

Attitude of Iranian Orthopedic Residents towards Online Education Programs in COVID-19 Pandemic

Reza Jahanshahi ^a, Adel Ebrahimpour ^b, Hossein Mohebbi ^c, Shiva Momen ^d, Mehrdad Ghobadi ^e, Javad Ahmadlou ^e, Peyman Zia ^f, Mehdi Aarabi ^{g,h}, Seyyed-Mohsen Hosseinienejad ^{f,h*}

^a Golestan University of Medical Sciences, Gorgan, Iran; ^b Shohada-e Tajrish Hospital, Shahid Beheshti University of Medical Sciences, Tehran, Iran; ^c Kermanshah University of Medical Sciences, Kermanshah, Iran; ^d Mazandaran University of Medical Sciences, Sari, Iran; ^e Bone and Joint Reconstruction Research Center, Shafa Orthopedic Hospital, Iran University of Medical Sciences, Tehran, IR Iran; ^f Shahid Beheshti University of Medical Sciences, Tehran, Iran; ^g Toronto East General Hospital, University Health Network, Toronto, Ontario, Canada; ^h Connective Tissue Rheumatology Research Center (JBCRC), Golestan University of Medical Sciences, Gorgan, Iran

*Corresponding Author: Seyyed-Mohsen Hosseinienejad; Akhtar Hospital, Shahid Beheshti University of Medical Sciences, Tehran, Iran; E-mail: hosseinienejad.s.mohsen@gmail.com

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Abstract

Introduction: The current COVID-19 pandemic has imposed different educational challenges such as introducing online educational programs during medical residency. The purpose of this study was to assess the attitude of orthopedic surgery residents towards online educational methods during the residency. **Methods and Materials:** This cross-sectional study was performed to investigate the attitude of 150 Iranian orthopedic surgery residents towards online medical educational programs during the COVID-19 pandemic with administration of an 8-items previously designed questionnaire. **Results:** One hundred and eleven out of 150 orthopedic surgery residents (74%) completed the survey; 89 % of them reported using online methods, the most common of which was online webinars (84 %). They also reported using Sky room (76 %) to participate in clinical rounds and educational programs. A satisfaction rate of 8.2 out of 10 was reported towards online webinars. The main issue reported by participants was the poor internet connection and speed. 91.8 % of residents believed that continuing online education in residency would be beneficial. **Conclusion:** Orthopedic surgery residents believed that online educational programs can be favorable and useful enough to be continued after COVID-19 pandemic.

Keywords: Medical Education; Orthopedics; COVID-19; Internet

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Introduction

The COVID-19 pandemic might be continued and poses numerous challenges for people of all nationalities, including Iranians. Among those challenges are educational ones in the medicine field including surgical educational programs (1-3). Governments advise people to stay at their home in order to prevent the disease spread. As a result of such actions, the numbers of patients' referrals, outpatient visits, and inpatient admissions have been decreased in different surgical wards such as orthopedic surgery. Academic meetings and group

discussions have also been introduced as part of efforts to reduce COVID-19 spread and the burden on health care staff managing the educational programs as well (1-4).

Educational programs must use new strategies to provide patients' care while ensuring the health concurrent with education of medical residents. Accordingly, teaching lectures have been promoted to be delivered online in form of webinars through various platforms such as Zoom, Microsoft, Skype, etc. (5). Medical residents are now engaged with such technologically enhanced approaches during education (6, 7).

Table 1. Items of the online education survey

Survey	Num. (%)
1 Have your training programs been virtual and online since the start of the COVID-19 pandemic?	Yes: 99 (89%) No: 12 (11%)
If the answer is yes, answer the question 2, and if the answer is no, refer to question 7	
2 Which types of online modalities do you participate in?	Social networking groups (such as WhatsApp): 41 (46%) Webinar: 76 (84%) Video surgeries: 11 (10%) Online exams: 17 (15%) Online consulting: 25 (22.5%) Video conferencing: 20 (18%) Other: 8 (7%)
3 Which platforms do you usually use?	Microsoft: 15 (14%) Sky room: 84 (76%) Zoom: 0 Others: 12 (10%)
4 How do you evaluate these online modalities? 1; unsatisfactory to 10; satisfactory (%)	Social networking groups (such as WhatsApp): 7.4 (68%) Webinar: 8.2 (76%) Video surgeries: 4.6 (56%) Online tests: 2.3 (43%) Online consulting: 3.8 (40%) Video conferencing: 2.1 (35%) Other: not rated
5 What problems do you experience with online education?	Electronic Systemic problems (low speed internet, audio and video problems): 42 (38%) Lack of practical and clinical education: 19 (17%) Decreased concentration due to home/environmental distractions: 29 (26%) Interference in scheduling and multiplicity of programs: 18 (16%) Others: 3 (3%)
6 Which events do you prefer to continue after the pandemic is over?	Social networking groups (such as WhatsApp): 38 (34%) Webinar: 75 (68%) Video surgeries: 12 (11%) Online exams: 24 (22%) Online consulting: 23 (21%) Video conferencing: 16 (14%) Other: 5 (4%) None rated: 4 (3%)
7 Do you believe that online education should be continuing after the pandemic era?	Yes: 102 (92%) No: 9 (8%)
8 Do you think that after the pandemic era, trainings for groups of less than 100 members should be performed online?	Yes: 95 (85.5%) No: 16 (14.5%)

In an attempt to maintain a reasonable number of educational programs for residents, most of the academic centers in Iranian universities have shifted to online resources.

An online education is applied by the use of internet -based resources for teaching and learning (8, 9). The advantages of online learning in the surgical setting include easy access, platforms accommodating a wide variety of learning styles, and effectively teaching a broad array related to surgical methods (10). Also, the medical trainees including residents, regardless of

their current situation, could have access to different webinars and unprecedented courses regularly (11).

According to a previous study, surgical residents who use e-learning programs are more satisfied with their learning experience than those who use traditional teaching methods (12). Although the use of E-learning platforms in surgical training has recently increased, the role of this technology among orthopedic surgery residents has not been thoroughly investigated yet (10, 11). Previous research on online trainings

of orthopedic surgery residents' skills have yielded positive results in terms of improved performance of surgical procedures such as closed reduction and pinning, diagnostic arthroscopy, and surgical skills in spine operations (10, 13-15).

We have hypothesized that, despite the fact that online education has been unexpectedly imposed in the various academic orthopedic surgery residency programs it is favorable and useful enough to be utilized in the future. Accordingly, we decided to conduct a survey among Iranian orthopedic surgery residents to identify the benefits and drawbacks of this method of broadcasting academic programs for the future of orthopedic surgery education.

Methods and Materials

In this cross-sectional study, an eight-item questionnaire (Table 1) was sent via both email and WhatsApp messenger to 150 residents of orthopedic surgery in all Iranian academic medical centers from 10th to 20th July 2020 (second academic semester). Ninety residents responded the survey via WhatsApp messenger and twenty one replied back via email. The residents were informed about the study details and informed consents were obtained from all of them. The study was set up in Golestan University of Medical Sciences, Gorgan and was approved by ethical committee (ID: 13-112221). A previously published English questionnaire was modified and used after testing the validity and reliability through a pilot assessment among 10 faculty members of the local universities (11). By this questionnaire, the participants' attitude toward online educations in the current COVID-19 pandemic was investigated. One week after sending the questionnaires, the residents sent back their attitude. Data were analyzed by SPSS16.0 (Chicago IL, USA) to report frequency and percentage for all items of the questionnaire.

Results

One-hundred eleven residents (74%), including 99 males (89%), replied back the questionnaires. Participants' mean (SD) for age was 30.25 ($\pm$ 3.15) with range of 26 to 38 years.

Eighty-nine %of the participants in the study stated that their programs were conducted internet-based space and online; as the residents declared the most commonly used modality was online webinar (84%). Next, social networking groups, online exams, video patient consultations, and video conferencing were

the other online environments in which residents participated. Also, the main platform used by the residents was Sky room in 76% of cases.

The residents answered the question "How do you assess the online education modalities received during the COVID-19 pandemic (question 4 in the questionnaire)?". Grades from 1 to 10 1 was very unsatisfactory, and 10 were very satisfactory. Webinars were rated most popular with a mean grade of 8.2 followed by social network groups received mean grade of 7.4.

Residents mentioned technical aspects including slow internet connection and audio problems (38%), lack of concentration due to home distractions (26%), absence of practical education in surgical training (16%), and difficulties with scheduling and overload of seminars/presentations (17%) as the online education obstacles.

After answering the question "After the pandemic is over, which online-based educational instances would you continue to us (question 7 in the questionnaire)", residents preferred to continue attending webinars (68%), social networking groups (34%), online exams (22%), video consultation on real patients (21%), video conferencing (14%), and video surgeries (11%). Also, 3% of the participants chose the option of none.

92% of residents believed that web-based platforms should continue for theoretical education after the end of the COVID-19 pandemic. Also, 85.5% of residents believed that academic meetings involving less than 100 participants should be holed in Internet-based platforms. Details of the survey have been given in Table 1.

Discussion

Among different teaching methods to orthopedic surgery residents, the face-to-face method has always been preferred, but because of the COVID-19 pandemic, we have been forced to use alternative methods that were less valued in the past (6, 11, 14). The most suitable option for continuing education in universities could be Internet-based platforms to help maintaining quarantine conditions and make orthopedic surgery residency education continue without any interruption. Because of pandemic situation and the new era of the online education, we decided to study the strengths and weaknesses of a different teaching method during the pandemic among Iranian residents.

Based on findings of this study, the webinars received high ratings among orthopedic surgery residents and the most

residents wanted the applying webinars to continue after the COVID-19 pandemic. However, online tests and video patient consultations with poor ratings were only a temporary solution in pandemic and were not accepted by orthopedic surgery residents as a permanent modality. This finding was also reported in a study by Figueroa *et al.* (16).

Online system problems including audio and video problems and slow internet speeds have been the most common problems experienced by orthopedic surgery residents. Technical issues are still significant during online activities that require more data transmission than usual, reported with loss or delay of connection. Previously, researchers have pointed to these technical problems in their studies and consider them as one of the most important obstacles to online education (16-18). These problems may be solved with the development of relevant softwares (virtual meeting applications) widely used due to the Covid-19 pandemic situation.

Education of orthopedic surgery residents consists of theoretical and practical teaching sessions that should be clinically performed. Due to the COVID-19 pandemic situation, the practical part is negatively affected and more time is needed for instructors to provide theoretical education. Problems such as inadequate space at home and reduced concentration due to environmental events, interference of scheduling and multiplicity of programs have been experienced by residents, which has reduced learning efficacy. Figueroa *et al.* also pointed out these problems, and their proposed solution was better coordination and communication between the instructors and the trainees. Preparation of a formal schedule of activities at reasonable times would be useful either (16).

Finally, due to the good evaluations obtained from online teaching methods and according to the final two questions, most orthopedic surgery residents preferred to receive online medical education training. It is interesting to note that Figueroa *et al.* and Funke *et al.* concluded that teaching in small groups and face-to-face learning are highly appreciated compared to online methods (16, 19). Different perspectives reflect the challenges that educators face in balancing online and face-to-face instruction as many residents are still significantly interested in face-to-face instruction.

Limitation of our study was small sample size due to difficulties to access residents in COVID-19 pandemic restriction and also internet-based technical problems while sending questionnaires. It is proposed that a same study could be performed among other subspecialty residents groups.

Patient's satisfaction in the current pandemic situation is also important and should be assessed in the future studies.

Conclusion

Most Iranian universities have extensively used online education facilities to meet all of the curriculum objectives during COVID-19 pandemic. Based on the finding, the majority of residents wanted to continue online educational programs even after the pandemic is over.

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Conflict of interest:

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Authors' contributions:

R.J did definition of intellectual content, data analysis, statistical analysis, manuscript editing and manuscript review. A.E did definition of intellectual content, literature search, manuscript editing, and manuscript review. H.M did definition of intellectual content, literature search, manuscript editing, and manuscript review. S.M proposed the study concept and did literature search, manuscript editing, and manuscript review. M.G, J.A, P.Z, M.A did definition of intellectual content, literature search, data collection, manuscript editing, and manuscript review. S-M, H proposed the study concept, design, definition of intellectual content, literature search, data acquisition, data analysis, statistical analysis, manuscript preparation, manuscript editing and manuscript review.

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