health science students during COVID-19 pandemic in relation to sociodemographic factors.

Methods: A total of 192 health science students having distance education during pandemic via a live lesson system were included in this questionnaire-based survey. The online questionnaire form elicited items on participant characteristics, and personal opinions and experience on distance education, which were evaluated overall and with respect to gender, university (state vs. foundation) and place of residence (urban vs. rural) subgroups.

Results: Only 38.0% and 22.4% of students considered distance education to be sufficient for theory-based and practical-based courses, respectively. Distance education was considered less advantageous than on-campus education in terms of focusing the practical-based courses by 55.2% of students, and to be less effective in terms of gaining knowledge by 45.8%. Ability to record and later access to live lectures (61.5%, more commonly by males and for urban location) and pacing options (29.2%, more commonly by females and for rural location) were the most commonly reported advantages of distance education, while the most commonly reported disadvantages were technical problems (33.9%, more commonly for foundation universities and rural location), need for strong self-motivation/discipline (33.3%, more commonly for state universities and rural location) and lesser learning efficiency (29.2%, more commonly by females). Most of the students reported problems in regularly following the practical-based live courses (62.0%) and difficulties with following live courses due to limited personal access to a computer and the internet (82.8%). Distance education was considered less advantageous than on-campus education in terms of focusing the practical-based courses by 55.2% of students, and to be less effective in terms of gaining knowledge by 45.8%.

Conclusions: Our findings revealed that distance education experience during the COVID-19 pandemic was considered not satisfactory, particularly for practical-based courses, by most health science students. Technical and infrastructural resources, the compatibility of content and learning materials with the purpose of the course and the teaching skills and compliance of the instructors were considered as the major challenges in distance education, while the ability to record and later access to live lectures and pacing options were the main advantages of distance education.

Keywords:
COVID-19 Pandemic, Distance Education, Advantages, Effectiveness

Anahtar Sözcükler:
COVID-19 Pandemisi, Uzaktan Eğitim, Avantajlar, Etkinlik

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Özet

Amaç: *Bu çalışma, sağlık bilimleri öğrencilerinin COVID-19 pandemisi sürecinde uzaktan eğitim deneyimlerinin sosyodemografik faktörler bağlamında incelenmesi amacıyla tasarlandı.*

Yöntem: *Bu anket çalışmasına, pandemi sürecinde gerçek-zamanlı bir ders sistemi üzerinden uzaktan eğitim almış olan toplam 192 sağlık bilimleri öğrencisi dahil edildi. Online anket formu katılımcı özellikleri ve uzaktan eğitime dair kişisel görüş ve deneyimlere yönelik maddeler üzerinden, toplam popülasyonda ve ayrıca cinsiyet, üniversite (devlet ve vakıf) ve yerleşim bölgesi (şehir ve kırsal) alt gruplarında değerlendirildi.*

Bulgular: *Uzaktan eğitim, öğrencilerin sadece %38,0'i tarafından teorik dersler için ve sadece %22,4'ü tarafından uygulamaları dersler için yeterli bulundu. Uzaktan eğitim, öğrencilerin %55,2'si tarafından uygulamaları derslere odaklanma açısından ve %45,8'I tarafından bilgi kazanımı açısından kampüs eğitimine göre daha az avantajlı bulundu. Gerçek-zamanlı derslerin kayıt edilerek sonradan ulaşılabilmesi (%61,5, daha çok erkekler ve kırsal bölgede yaşayanlar tarafından) ve bireysel hıza göre öğrenme opsiyonu sunması (%29,2, daha çok kız öğrenciler ve kırsal bölgede yaşayanlar tarafından) uzaktan eğitimin başlıca avantajları olarak belirtilirken, teknik problemler (%33,9, daha çok vakıf üniversiteleri ve kırsal bölge için), yüksek motivasyon/disiplin gereksinimi (%33,3, daha çok devler üniversiteleri ve kırsal bölge için) ve daha düşük öğrenme etkinliği (%29,2, daha çok kız öğrenciler tarafından) uzaktan eğitimin başlıca dezavantajları olarak belirtildi. Öğrencilerin çoğu uygulamalı derslerin düzenli takibinde zorlandıklarını (%62,0) ve kısıtlı bilgisayar ve internet erişimi nedeniyle gerçek-zamanlı dersleri takipte sorun yaşadıklarını (%82,8) ifade etti. Uzaktan eğitim kampüs eğitimine göre, öğrencilerin %55,2'si tarafından uygulamalı derslere odaklanma açısından daha dezavantajlı ve öğrencilerin %45,8'i tarafından bilgi kazanımı açısından daha verimsiz bulundu.*

Sonuç: *Bulgularımız, çoğu sağlık bilimleri öğrencisinin COVID-19 pandemisi sürecinde deneyimledikleri uzaktan eğitimi, özellikle uygulamalı dersler açısından, tatminkâr bulmadığına işaret etmektedir. Uzaktan eğitimin başlıca zorlukları, teknik ve altyapı kaynakları, eğitimin içerik ve öğrenme materyalleri açısından amacı karşılamadaki etkinliği ve eğitmenlerin öğretme becerileri ve sisteme adaptasyonu ile ilgili problemler olarak belirtilirken, derslerin kaydedilerek sonradan erişimine imkan vermesi ve bireysel öğrenme hızının uygulanabilir olması uzaktan eğimin başlıca avantajları olarak belirlendi.*

INTRODUCTION

The COVID-19 pandemic has caused major disruption of systems worldwide, including the education services, with an abrupt shift from face-to-face education to alternative education methods such as distance learning (1-3).

Distance education, defined as using computer technology to deliver training, including technology-supported learning either online, offline, or both, has become a compulsory model used in many countries at all levels of education (4-6). However, the traditional didactic learning in medical as well as health sciences education has been existentially challenged in the wake of this global emergency, including a sudden transition from a classroom-based teaching to live courses without enough time to plan and prepare well-structured distance education programs and using distance e-learning tools (i.e. digital platforms and technologies) that often lack the depth and organization to reliably perform an educational curriculum (1-3,7,8).

With the onset of the pandemic in Turkey, education was suspended for a week in all universities from 16 March, and then 1-month asynchronous education was applied from March to April 2020. Afterwards, a synchronous distance education model was initiated in Spring semester of 2019-2020 Academic Year along with development of the learning management system infrastructure (5,6,9-11).

Given the likelihood of distance education to

remain an integral part of health science education care even after the COVID-19 pandemic, addressing current online teaching experiences is considered to improve understanding of the perceived advantages and drawbacks of distance education (12,13) and the delivery of distance education in terms of the fulfillment of desired learning objectives, the effective delivery of live courses and adequate support provided by faculty and teaching assistants (3,5,12,14,15).

Despite its potential impact on students' expectations or practice regarding distance education, the sociodemographic features have not been extensively investigated in the setting of distance education during pandemic, along with inconsistent data particularly on the gender influence reported by previous studies (16-21).

Therefore, this study aimed to evaluate distance education experience by health science students during COVID-19 pandemic in relation to sociodemographic factors.

METHODS

Study Population

A total of 192 health science (child development, nursery, health management and medical imaging techniques) students having distance education during pandemic via a live lesson system (blended synchronous and asynchronous courses) supported by the university-based Distance Education Application and Research Center (DEARC) were included on a voluntary basis in this descriptive cross-sectional questionnaire-based online survey conducted between March 2020 and June 2021. The survey link including the questionnaire form was sent to the participant's phone and those who agreed to participate in the study and completed the online questionnaire form comprised the study population. Overall, an online survey link was sent to 300 of 332 students studying at a state university (n=188) and a foundation university (n=144) with available contact details, while 192 of 300 students (response rate: 64%) who received the online survey link agreed to participate in the study. The study was conducted in accordance with the ethical principles stated in the "Declaration of Helsinki", and participant's informed consent was obtained electronically in advance of the data collection through the informed consent page presented two options (yes/ no).

The Questionnaire

The questionnaire form elicited items on a) socio-demographic characteristics (age, gender, year in university, type of university, place of residence, family type) and COVID-19 history, b) device usage and advantages and personal view on disadvantages of distance education, as assessed by multiple choice questions, c) personal experience and opinions on distance education (overall, technical issues, practical- and theory-based courses, course hours and lecturers), as assessed on a 3-point Likert scale (1: disagree, 2: indecisive, 3: agree) with the scores computed as mean item score and higher scores indicating a stronger agreement. The quality and reliability of the questionnaire items were tested via a pilot study in a small sample of students, and the questionnaire form was finalized based on the pilot survey results.

Study Parameters

Participant characteristics, and personal opinion and experience on distance education were evaluated overall and with respect to gender (female vs. male), university (state vs. foundation) and place of residence (urban vs. rural) subgroups.

Statistical Analysis

Statistical analysis was made using IBM SPSS Statistics for Windows, version 27.0 (IBM Corp., Armonk, NY). The normal distribution assumption was examined with Kolmogorov-Smirnov test. Chi-square (2) test was used for the comparison of categorical data. Mann-

Whitney U test were used for the parametric variables. Data were expressed as mean± standard deviation (SD), median and percent (%) where appropriate. p<0.05 was considered statistically significant.

RESULTS

Sociodemographic Characteristics and COVID-19 History

Overall, 59.9% of participants aged 17-20 years and 58.3% were females. Most (66.7%) of

participants were in the first academic year and were studying at a state university (70.3%) and living in rural area (63.5%). COVID positivity within the last 10 days was evident in 55.7% of participants or their family members (Table 1).

Urban vs. rural residence was associated with higher percentage of males (55.7 vs. 33.6%, p=0.003) and single-parent family type (34.3 vs. 0.0%, p<0.001), and with lesser likelihood of COVID-19 contact history (5.7 vs. 20.5, p=0.023) (Table 1).

Device Usage and Personal View on Advantages and Disadvantages of Distance Education

Overall, computer and smart phone were the most commonly used e-devices (42.2% for each) in the distance education. Ability to record and later access to live lectures (61.5%) and pacing options (29.2%) were the most commonly reported advantages of distance education, while the most commonly reported disadvantages were technical problems (33.9), need for strong self-motivation/discipline (33.3%) and lesser learning efficiency (29.2%) (Table 2).

For advantages of distance education, pacing options (32.1 vs. 25.0%) and more comfortable learning environment (8.9 vs. 0.0%) were more commonly reported by females, whereas ability to record and later access to live lectures (65.0 vs. 58.9%) and accessibility of time and place in education (0.0 vs. 10.0%) were more commonly reported by males (p<0.001). Ability to record and later access to live lectures was more commonly reported by students living in a urban area (65.7 vs. 59.0%), while pacing options (36.1 vs. 17.1%) was more commonly reported by those living in a rural area (p=0.005) (Table 2).

For disadvantages of distance education, lesser learning efficiency (32.1 vs. 25.0%) was more commonly reported by females, while lack of live communication (0.0 vs. 8.8%) was more commonly reported by males (p<0.001). Technical problems (54.4 vs. 25.2%) were more commonly reported by foundation university students (54.4 vs. 25.2%) and students living in urban area (51.4 vs. 23.8%), while the need for strong self-motivation/discipline was more commonly reported by state university students (41.5 vs. 14.0%) and students living in rural area (44.3 vs. 14.3%) (p<0.001 for each) (Table 2).

Urban vs. rural place of residence was also associated with more frequent use of computers (51.4 vs. 36.9%) and less frequent use of smart phones (30.0 vs. 49.2%) in distance education (p=0.035) (Table 2).

Personal Experience and Opinions of Students on Distance Education

Most of students reported that they experience problems in regularly following the practical-based live courses (62.0%), difficulties with following live courses due to limited personal access to a computer and internet (82.8%), or due to problems related to technology and interface of the system (Table 3).

Overall, 81.2% of students considered the infrastructure of the DEARC to be insufficient and 54.2% stated that it should be improved to prevent technical problems, 29.7% considered the capacity of DEARC not sufficient to provide a continuous live course in case of large number of participants. In addition, only 27.1% considered content and learning materials of distance education to be compatible with the purpose of the course and only 18.2% considered the teaching skills and compliance of the instructors with the distance education system to be satisfactory (Table 3).

Table 1. Sociodemographic Characteristics and COVID-19 History

	Total (n=192)		Gender					University					Place of residence				
			Female (n=112)		Male (n=80)		p value	State (n=135)		Foundation (n=57)		p value	Urban (n=70)		Rural (n=122)		p value
	n	%	n	%	n	%		n	%	n	%		n	%	n	%	
Age																	
17-20	115	59.9	75	67.0	40	50.0		79	58.5	36	63.2		42	60.0	73	59.8	
21-24	29	15.1	17	15.2	12	15.0	**0.021**	16	11.9	13	22.8	**0.027**	8	11.4	21	17.2	0.461
≥25	48	25.0	20	17.9	28	35.0		40	29.6	8	14.0		20	28.6	28	23.0	
Gender																	
Female	112	58.3						68	50.4	44	77.2	**0.001**	31	44.3	81	66.4	**0.003**
Male	80	41.7						67	49.6	13	22.8		39	55.7	41	33.6	
Year in university																	
First	128	66.7	83	74.1	45	56.3		97	71.9	31	54.4		60	85.7	68	55.7	
Second	30	15.6	6	5.4	24	30.0	**<0.001**	23	17.0	7	12.3	**0.001**	4	5.7	26	21.3	**0.000**
Fourth	34	17.7	23	20.5	11	13.8		15	11.1	19	33.3		6	8.6	28	23.0	
Type of university																	
State	135	70.3	68	60.7	67	83.8	**0.001**						50	71.4	85	69.7	0.798
Foundation	57	29.7	44	39.3	13	16.3							20	28.6	37	30.3	
Place of residence																	
Urban	70	36.5	41	36.6	29	36.3		49	36.3	21	36.8						
Rural-town	54	28.1	35	31.3	19	23.8	0.147	39	28.9	15	26.3	0.930					
Rural-other	68	35.4	36	32.1	32	40.0		47	34.8	21	36.8						
Family type																	
Nuclear	88	45.8	49	43.8	39	48.8		64	47.4	24	42.1		24	34.3	64	52.5	
Single-parent	24	12.5	13	11.6	11	13.8	0.607	16	11.9	8	14.0	0.782	24	34.3	0	0.0	**<0.001**
Extended	80	41.7	50	44.6	30	37.5		55	40.7	25	43.9		22	31.4	58	47.5	
Chronic disease																	
Yes	42	21.9	26	23.2	16	20.0	0.595	23	17.0	19	33.3	**0.013**	12	17.1	30	24.6	0.230
No	150	78.1	86	76.8	64	80.0		112	83.0	38	66.7		58	82.9	92	75.4	
COVID (+) (self/family member)																	
Yes	107	55.7	62	55.4	45	56.3		79	58.5	28	49.1		43	61.4	64	52.5	
No	56	29.2	29	25.9	27	33.8	0.186	30	22.2	26	45.6	**0.001**	23	32.9	33	27.0	**0.023**
Contact history	29	15.1	21	18.8	8	10.0		26	19.3	3	5.3		4	5.7	25	20.5	

χ^2 test

Table 2. Device Usage and Personal View on Advantages and Disadvantages of Distance Education

	Total (n=192)		Gender				University					Place of residence				
			Female (n=112)		Male (n=80)		p value	State (n=135)		Foundation (n=57)		p value	Urban (n=70)		Rural (n=122)		p value
	n	%	n	%	n	%		n	%	n	%		n	%	n	%	
Electronic device used in distance education																	
Computer	81	42.2	45	40.2	36	45.0	0.713	61	45.2	20	35.1	0.433	36	51.4	45	36.9	**0.035**
Smart phone	81	42.2	50	44.6	31	38.8		54	40.0	27	47.4		21	30.0	60	49.2	
Tablet	30	15.6	17	15.2	13	16.3		20	14.8	10	17.5		13	18.6	17	13.9	
Advantages of distance education																	
Accessibility of time and place in education	8	4.2	0	0.0	8	10.0	**<0.001**	7	5.2	1	1.8	0.393	5	7.1	3	2.5	**0.005**
Pacing options	56	29.2	36	32.1	20	25.0		36	26.7	20	35.1		12	17.1	44	36.1	
Ability to record and later access to live lectures	118	61.5	66	58.9	52	65.0		86	63.7	32	56.1		46	65.7	72	59.0	
More comfortable learning environment	10	5.2	10	8.9	0	0.0		6	4.4	4	7.0		7	10.0	3	2.5	
Disadvantages of distance education																	
Lack of live communication	7	3.6	0	0.0	7	8.8	**0.014**	3	2.2	4	7.0	**<0.001**	4	5.7	3	2.5	**<0.001**
Technical problems	65	33.9	38	33.9	27	33.8		34	25.2	31	54.4		36	51.4	29	23.8	
Lesser learning efficiency	56	29.2	36	32.1	20	25.0		42	31.1	14	24.6		20	28.6	36	29.5	
Need for strong self-motivation/discipline	64	33.3	38	33.9	26	32.5		56	41.5	8	14.0		10	14.3	54	44.3	

χ^2 test

Table 3. Personal Experience and Opinions of Students on Distance Education and Gender-, Residence- and University-Based Differences

	Disagree		Indecisive		Agree	
Personal experience	**n**	**%**	**n**	**%**	**n**	**%**
I have no problems in regularly following practical-based live courses within the distance education system during COVID-19 pandemic	88	45.8	31	16.1	73	38.0
I experience difficulties with following live courses due to limited personal access to a computer and internet	22	11.5	11	5.7	159	82.8
I experience difficulties with following live courses due to problems related to technology and interface of the system	75	39.1	49	25.5	68	35.4
Distance education improved my performance on theory-based courses	99	51.6	90	46.9	3	1.6
Distance education improved my interest in courses	93	48.4	60	31.3	39	20.3
I enjoyed participating in projects assignments (community service practices) within the distance education program	77	40.1	66	34.4	49	25.5
Opinions on technical issues	**n**	**%**	**n**	**%**	**n**	**%**
I consider the infrastructure of the distance education center (DEC) to be improved to prevent technical problems	56	29.2	32	16.7	104	54.2
Capacity of DEC is not sufficient to provide a continuous live course in case of large number of participants	71	37.0	64	33.3	57	29.7
The technical infrastructure of distance education provided by the university is sufficient	135	70.3	22	11.5	35	18.2
Programs such as Google meet or zoom can be used for live class sessions	66	34.4	45	23.4	81	42.2
Opinions on course content and lecturers	**n**	**%**	**n**	**%**	**n**	**%**
Course hours in the distance education are satisfactory	57	29.7	52	27.1	83	43.2
Course hours in the distance education should be increased	119	62.0	26	13.5	47	24.5
Content and learning materials of distance education are compatible with the purpose of the course	106	55.2	34	17.7	52	27.1
Content and learning materials of distance education are novel	135	70.3	22	11.5	35	18.2
Distance education improved lecturing performance of instructors	87	45.3	46	24.0	59	30.7
The teaching skills and compliance of the instructors with the distance education system are satisfactory	135	70.3	22	11.5	35	18.2
Opinions on overall distance education	**n**	**%**	**n**	**%**	**n**	**%**
I consider distance education to be sufficient for the theory-based courses	67	34.9	52	27.1	73	38.0
I consider distance education to be sufficient for practical-based courses	112	58.3	37	19.3	43	22.4
I consider distance education not to be sufficient for practical-based courses	0	0.0	27	14.1	165	85.9
Distance education is less advantageous than on-campus education in terms of focusing the practical-based courses	31	16.1	55	28.6	106	55.2
On-campus education is more effective than distance education in terms of gaining knowledge	88	45.8	63	32.8	41	21.4
Online exams can be replaced by home-assignments	55	28.6	87	45.3	50	26.0
Overall, I consider distant education satisfactory for vocational development	53	27.6	62	32.3	77	40.1

	Mean±SD (median) Likert Scores		
Gender-based differences	**Female (n=112)**	**Male (n=80)**	p value
I consider distance education not to be sufficient for practical-based courses	2.8±0.4 (3.0)	2.9±0.2(3.0)	**0.009***
I consider distance education to be sufficient for practical-based courses	1.8±0.9(1.0)	1.4±0.6(1.0)	**0.007***
Programs such as Google meet or zoom can be used for live class sessions	2.2±0.9 (2.0)	1.9±0.9(2.0)	**0.041***
Online exams can be replaced by home-assignments	2.7±0.5(3.0)	2.9±0.3(3.0)	**0.001***
Capacity of DEC is not sufficient to provide a continuous live course in case of large number of participants	2.1±0.8(2.0)	1.7±0.7(2.0)	**0.001***
Content and learning materials of distance education are compatible with the purpose of the course	1.6±0.8(1.0)	1.9±0.9(2.0)	**0.015***
Overall, I consider distant education satisfactory for vocational development	2.3±0.7(2.0)	1.9±0.9(2.0)	**<0.001***
On-campus education is more effective than distance education in terms of gaining knowledge	1.6±0.8(1.0)	1.9±0.7(2.0)	**0.003***
Distance education improved my interest in courses	1.9±0.8(2.0)	1.5±0.7(1.0)	**<0.001***
Residence-based differences	**Urban (n=70)**	**Rural (n=122)**	p value
I experience difficulties with following live courses due to limited personal access to a computer and internet	3.0±0.0 (3.0)	2.5±0.8(3.0)	**<0.001***
Distance education is less advantageous than on-campus education in terms of focusing the practical-based courses	2.6±0.6(3.0)	2.3±0.8(3.0)	**0.018***
Distance education improved my performance on theory-based courses	1.7±0.5(2.0)	1.4±0.5(1.0)	**<0.001***
On-campus education is more effective than distance education in terms of gaining knowledge	1.9±0.7(2.0)	1.7±0.8(1.0)	**0.009***
I enjoyed participating in projects assignments (community service practices) within the distance education program	2.1±0.9(2.0)	1.7±0.7(2.0)	**0.001***
	Urban (n=70)	**Rural (n=122)**	p value
Course hours in the distance education should be increased	1.8±0.8(2.0)	1.5±0.9(1.0)	**0.019***
I consider distance learning to be sufficient for practical-based courses	1.8±0.8(2.0)	1.5±0.8(1.0)	**0.004**
Content and learning materials of distance education are compatible with the purpose of the course	1.9±0.9(2.0)	1.6±0.8(1.0)	**0.006**
University-based differences	**State (n=135)**	**Foundation (n=57)**	p value
Distance education improved my performance on theory-based courses	1.5±0.5(2.0)	1.4±0.6(1.0)	**0.043***
Distance education improved lecturing performance of instructors	1.9±0.9(2.0)	1.6±0.8(1.0)	**0.032***
Course hours in the distance education are satisfactory	2.2±0.9(2.0)	1.9±0.8(2.0)	**0.034***
Course hours in the distance education should be increased	1.5±0.8(1.0)	1.9±1.0(1.0)	**0.007***
I consider distance education to be sufficient for practical-based courses	1.5±0.7(1.0)	1.9±1.0(1.0)	**0.036***
Overall, I consider distant education satisfactory for vocational development	2.0±0.8(2.0)	2.3±0.8(2.0)	**0.037***

**p, Mann-Whitney U test*

Only 38.0% and 22.4% of students considered distance education to be sufficient for theory-based and practical-based courses, respectively. Distance education was considered less advantageous than on-campus education in terms of focusing the practical-based courses by 55.2% of students, and to be less effective in terms of gaining knowledge by 45.8%. Overall, 40.1% of students reported that distant education was satisfactory for vocational development (Table 3).

Gender, Residence and University-Based Differences

Male vs. female participants had significantly higher scores (a stronger agreement) on insufficiency of distance education for practical-based courses (p=0.009), the likelihood online exams to be replaced by home-assignments (p=0.001), compatibility of content and learning materials with the purpose of the course (p=0.015) and higher efficacy of on-campus education on gaining knowledge (p=0.003) (Table 3).

Female vs. male participants had significantly higher scores (a stronger agreement) on the likelihood of programs such as Google meet or zoom to be used for live class sessions (p=0.041), insufficient capacity of DEC to provide a continuous live course in case of large number of participants (p=0.001), satisfactoriness of distant education for vocational development (p<0.001) and improved interest in courses after distance education (p<0.001) (Table 3).

Students from urban vs. rural residence had significantly higher scores on limited personal access to a computer and internet (p<0.001), consideration of distance education as less advantageous than on-campus education in terms of focusing the practical-based courses (p=0.018) and gaining knowledge (p=0.009), improved performance on theory-based courses via distance education (p<0.001) and compatibility of content and learning materials of distance education with the purpose of the course (p=0.006) (Table 3).

Students from state vs. foundation university had significantly higher scores on association of distance education with improved performance on theory-based courses (p=0.043) and improved lecturing performance of instructors (p=0.032) and satisfactoriness of course hours (p=0.034), while those from foundation vs. state university had significantly higher scores on the consideration of distance education to be sufficient for practical-based courses (p=0.036) and to be satisfactory for vocational development overall (p=0.037) (Table 3).

DISCUSSION

Our findings on distance education experience by health science students during COVID-19 pandemic revealed that most of student had difficulties with regularly following the live courses, particularly the practical-based live courses, due to limited personal access to a computer and internet or due to problems related to technology and interface of the system. The novelty and compatibility of content and learning materials with the purpose of the course as well as the teaching skills and compliance of the instructors with the distance education system were considered not sufficient by at least two-third of study population. Most of students reported the ability to record and later access to live lectures (particularly the males) and pacing options (particularly the females) as the main advantages of distance education, while technical problems (particularly in case of urban residence) and need for self-motivation/discipline (particularly in case of rural residence) were the main disadvantages. The type of university also affected the personal experience and opinions of students regarding the distance education, particularly in terms of the areas of improved performance (theory-based scores in the state university but

practical-based courses and vocational development in the foundation university) and the main disadvantages (technical problems in the state university but need for strong self-motivation/discipline in the foundation university).

In a past study on distance education experience by 104 preclinical medical students in USA during March 2020, while most of students (64.1%) preferred the flexibility of learning material at their own pace, majority reported that distance education negatively affected the quality of instruction and their learning experiences in laboratory-based classes, decreased the feeling of being connected to the medical school or classmates and caused feelings of anxiety (22).

In a past study with 2721 medical students across 39 medical schools in UK in May 2020, the authors reported that medical schools adapted to the pandemic with development of new distance-learning platforms, use of question banks and other online active recall resources (12). The greatest perceived benefits of online teaching platforms were reported to be the flexibility and ability for students to learn at their own pace, while family distraction (26.76%) and poor internet connection (21.53%) were the commonly perceived barriers to using online teaching platforms (12). In a past with study 1011 applied sciences students having distance education during pandemic period of 2019-2020 in Turkey, the authors reported the use of computers (46.1%) and phones (52.4%) as the main devices, and noted that availability computer and internet connection remarkably affects the opinions of students regarding their satisfaction with the distance education (5). In a past study from Jordan with 538 medical students who have participated in distance learning amid COVID-19 pandemic, the authors indicated that only 26.8% of students were satisfied with their experience in medical distance learning, and 55.9% of students considered time-saving and flexibility of class as main advantages of distance education, while the main drawbacks of distance education were reported to be the low quality of teaching (48.3%), poor interaction with instructors (62.1%) and internet streaming quality and coverage (69.1%) (4).

Hence, our findings support the consideration of the ability to engage in self-paced learning due to schedule flexibility and early availability of pre-recorded lectures as the main advantage and best aspect of distance education by university students (4,12,22-24), while consideration of the technical and infrastructural resources as a major challenge for implementing distance education (4,5,12).

Importantly, health science students participated in the current study considered distance education not to be satisfactory for vocational development, particularly for practical-based courses, and to be less advantageous than on-campus education in terms of focusing the practical-based courses rather than gaining knowledge. Similarly, in a multinational large-scale study on perception and satisfaction of health sciences students (n=1255), towards E-learning during the COVID-19 lockdown across 11 countries, 41% of students reported interference of E-learning due to network problems, more than one third of the students preferred classroom teaching, while 60% considered that clinical and practical skills are best learned in clinics and laboratories (25). In addition, other studies also indicated that university students were less satisfied with online teaching and ill-prepared for their profession compared with face-to-face teaching (12), while distance education in medicine and health sciences has been associated with the loss of clinical experiences in the core curriculum and reduced impact of laboratory courses (22).

The sudden and complete transition to distance education necessitated by COVID-19 emerged several challenges in meeting the complex learning objectives due to unpreparedness in complete integration of technology and flexible

distance learning options into medical or health sciences curricula (3,22,26). Indeed, the infrastructure and facilities for laboratory experiments are considered not practically up-to-date and adequate even in conventional institutions, while hands-on experience for effective transfer of technical skills is also limited in distance education (26,27).

The novelty and compatibility of content and learning materials with the purpose of the course as well as the teaching skills and compliance of the instructors with the distance education system were considered not sufficient by at least two-third of our students, while most of student had difficulties with regularly following the live courses, particularly the practical-based live courses, due to limited personal access to a computer and internet or due to problems related to technology and interface of the system.

In a nation-wide study with 17,939 university students having distance education during pandemic in Turkey, authors reported that majority of students complained about the poor technical quality of online course material, and its incompatibility with the objectives of the course as well as use of readily available rather than original newly prepared materials (28).

Satisfaction in distance learning is considered to be strongly linked to students' prior experience in distance learning as well as experiences and interactions of instructors (7). The reluctance of educators to engage in new technologies and applications due to their limited knowledge or lack of proper training in these fields is considered amongst the challenges of distance education (29), while the institutional support with a strategy designed to facilitate the implementation of key skills and the adoption of methodologies by faculty is considered essential for the success of distance education (4,30). The quality of institutional support seems also notable given the considerable difference noted between state and foundation universities in our study in terms of perspectives of students regarding the improved performance areas and the difficulties during distance education experience.

Hence, our findings support the importance of identifying and overcoming the barriers related to technological, financial and institutional conditions as well as those related to educators and students in successful implementation of distance education (4). Accordingly, developing an improved and sustainable distance education curriculum including structured electronic health record and telehealth training for students as well as training for teaching faculty to increase fluency in remote teaching formats and technologies seem to be crucial to effectively meet the needs of students (3,22,29). In this regard, use of a mixture of online and in-person teaching education being incorporated into an effective learning method such as problem-based learning (PBL) or team-based learning (TBL) has been suggested to maximize the benefits of these learning methods and to improve learning outcomes (7,12,31,32).

Notably, in a systematic review and meta-analysis of 7 randomized controlled trials (RCTs) with 594 health science students from January 2000 to March 2020 on the effectiveness and acceptance of synchronous distance education (SDE) compared with traditional education, the authors reported no significant difference between two methods in terms of knowledge acquisitions and skills, while the pooled effect size of overall satisfaction significantly favored SDE over traditional education (33). The authors concluded that SDE was not significantly different from traditional education in effectiveness and had higher satisfaction ratings, and that their findings provide indications for adoptions of online remote education in health science education centers (33).

In a past study from Turkey on acceptance and attitudes of 381 physical therapy and rehabilitation students towards the distance

education during the COVID-19 outbreak (May 2020 to June 2020), the authors reported that students had partly positive attitudes towards distance education and moderate sense of community, while the students in the second and third academic years vs. last-year and first-year students had less-positive attitudes and lower sense of community, because most of their curricula consisted of practical courses and summer field internships (6). In the current study, at least two-third of students considered the teaching skills and compliance of the instructors with the distance education system not sufficient. This seems notable given that first-year students comprised the 66.7% of our study population, as followed by the second-year (15.6%) and fourth-year (17.7%) students. In this regard, it should be noted that the emergency remote teaching adopted in times of pandemic is configured as a temporary change, with no time for planning or preparedness for this type of teaching, and the teacher is the one who creates and organizes their classes, intermediates via technology with the students (8,34,35). Hence, the lower satisfaction with distance education reported by students, as in the current study, under the pandemic conditions may also be related to unexpected sudden introduction of distance education on a large scale, allowing for inconsistencies with underdeveloped medical curricula, technical difficulties and inadequate level of preparedness among the teachers (12,29).

Accordingly, to increase the quality of learning, this emergency remote teaching should be converted into intentional remote teaching which is based on carefully built infrastructure comprising of technologically versatile lecturers, and an organizational process of teaching with standardized activities and teaching materials via teaching staff, the pedagogical team and the managers (8,12,34,36).

Our findings also indicate the significant impact of sociodemographic features on personal view and experience of students regarding the distance education, with consideration of ability to record and later access to live lectures by males and pacing options by females as the main advantages of distance education, while more frequent report of technical problems by students living in urban areas and need for self-motivation/discipline by those living in rural areas as the main disadvantages of distance education. Previous studies from Turkey revealed inconsistent findings regarding the impact of sociodemographic factors on the attitudes and preferences of students related to the distance education during pandemic. Some studies reported significant gender influence on attitudes towards the distance education with higher scores for the preference and utility of distance education among male students, while others indicated the presence of positive attitudes towards the distance education experience overall with no significant difference between male and female students (17-21).

Given the potential impact of sociodemographic features on students' expectations regarding distance education as well as on the use of technology or tools employed in distance education (16), our findings emphasize the value of exploring sociodemographic characteristics of distance learners to develop an improved framework or model of the distance education system that meets the needs in terms of the accessibility to the system, preferred communication technology and course content (37).

Limitation

Certain limitations to this study should be considered. First, the cross-sectional study design limits the ability to make causal inferences. Second, potential lack of generalizability seems another important limitation due to small samples size.

CONCLUSIONS

In conclusion, our findings revealed that distance education experience during COVID-19 pandemic was considered not satisfactory, particularly for practical-based courses, by most of health science students. Although, problems related to the technical and infrastructural resources, the compatibility of content and learning materials with the purpose of the course and the teaching skills and compliance of the instructors with the distance education system were considered as the major challenge in distance education, the ability to record and later access to live lectures and pacing options were considered the main advantages of distance education. Given the potential impact of sociodemographic characteristics and type of university on expectations and real-life experience of distance education, our findings emphasize the role of implementing distance education within a framework improved in terms of organizational process and infrastructure comprising of technologically versatile lecturers as well as in terms of meeting the learning objectives as well as student's expectations.

Conflict of Interest

The author declares that she has no conflict of interest

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