Covid-19 Pandemi Yönetimi Uzaktan Eğitim Programının Etkililiği
Effectiveness Of Covid-19 Pandemic Management Distance Education Program

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Özet

Amaç: Bu çalışma, COVID-19 pandemi sürecinde intörnlere yönelik hazırlanmış uzaktan eğitim programının etkililiğini paylaşmayı amaçlamaktadır.

Yöntem: Tek grup öntest/sontest deneyselçalışma düzeneğinde bir program değerlendirme çalışmasıdır. The Paired Samples T Test, Independent Sample t test, McNemar testi kullanılmıştır. Etki büyüklüğü için Cohen analizi yapılmıştır, nicel ve nitel veriler etkililik tartışması için birlikte yorumlanmıştır.

Bulgular: Öğrencilerin programdan memnuniyet düzeyi 10 üzerinden 7,8±1,6 (medyan:8)'dur. Pretest ortalaması 16,6± 2,9 (Medyan: 17; Min-max: 3-23) iken, posttest ortalaması 20,6± 3,2 (Medyan: 21; Min-max: 10-26) 'tır. Etki büyüklüğü Cohen's d=1,13 olarak bulunmuştur. Program sonunda öğrencilerin Türkiye ve DSÖ'nün mücadelede başarılı olduğuna yönelik görüşleri netleşerek artış göstermiştir (p=,000). Türkiye'de bu kadar COVID-19'un yaygınlaşmasının nedenini İslamik inancı nedeniyle S.Arabistan'ı ziyarete gidenler olarak gören öğrenci sayısında artış olmuştur (p=,000).

Sonuç: Öğrencilerin bilgi düzeyleri arttıkça yeterlik algılarının da arttığı, memnuniyet oranlarının yüksek olduğu görülmüştür. Nitelikli uzaktan eğitim özelliklerine bakıldığında ve etki büyüklüğü de göz önüne alındığında programın etkili olduğu sonucuna ulaşılabilir. Bu çalışma öğrenen gereksinim duyduğunda hiçbir kurumsal zorunluluk ve başarı baskısı olmadan da etkili öğrenmenin kısıtlı koşullarda da gerçekleşebileceğinin teyidi olarak kabul edilebilir.

Abstract

Aim: The current research aims to share the effectiveness of the distance education program designed for interns during COVID-19 pandemic.

Methods: It is a program evaluation study in a single group pretest-posttest experimental research design. The Paired Samples T-Test, Independent Sample t test, McNemar's test was used. The effect size was calculated by Cohen analysis. Quantitative and qualitative data were interpreted together for the discussion of effectiveness.

Results: The level of satisfaction of students with program was 7.8±1.6 points out of 10 (median:8). The average of pretest and posttest scores respectively referred to 16,6±2,9 (Median:17; Min-max:3-23) and 20,6±3,2 (Median:21; Min-max:10-26). As a measure of effect size the value of Cohen's d was found to be 1.13. At the end of the program, the opinion of the students regarding the success of Turkey and WHO in fighting against virus became clear and showed an increase (p=,000). Also, the number of students, blaming the pilgrims who had visited Saudi Arabia for their faith for the substantial spread of COVID-19, has increased (p=,000).

Conclusions: The program is effective considering the quality of its features and the size of its effect. This study can be accepted as a confirmation that effective learning can be realized in limited conditions without any success pressure when the learner needs it.

INTRODUCTION

COVID-19 pandemic has already taken its place among the most important historical events of the 21st century (1,2). It emerges not only as a public health threat but also causes massive economic, social, and educational disruptions. The education in the Faculties of Medicine has been suspended for a while, and education strategies have varied across countries and institutions (3). One of the most controversial topics is about the final year medical students, namely interns or family medicine practitioners (3,4,5).

Italy and UK have expedited the procedure for medical school graduates entering the workforce (4). Australia's final year medical students are being fast-tracked into early service as clinical assistants in a bid to bolster health systems (5). The Association of American Medical Colleges (AAMC) called for a suspension of activities that involve students interacting with patients and strongly suggested that medical students not be involved in any direct patient care activities unless there is a critical health care workforce need locally (3). There are disagreements among interns over this issue. Some students state that it is the responsibility of the supervising faculty to assure the safety of medical students within

their scope of practice, and they should not be in a healthcare or education setting without protective equipment provided for paid healthcare professionals, and without being safely assigned to clinical tasks. It was argued that medical students are learners and not essential workers, and without the protection's students are disadvantaged within the medical hierarchy (6).

On the other hand, another group of scholars has suggested that this year's graduating medical students should be free to make their own decisions about participation in the pandemic response, and the opportunity for this voluntary participation may be most appropriate for students with substantial clinical experience, and also all healthcare professionals, including medical students, have a role to play in tackling this pandemic (7).

On March 11, 2020, The World Health Organization (WHO) declared the novel coronavirus-COVID-19 outbreak a global pandemic and Turkey announced the first confirmed coronavirus case in the country (8,9). As of March 16, education at all universities in Turkey was suspended for a week, then it was decided that the higher education institutions will allow students to complete their training via distance education (10). The arrangement for the early graduation of medical students has raised the similar issue in Turkey, and suggestions for improving the competencies of interns regarding COVID-19 was pointed out in the Association for Evaluation and Accreditation of Medical Education Programs (TEPDAD) proposal of March 20, 2020 (11). Within this context, 'Management of COVID 19 Pandemic' Distance Education Program oriented toward interns was held in our faculty and was implemented from 11 to 30 April 2020.

Intervention: 'Management of COVID 19 Pandemic' Distance Education Program Needs Analysis and Establishing a Sense of Urgency

A questionnaire to measure the expectations of students regarding their education was administered to students in all six grades between 24 and 30 March 2020, and a total of 1375 students responded to the survey. The analysis of the questionnaire revealed that medical students, particularly interns, are treated as a source of knowledge by family members and friends, thus they need to broaden and deepen their knowledge about the situation, and they raise concerns related to incompetence of being graduated early. A total of 68,1 percent of medical students (n=937) reported that they wanted to receive evidence-based distance-education related to COVID-19 and pandemic management (12).

Individual and national requirements have actually triggered and shaped the development of 'Management of COVID-19 Pandemic' Distance Education Program. The sense of urgency is an essential starting-point that triggers trainers and management (13).

Establishment a working team

A team was formed to plan, manage, monitor and evaluate the program. This multidisciplinary team, including public health, family medicine, microbiology, infectious diseases, emergency medicine, and psychiatry specialists are responsible for developing resources, preparing tests, configuring tasks, answering the questions of students, and giving feedback to the ascribed tasks. Department of Medical Education has been involved in the development and evaluation of the program as coordinator. One student from 5th grade and one student from 6th grade participated in the team. These students have played an important role in improving the system, maintaining communication as well as improving peer assistance.

Setting Goals

The definition of competency about COVID-19 in the coronavirus pandemic has been investigated for a physician who can work in

primary health care and emergency services. Six modules were identified through opinions of specialists and literature review. The modules have been created by taking into account not only the biological but also the psychosocial and educational aspects of the disease.

Determination of Educational Methods

Moodle and Blackboard are world's most popular Learning Management Systems (LMS) used at Faculty of Medicine (14). We used Moodle as LMS in this program. In addition, Telegram and Zoom applications were used to maintain communication with students, and Google Meeting was preferred for face-to-face connections.

The program content is composed by multiple training methods and techniques appropriate to different learning styles. We opt learner-centered approach as a basic strategy, provide Turkish and English resources to our students, and they are encouraged to become independent learners. Presentations, live links, question and answer sections, case analyses, tasks and mini exams are installed on the system. Each module has an estimated time to completion, and students use the time to read resources, complete tasks assigned, discuss questions if any, and perform their own tests at the end. The learning objective of each module and their sources are clearly presented to the students to facilitate their learning. Two live links were organized to answer participant's questions, conduct face-to-face discussion, and share experiences. Two instructors, one public health specialist and one infectious disease specialist participated in a Google Meet video conference.

Infrastructure and Implementation

Online instructor should perform pedagogical, managerial, social and technical roles, and training of trainers should be conducted to develop these skills (15,16). This year Moodle has found a widespread use in our faculty. As part of our capacity building work, we delivered face to face training events on the use of Moodle for trainers in June 2019. Given the fact that the sixth-grade students have not experienced the Moodle System previously, both the system and the program were introduced via Zoom before the program started, and students were informed about timetables, reading materials, associated links, guidelines of tasks, and simulations.

Simple and user-friendly social media tools such as Telegram, Moodle, WhatsApp and e-mail were used for written communication. Also, the phone number of the coordinator was shared for voice calls with students.

The program is configured in the Moodle platform and accessible through https://eport.tip.omu.edu.tr/login/index .php. (System screenshot is displayed in APPENDIX 1).

The interns are introduced to system and have access to it with their institutional mail and password. Each module typically comprises two days of training with the transition to the new module on the third day. Resources are constantly being updated. Start and update of modules are shared with students via announcements on the System. Questions raised by both students and trainers are discussed in the question-answer part to provide an interactive environment.

Curriculum delivery is typified by blended mod. As for the synchronous tools, the great advantage is the simultaneous interaction among everyone. The synchronous option has the advantage of allowing for instant interaction and feedback, while the asynchronous mode allows for more control of pace and timing (17). While the program basically runs in asynchronous mode, Moodle discussion forum is used for student participation and interaction, and two face-to-face and online sessions has been held in a synchronous mode.

Assessment

After the completion of the five modules students participate in true-false test with 10 questions and take multiple-choice pretest and posttest with 26 questions. Students can take pre-posttest only once. The students were given feedback about their test performance. Moodle system presents students' answers and exam analysis for each test.

Tasks are designed to enable the students to practice and experience what they learned. Those defined by students are evaluated and feedback is given by lecturers. All assessments are designed to serve formative purposes, and test completion reports are shared with students at the end of the program. The program outline is presented in Table 1.

The purpose of this study is to share the effectiveness of the distance education program designed for medical students during COVID-19 pandemic. No data regarding the evaluation of COVID 19 education program is available yet in the literature, and this study will fill this gap.

METHODS

Study Type

This study, focused on program evaluation, is basically concerned with Distance Educational Program, called 'Management of COVID-19 Pandemic', for sixth grade students. Kern's six steps of curricular development were followed (18). Kirkpatric' model outlines four levels of training evaluation. Since the focus is on the early results of the program, two levels of Kirkpatrick's model, satisfaction, and success, were assessed during the evaluation phase (19).

Study Design

We use the triangulation strategy of mixed methods study design in which quantitative and qualitative data are collected, analyzed, and interpreted simultaneously (20).

This study used a single group, pretest-posttest experimental design to present the effectiveness of "Management of COVID-19 Pandemic' program.

Sample

A total of 296 interns attending the faculty were enrolled in the system. The students enter the system on a voluntary basis. As it is an experimental design, only the students completing the pretest and posttest were included in the study. A flowchart of the study is depicted in Figure 1.

1. Pretest/Posttest Knowledge

It is performed just before and at the end of the program and prepared by researchers. It is composed of 26 multiple choice questions measuring level of knowledge covered by the test objective.

2. Pretest/Posttest Perception

It is performed just before and at the end of the program and prepared by researchers. It consists of 8 statements that refer to the success in the pandemic fight (five likert type), reasons of spread (five likert type) and individual concerns (three likert type).

3. Program Evaluation Survey

It is a questionnaire used to find out student's opinions about the effectiveness of the program at the end. It is a 9-questions survey which contribute to the assessment of overall program and its components. There is also includes a space that the students can clearly write their opinions on.

4. Moodle System Evaluation Survey

It is a questionnaire designed to evaluate the infrastructure of the distance program, and to be answered by students at the end of the program. This 9-item survey quantifies the infrastructure, usability, feedback and grading as well as interaction features of the Moodle System.

Table 1. Program Outline

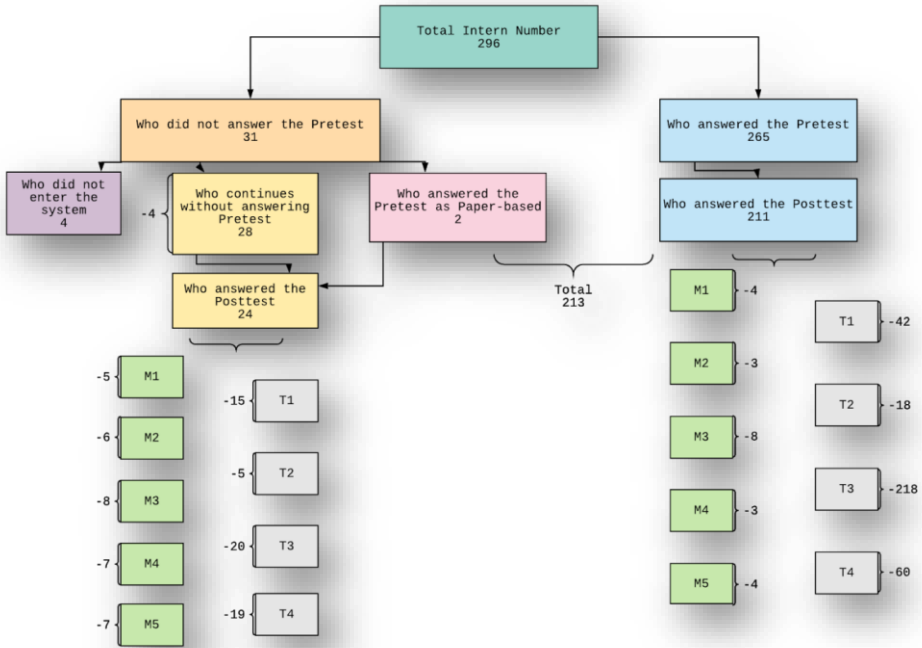| Module	Section	Active user	Time date
Greetings	Meeting with Students on Zoom		April 11th
Beginning	Introduce yourself and your expectations	Filled by students	Always open
	About program/matrix and E-port user guide	Info	
	Questions-answers- Announcements	Filled by students/teachers- Filled by teachers/coordinator	
	Pretest	Filled by students	April 12th
M1: Coronaviruses and COVID-19	Presentations /Materials/Guides/ algorithms	İnfo	April 13-14th
	T1*: Management of COVID with Simulation	Filled by students/feedback by teachers: Diagnosis and treatment planning/execution over 3 cases in simulation environment	
	EME_1: What We learned? and What You Wonder?	Filled by students	
M2: Outbreak Management	Presentations /Materials/Guides/ algorithms	Info	April 15-16th
	EME_2: What We learned? and What You Wonder?	Filled by students	
	T2: Filiation	Filled by students/feedback by teachers: To analyze the patient through a structured scenario and to create a filiation scheme	
M3: Community Education	Presentations /Materials/Guides algorithms	Info	April 17-18th
	EME_3: What We learned? and What You Wonder?	Filled by students	
	T3: Interviewing with the quarantined person	Filled by students/feedback by teachers: Video/audio interview with a contact in accordance with the guide	
	Meeting with Students on Google Meeting	With student and teacher participation	April 18th
M4: Clinical Skills	Presentations /Materials/Guides/ Videos algorithms	Info	April 19-20th
	EME_4: What We learned? and What You Wonder?	Filled by students	
M5: COVID-19 and Mental Health	Presentations /Materials/Guides algorithms	Info	April 21-22nd
	EME_5: What We learned? and What You Wonder?	Filled by students	
M6: Corona in Turkey and World	Links: Associations, WHO, Ministry of Health and Current Articles	Info	April 23-24th
	T4: Interpretation of the Fighting Process	Filled by students/feedback by teachers: An article answering the following questions. What is the strength, weakness, opportunity and threat of the World Health Organization and the Ministry of Health in the process of managing the COVID-19 pandemic?	
	EME_6: What We learned? and What You Wonder?	Filled by students	
	Meeting with Students on Google Meeting	With student and teacher participation	April 27th
English Sources	Links: Associations, WHO, Corona Textbook, Harward Medical School Students' Study etc.	Info	Always open
Evaluation	Posttest	Filled by students	April 30th 23.59
	Program/Moodle System Evaluation	Filled by students	
	Activity Report	Filled by coordinator	3 May 2020

*Task; **End of Module Exam

Figure 1. Flowchart of study

M: End of Module test; M1: Corona and COVID 19; M2: Outbreak Management; M3: Community Education; M5: Clinical Skills

T: Task; T1: Management of COVID with Simulation; T2: Filiation; T3: Interviewing with the quarantined person; T4: Interpretation of the Fighting Process

* The numbers outside the boxes show individuals who have not responded to the test/task.

** The solutions have provided to students having technical problems.

Collection of Data

Care was taken to anonymize the usernames, and Program evaluation and Moodle System Evaluation Survey was hosted in Google Forms and linked to the consent web page. All the other data were collected across infrastructure provided by Moodle system.

Analysis of Data

IBM® SPSS® Statistics V20 was used for statistical analysis of the data. Data were expressed as mean±standard deviation, median (minimum–maximum), and number (%). The Kolmogorov-Smirnov test was used to evaluate the conformity of the quantitative data distribution to a normal distribution. The Paired Samples T Test was used for binary groups, and the Independent Sample t test was used for comparisons of two independent groups. McNemar's test was used to measure the change in student perceptions between pretest and posttest by joining the study group.

The statistical significance level was accepted as $p \leq 0,05$ for all tests. The magnitude of the effect size is measured according to the categories proposed by Cohen.

Descriptive content analysis methods were used for analyzing the qualitative data, and those data were categorized in terms of similarity and difference.

Ethical Statement

The Clinical Research Ethics Committee of Ondokuz Mayıs University Medicine Faculty approved this study (OMU KAEK protocol no: 2020/152).

RESULTS

Satisfaction Level of Students

The general level of satisfaction of students with program was 7.8±1.6 points out of 10 (median:8). Students scored the program as a 4/5 for program content, duration, methods, educational quality, resources and problem-solving ability.

The Moodle System showed a satisfaction level of 3.9±0.9 points out of 5. The results showed that the students appreciated the system for accessibility (4,2±0,9), complexity (2.0±0.9), transparency (3.9±0.9), and feedback (3.9±0.8). (Table 2. The opinions of students about program and Moodle System)

We classified the verbal expressions of students into five categories:

a. Statements about content and benefit: Pleasant, useful, successful, efficient, instructive, entertaining, awareness-raising, information developer and updater, wide, full, stress reliever, competence developer, self-confidence building (47). Sample statements:

It was a very comprehensive training process that could approach the COVID-19 pandemic process in every aspect. (S64) (*Student number64)

It helped me a lot about how to approach the coronavirus pandemic biopsychosocially. It was a successful practice. (S74)

This program was extremely helpful in increasing my knowledge about COVID-19 (S69)

... I feel more confident about being a doctor than I did last year. (S102)

I feel confident and well-informed about COVID-19, and I am not scared of it.

I want to graduate from faculty. (S40)

You have decreased my anxiety about being assigned and starting to work immediately. (S15)

b. Statements about resources: resources with similar content (12), resource diversity (7), ability to access current and accurate information (3), increasing number of live broadcasts and/or expanding experience sharing (3). Sample statements:

It has enabled us to access information from reliable sources in the disinformation environment. (S99)

... a number of new resources were added to the program, and they had identical items (S83)

Live broadcasts were helpful and contributory. I would like to meet personnel working in the field of filiation to listen his experiences and to observe the system conducted by Ministry of Health. (S5)

c. Statements about tests: Intensifier, feedback provider (9). Sample statements:

Posttests helped to reinforce learning. (S106)

...I have evaluated my progress with pre- and post-tests. (S41)

d. Statements about tasks: Compelling video recording (11), slow loading simulation but instructive, increasing the number of simulation cases (12), excess number of tasks (3)
Sample statements:

Simulation cases can be developed by adding additional diagnoses. Video recording task took a lot of time and effort, so simple tasks may be more amenable to explicit. (S17).

e. Statements about infrastructure: Online education, e-port design, feedback feature (12)

making me happy by giving feedback on the task of meeting with contact persons. (S44)

Table 2. Students' Opinions on The Program and Moodle System

	Statements	5 n (%)	4 n (%)	3 n (%)	2 n (%)	1 n (%)	Median (min-max)	Mean± SD
Program (n=111)	Program duration was sufficient	72(64.9)	24(21.6)	8/7.2)	5(4.5)	2(1.8)	5(1-5)	4.3±0.9
	The program content was sufficient	74(66.7)	29(26.1)	6(5.4)	1(1.1)	1(0.9	5(1-5)	4.6±0.7
	Educational methods such as presentations, videos and live broadcasts were used for the purpose	68(57.7)	28(25.2)	12(10.8)	1(0.9)	2(1.8)	5(1-5)	4.4±0.9
	Infrastructure of distance education system was sufficient	64(57.7)	31(27.9)	11)9.9)	3(2.7)	2(1.8)	5(1-5)	4.4±0.9
	Trainers' performance in designing the system, presentations, and tasks was appropriate and sufficient.	57(51.4)	32(28.8)	17(15.3)	5(4.5)		5(1-5)	4.3±0.9
	Information resources (electronics and information consultant) were available and sufficient	70(63.1)	26(23.4)	11(9.9)	2(1.8)	2(1.8)	5(1-5)	4.4±0.9
	Problems arising during the program process could be solved	59(53.2)	32(28.8)	17(15.3)	1(0.9)	2(1.8)	5(1-5)	4.3±0.9
	Pre/post-tests and modules developed achievements	55(49.5)	37(33.3)	14(12.6)	3(2.7)	2(1.8)	4 (1-5)	4.3±0.9
	Please assign a value between 1 and 10 to evaluate the program (10 very good, 1 very bad)						9(1-10)	7.8±1.6
Moodle (n=85)	I reached the lessons/tasks/resources easily	37(33.6)	40(36.4)	1 (0.9)	3(2.7)	4(3.6)	4(1-5)	4.2±0.9
	I needed help using the system	2(1.8)	23(20.9)	9(8.2)	34(30.9)	17(15.5)	2(1-5)	2.5±1.2
	I found the system complicated	2(1.8)	4(3.6)	9(8.2)	46(41.8)	24(21.8)	2(1-5)	2.0±0.9
	Working in an electronic environment was enjoyable	10(9.1)	33(30)	19(17.3)	19(17.3)	4(3.6)	4(1-5)	3.3±1.1
	I am glad to see the instructor's feedback on the system instantly	17(15.5)	58(52.7)	6(5.5)	3(2.7)	1(0.9)	4(1-5)	4.0±0.8
	I am satisfied with the instructor's feedback process via Moodle system	16(14.5)	53(48.2)	9(8.2)	6(5.5)	1(0.9)	4(1-5)	3.9±0.8
	The feedback about the tasks was useful	8(7.3)	53(48.2)	18(16.4)	5(4.5)	1(0.9)	4(1-5)	3.7±0.8
	I saw the score I got from the task easily	19(17.3)	50(45.5.)	8(7.3)	6(5.5)	2(1.8)	4(1-5)	3.9±0.9
	I am generally satisfied with the Moodle process	17(15.5)	54(49.1)	6 (5.5.)	4(3.6)	4(3.6)	4(1-5)	3.9±0.9

Students' Achievements
Change in students' level of knowledge before and after the program:

Two hundred and thirteen of the students participating in the study answered pretest and posttest questions. Of these, 121(56,8%) were women and 92 (43,2%) were men. The results showed that the *mean pretest score was* 16,58± 2,85 (Median: 17; Min-max: 3-23) *while the mean posttest* score was 20,58± 3,20 (Median: 21; Min-max: 10-26). While 22.53% of the students got high score in pretest, this rate increased to 76.99% in posttest. Pre-posttest correct answer distribution is shown in Table 3.

Table 3. Pretest-Posttest Correct Answer Distribution

Number of Correct Answers	Pretest n (%)	Score Out of 100 n (%)	Posttest n (%)	Posttest n (%)	Out of 100 n (%)	Statistics
3	1(0.5)		10	1(0.5)		
8	1(0.5)		11	2(0.9)	Low ≤50 5(2.35)	
10	3(1.4)	Low ≤50 30(7.60%)	12	1(0.5)		
11	3(1.4)		13	1(0.5)		
12	8(3.8)		14	6(2.8)		
13	14(6.6)		15	6(2.8)		
14	17(8.0)		16	7(3.3)	Medium 51-69 44(20.66%)	
15	21(9.9)		17	9(4.2)		λ^2 =44.506 p=0.000
16	27(12.7)	Medium 51-69 149(69.95%)	18	16(7.5)		
17	37(17.4)		19	35(16.4)		
18	33(15.5)		20	29(13.6)		
19	20(9.4)		21	31(14.6)		
20	11(5.2)		22	10(4.7)	High ≥70 164(76.99%)	
21	11(5.2)	High ≥70 48(22.53%)	23	28(3.1)		
22	2(0.9)		24	8(3.8)		
23	4(1.9)		25	7(3.3)		
			26	16(7.5)		

*N=213; 121(56,8%) were women and 92 (43,2%) were men.

There was a significant increase in the students' level of knowledge after the training program (t=-16,4, df=212, p<0,001, Cohen's d=1,13). Although this increase was seen in both sexes, women had higher scores than men (Table 4: Change in knowledge levels by gender)
Cronbach's alpha for pretest and posttest scores were 0.51 and 0.68 on the reliability analysis of the tests. Correct answer distribution according to pre-posttest targets is given in Table 5.
A significant difference was found in all questions except for the one related to radiological diagnosis and treatment.

Table 4. Change In Knowledge Levels by Gender

	Pretest	Posttest	t	df	p*
Kadın	16,7±2,6 (10-23)	21,0±3,0(10-26)	-13,2	120	0,000
Erkek	16,2±3,0 (10-26)	20,0±3,3 (11-26)	-9,8	91	0,000
t**	1,26	2,24			
df**	211	211			
p**	0,207	**0,026**			

*Paired t test, ** student t test

Table 5. Pre-Posttest Correct Answer Distribution According to Targets

	Learning outcomes	True n (%) Pretest	True n (%) Posttest	Statistics λ^2	p
	M1. Corona and COVID-19				
1	to be able to explain the transmission way of coronavirus	189(88,7)	198(93,0)	1.231	0.267
2	to be able to explain the clinical features of coronavirus	181(85,0)	203(95,3)	10.05	**0.002**
3	to be able to distinguish the suspect, possible and confirmed case	199(93,4)	207(97,2)	1.02	0.31
4	to be able to explain what to do in the detection of a possible case	141(66,2)	181(85,0)	8.480	**0.004**
5	to be able to manage a patient presented with clinical features and PCR result	157(73,7)	184(86,4)	8.373	**0.004**
	M2. Management of Outbreak				
6	to be able to list pandemic diseases	90(42,3)	115(54,0)	6.86	**0.009**
7	to be able to explain the information collected in pandemic	62(29,1)	102(47,9)	11.672	**0.001**
8	to be able to explain the concept of filiation	109(51,2)	123(57,7)	17.457	**0.000**
9	to be able to explain the processes in contact person scanning	208(97,7)	213(100)		
	M3. Community Education				
10	to be able to explain the concept of eradication	208(97,7)	212(99,5)	41.796	**0.000**
11	to be able to explain the concepts such as pandemic, isolation, quarantine, ending the pandemic, surveillance, incubation, social distancing, herd immunity properly.	124(58,2)	162(76,1)	1.443	0.230
12	to be able to make suggestions to the public about physical activity during the social isolation period	200(93,9)	203(95,3)	35.280	**0.000**
	M4. Clinical Skills				
13	to be able to explain the proper sampling properties	137(64,3)	171(80,3)	21.887	**0.000**
14	to be able to explain the characteristics of COVID-19 patient care and necessary skills in the hospital	24(11,3)	101(47,4)	8.253	**0.004**
15	to be able to explain the proper usage of personal protective equipment	103(48,4)	166(77,9)	15.036	**0.000**
16	to be able to explain the actions to be taken for the contact healthcare worker	139(65,3)	170 79,8)	2.120	0.145
17	to be able to use algorithms for the follow-up of the inpatient/outpatient	138(64,8)	189(88,7)	4.260	**0.039**
18	to be able to distinguish contact and close contact person	208(97,7)	213(100)		
19	to be able to make risk assessment of healthcare personnel with potential exposure to COVID-19 patients in healthcare environment	182(85,4)	204(95,8)	20.521	**0.000**
20	to be able to explain preventive approaches to protect healthcare workers	56(26,3)	81(38,0)	4.621	**0.032**

	M5. COVID-19 and Mental Health				
21	to be able to list common mental disorders during quarantine	175(82,2)	199(93,4)	15.792	**0.000**
22	to be able to explain how to deal with fear and anxiety in the pandemic process	179(84)	206(96,7)	9.150	**0.002**
23	to be able to explain how the healthcare worker may come over exhaustion	149(70,0)	182(85,4)	3.943	**0.047**
	M6. Corona in Turkey/World				
24	to be able to follow the developments related to COVID-19 in Turkey	201(94,4)	210(98,6)	50.968	**0.000**
25	to be able to follow the developments related to COVID-19 in the world	63(29,6)	141(66,2)	38.484	**0.000**
26	to be able to iidentify reliable sources that can be used to follow the developments related to COVID-19	110(51,6)	175(82,2)	27.431	**0.000**

Students' perceptions of competencies by the end of the program have been changed (Table 6. Students' perceptions of self-efficacy before and after the program). While there were 43 (20.2%) people who thought that it was not competent in any way, 16 (7.5%) people gave this response after the program.

Table 6. Students' Perceptions of Self-Efficacy Before and After the Program

	Abilities	Before n (%)	After n (%)	λ^2	p
1	I can perform CPR	158(74.2)	181(85,0)	47.55	0,00
2	I can perform triage	114(53.5)	155(72,8)	21.55	0,00
3	I can act in accordance with algorithms	101(47.4)	162(76.1)	38.05	0,00
4	I can make filiation	32(15.0)	151(70.9)	9.54	0,002
5	I can manage COVID-19 suspicious case	53(24.9)	139(65.3)	17.07	0.00
6	I can take COVID-19 sample	67(31.5)	147(69.0)	22.19	0.00
7	I can take personal protective measures	126(59.2)	189(88.7)	24.37	0.00
8	I can oxygenate the patient	97(45.5)	127(59.6)	35.22	0.00
9	I can perform intubation	52(24.4)	70(32.9)	41.24	0.00
10	I can treat symptoms	99(46.5)	146(68.5)	35.51	0.00
11	I can treat pneumonia	73(34.3)	119(55.9)	49.57	0.00
12	I can take measures to protect my mental and physical health	108(50.7)	149(70)	33.81	0.00
13	I can give information about the subject	103(48.4)	174(81.7)	12.22	0.00
14	I can do public education	80(37,6)	137(64.3)	23.88	0.00
15	I can follow the developments on the subject from the correct resources	117(54.9)	168(78.9)	15.63	0.00
16	I can do teamwork	140(65.7)	168(78.9)	43.17	0.00
17	I'm not competent by any means	43(20.2)	16(7.5)	9.54	0.002

The opinion of the students regarding the success of Turkey and WHO in fighting against virus became clear and showed an increase at the end of the program (p=,000). Also, the number of students, blaming the pilgrims who had visited Saudi Arabia for their faith for the substantial spread of the COVID-19 has increased (p=,000).

Although the students declared verbally, there was no statistically significant difference in anxiety scores about COVID-19 before and after the program.

Table 7. Change In Students' Opinions About Success, Dissemination and Concerns In Fighting Against Virus

Statements			Post-program*		
Success in the fight			**Ineffective**	**Effective**	**p**
What do you think about Turkey's fight against COVID-19 pandemic?	**Pre***	Ineffective	15(16.9)	74(83.1)	**0.000**
		Effective	0	124(100)	
What do you think about the fight of WHO against COVID-19 pandemic?	**Pre**	Ineffective	110(66.3)	56(33.7)	**0.000**
		Effective	15(31.9)	32(68.1)	
Dissemination			**I disagree**	**I agree**	
The pilgrims who had visited Saudi Arabia for their faith are responsible for the substantial spread of COVID-19 in Turkey	**Pre**	I disagree	53(33.3)	106(66.7)	**0.000**
		I agree	4(7.4)	50(92.6)	
Illegal immigrants are the cause of spread of COVID-19 in Turkey	**Pre**	I disagree	121(83.4)	24(16.6)	0.766
		I agree	21(30.9)	47(69.1)	
The cause of the spread of COVID-19 in Turkey is the people coming from overseas	**Pre**	I disagree	12(48.0)	13(52.0)	0.523
		I agree	9(4.8)	179(95.2)	
The cause of the spread of COVID-19 in Turkey is the young people trying to get out to the street	**Pre**	I disagree	19(48.7)	20(51.3)	0.461
		I agree	26(14.9)	148(85.1)	
Concern			**Yes**	**No**	
Do you have any concern about getting COVID-19?	**Pre**	**Yes**	110(80.3)	27(19.7)	0.233
		No	18(23.7)	58(76.3)	
Do you have any concern about a family member getting COVID-19?	**Pre**	**Yes**	187(94.9)	10(5.1)	0.832
		No	12(75.0)	4(25.0)	

* The groups were unified.

**McNemar Test was performed.

DISCUSSION

The 'Management of COVID-19 Pandemic' program was designed and implemented on the basis of the responsibility and accountability to the medical student/society as well as individual and national needs during the suspension period of education due to viral pandemic. In this study, we wanted to discuss the effectiveness of the program by presenting the change in students' achievements/perceptions before and after the program.

A qualified/effective distance education should meet two parameters: (i) to ensure/sustain student participation, (ii) monitoring/evaluation of implementation and continuous improvement (21).

The program is primarily delivered online through distance education, which became compulsory amid COVID-19 pandemic, without pressure from summative evaluation, and on a voluntary basis.

The number of students participating in/finishing the program is high. There are many strategies to gain and sustain student attention in the literature (13). We find that two types of motivation for participation are intrinsic and extrinsic; a) intrinsic factors are learning desire, need for competence, and curiosity; b) extrinsic factors are graduation through this program, back to faculty to complete graduation and participation in healthcare system during internship, and program methods/strategies for student participation.

Many methods/strategies have been used in our program, such as creating interesting questions, discussing the questions, opening each module on its own day, assigning tasks, performing end-of-module tests, making case analysis and feedback.

Video games are among the recommended strategies, as they can teach higher-order

thinking skills such as strategic thinking, interpretative analysis, problem solving, plan formulation and execution, and promote adaptation to rapid change (22). The use of virtual patients is a key example of game-informed learning in medical education, and simulation-based education was found important in providing appropriate education without endangering students (23).

In our program, a virtual patient program was used to search and/or interpret data, make appropriate clinical decisions, make a diagnosis, formulate a treatment regimen through three different COVID-19 scenarios, students were provided with experience, and they were asked to prepare a report to explain their experiences for each case. This task is one of the most admired tasks of the program according to student feedback, and the reason why relatively few (73.23%) students have completed the task is because the system is slow, students are reluctant to write reports, or computer/internet/phone is incompatible/inadequate.

Instructors should strive to communicate with students more often than face-to-face training programs to motivate students (5). In this context, interactions via Telegram, WhatsApp, Zoom, Google Meeting and Moodle have been one of our most important steps to ensure/sustain student participation.

Content and resources represent important aspects of the program. The initially created blueprints equip students with the resources needed to refer. The initial and end phases of the program coincided with the most intense phase of the COVID-19 pandemic in Turkey, and in this period, information was renewed, and guidelines were constantly updated. They were instantly uploaded to the system, and the students were apprised of the current situation. The subject and the reason for the change were certainly explained during download. It is essential to avoid creating cognitive load in such mechanisms (5). On the other hand, some students put their demand for concise resources, which was perhaps the most challenging part of our program.

Monitoring/evaluation of implementation results prove that students reported that the program was a qualified distance education. The acquisitions gained from the program was high among students during this process. While 48 (22.53%) of the students got high score in pretest, this number increased to 164 (76.99%) in posttest. Only 5 students had ≤50 low score in post-test. Five students were contacted by phone and their opinion on low score and program was asked for, and they stated that they could not use the system (end-module tests, tasks, resources) efficiently.

There is a positive correlation between knowledge level of students and perception of competence. Although the students had training about CPR, triage in their previously curriculum they had low scores in the pre-test. Many videos related to these skills were placed in COVID-19 management program. The reasons for the high-level perception of proficiency in post-test were considered as the revision of the students' existing knowledge and their beliefs in doing so. It has been observed that there is an increase in the number of students who charged the reason for the spread of COVID-19 to those who visited Saudi Arabia due to their Islamic belief. There is no scientific evidence of this judgment, besides there were resources for stigmatization in the mental health module. This is thought to be relevant to the impact of first impressions and media news. In fact, the main point is that such sensitive issues should be discussed face-to-face with experience sharing sessions, not in written materials.

CONCLUSIONS

When this study is examined in terms of qualified distance education features, the quantitative and qualitative data are interpreted together, and the effect size is taken into consideration, it can be concluded that the 'Management of COVID-19 Pandemic' is effective. The aspects of the program that

should be developed are focusing on concise content, developing the simulation program, and emphasizing the subject of stigmatization.

Management of COVID-19 pandemic is the new educational requirement for medical students. Faculties should provide contextual and situated learning opportunity. Well-designed distance education programs, processed with activities that ensure student participation, and carried out with motivated trainers, will fulfill this goal.

This study can be considered as a confirmation that effective learning can take place in limited conditions when learner needs it without the pressure of success.

Limitations And Directions for Future Research

This study is limited to a group of interns, at one faculty. The absence of a resource related to the COVID-19 program failed to provide a discussion environment where we could compare the effect. Our study will be a reference source for the increase of studies on this subject. This program will be available for first to fifth grade students.

In terms of social accountability, research is needed to evaluate such processes in the context of competence.

Acknowledges

REFERENCES

1. Dong E, Du H and Gardner L. An interactive web-based dashboard to track COVID-19 in real time. *The Lancet infectious diseases*. 2020 Available at: https://doi.org/10.1016/S1473-3099(20)30120-1. [Accesed: 15 April 2020].

2. CSSE. COVID-19 Dashboard by the Center for Systems Science and Engineering (CSSE) at Johns Hopkins University (JHU).2020. Available at: https://coronavirus.jhu.edu/map.html. [Accesed 5 May 2020].

3. Miller DG, Pierson L and Doernberg S. The Role of Medical Students During the COVID-19 Pandemic. *Ann Intern Med*. 2020. Available at: https://doi.org/10.7326/M20-1281[Accesed 5 May 2020].

4. General Medical Council. Joint statement: earlyprovisional registration for final year medical students. 2020. Available at: https://www.gmc-uk.org/news/news-archive/early-provisional-registration-for-final-year-medical-students. [Accessed: 10 May 2020].

5. Arandjelovic A, Arandjelovic K, Dwyer K and Shaw C. COVID-19: Considerations For Medical Education During A Pandemic. *MedEdPublish.*2020. https://doi.org/10.15694/mep.2020.000087.1 [Accesed 5 May 2020].

6. Menon A, Klein Ej, Kollars K, Kleinhenz A. Medical Students Are Not Essential Workers: Examining Institutional Responsibility During the Covıd-19 Pandemic. *Academic Medicine*. 2020; 1-9. 10.1097/Acm.0000000000003478

7. Alsafi Z, Abbas AR, Hassan A, Ali MA. The Coronavirus (COVID-19) Pandemic: Adaptations in Medical Education. *International Journal of Surgery* 2020; 78 64–65. Https://Doi.Org/10.1016/J.İjsu.2020.03.083 [Accesed 5 May 2020].

8. Republic of XXX Ministry of Health Public Health Divison. COVID-19 (SARS-CoV-2 Infectıon) Guideline. 2020; 11. Updated at: April 14, 2020. Available at:

https://covid19bilgi.saglik.gov.tr/depo/rehberler/COVID-19_Rehberi.pdf. [Accesed 15 April 2020].

9. World Health Organization. WHO Director-General's opening remarks at the media briefing on COVID-19 – March 11, 2020. Geneva, Switzerland. Available at: https://www.who.int/dg/speeches/detail/who-director-general-s-opening-remarks-at-the-media-briefing-on-covid-19---11-march-2020. [Accesed 15 April 2020].

10. Council of Higher Education. 2020. Available at: https://www.turkiye.gov.tr/yok-ebys. [Accesed 5 May 2020].

11. TEPDAD. COVID 19 Salgını döneminde Tıp Eğitimi ile İlgili TEPDAD Önerileri 20 Mart 2020. Available at: http://tepdad.org.tr/announcement/4. [Accesed 5 May 2020].

12. Aker S, Mıdık Ö (2020) The Views of Medical Faculty Students in Turkey Concerning the COVID-19 Pandemic. *Journal of Community Health*. Published online: 15 May 2020 https://doi.org/10.1007/s10900-020-00841-9

13. Taha MT. Abdalla ME Wadi M and Khalafalla H. Curriculum Delivery ın Medical Education During an Emergency: A Guide on The Responses to The Covıd-19 Pandemic. *MedEdPublish*. 2020. DOI: 10.15694/mep.2020.000069.1. [Accesed 5 May 2020].

14. Baig M, Gazzaz ZJ, Farooq M. Blended Learning: The impact of blackboard formative assessment on the final marks and students' perception of its effectiveness. *Pakistan Journal of Medical Sciences Online 2020;* 36(3). DOI: 10.12669/pjms.36.3.1925. [Accesed 10 May 2020].

15. Kwon K, Park SJ, Shin S and Chang CY. Effects of different types of instructor comments in online discussions. Distance Education. *Taylor&Francis*. 2018; 40(2): 226-242.

16. Philipsen B, Tondeur J, Roblin NP, Vanslambrouck S and Zhu C. Improving teacher Professional development for online and blended learning: A systematic meta-aggregative review. Educational Technology Research and Development. *Springer*. 2019; 67(5): 1145-1174.

17. Ellaway R, Masters K. AMEE Guide 32: E- Learning in Medical Education. Part 1: Learning teaching and assesment. *Medical Teacher*. 2008; 30(5): 455-473.

18. Kern DE, Thomas PA, Hughes MT. *Curriculum Development for Medical Education*. A Six-Step Approach. 2nd Edition. John Hopkins University Press, Baltimore, 2009.

19. Smidt A, Balandin S, Sigafoos J, Reed VA. The Kirkpatrick model: A useful tool for evaluating training outcomes. *Journal of Intellectual & Developmental Disability*. 2009; 34(3):266–27

20. Creswell, JW. *Research Design. Qualitative, Quantitative, And Mixed Methods Approaches*. London: Sage Publications, 2003

21. Sandars J. Correia R, Dankbaar M, de Jong P, Goh PS, Hegel I, Masters K, Oh SY , Patel R, Premkumar K, Webb A, Pusic M. Twelve tips for rapidly migrating to online learning during the COVID-19 pandemic. *MedEdPublish*. 2020 https://doi.org/10.15694/mep.2020.000082.1 [Accesed 10 May 2020].

22.   Singhal S, Hough J, Cripps D. Twelve tips for incorporating gamification into medical education. *MedEdPublish. MedEdPublish. 2020.* DOI: https://doi.org/10.15694/mep.2019.000216.1 [Accesed 10 May 2020].

23. Deng A, Wang JJ, Tsui CH. Keeping Trainees Safe in A Pandemic: The Evolving Role of Medical Simulation Training. *J Can Anesth.* 2020. https://Doi.Org/10.1007/S12630-020-01662-Z [Accesed 10 May 2020]