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Scientific Article

Effect of COVID-19 Pandemic on Oncology Residency Training in India and a Novel Online Academic Solution: Results of an Online Survey

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Abstract

Purpose: Coronavirus disease 2019 (COVID-19) has had a global effect on the training of residents of medicine because of what has been required in the pandemic. The field of oncology has not been spared, as pre-pandemic training schedules have not been available for residents. We conducted an online survey to understand the effect of the pandemic and the effect of online teaching schedules as a measure to help residents of oncology in their training.

Methods and Materials: An online survey consisting of 31 questions was sent through various social media platforms based on the training pattern before the onset of COVID-19, effect of the pandemic on educational activities, and the effect of online academic activities on residency training and learning. The survey addressed the need for online academics as an alternate mode of teaching. The survey was left open for a period of 4 weeks with participation requests from the various branches of oncology, including radiation, surgical and medical oncology, onco-anesthesia, palliative oncology, neuro-oncology, and so forth. The frequencies obtained in the survey were analyzed using descriptive statistical analyses.

Results: After a 4-week period, there were 255 responses received from students of oncology from various specialties. Around 69.8% of respondents (n = 178) were junior residents, followed by senior residents (n = 72; 28.2%). The majority of the respondents were radiation oncologists (n = 204; 80%). Around 70.9% had an ongoing structured teaching program related to oncology training, with the majority (40.3%) of them having more than 3 hours every week of oncology-based training. Another 31.3% reported having 1 to 2 hours of such training every week, and 60.8% of participants agreed their training was affected by pandemic and related safety regulations. Most students (90.9%) found the online teaching sessions helped maintain training qualities as they were in the pre-COVID times. About 69.1% of the students felt that the quality of these online sessions was better compared with the institute-based onsite classroom teaching. However, as is expected, 77.6% of them agreed that their hands-on training was affected in the pandemic. When asked if online teaching can replace every aspect of classroom teaching, 66.7% of respondents did not agree. The majority (83.9%) felt that students should be given the opportunity to present a given topic under the supervision of a senior faculty member experienced and expert in that topic. The students pointed out the lack of practical exposure as the most common deficiency, followed by the lack of direct interaction with the teaching faculty.

Conclusions: The pandemic has limited the access to essential training in the branches of oncology, and though online sessions cannot replace the hands-on training and clinical exposure needed for the students, online academics and webinars have proven to be an

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Introduction

The onset of coronavirus disease 2019 (COVID-19) pandemic in India started in February 2020 and led to a nation-wide lockdown beginning in March 2020, having a major effect on cancer care facilities across the country.\(^1\) It has led to drastic changes in the education system across the country, with a major effect and shift in delivery of training especially in medical education, including the oncology division. The fears surrounding COVID-19 and subsequent administrative regulations limited the teaching staff. The regulations also mandated the need for social distancing, which affected not only cancer care\(^2\) but also the landscape of teaching approaches. Collectively, these demands required various forms of innovations for delivering quality education. These included the evolving role of online real time seminars and lectures through various video-based platforms, which has been in the making over the past few years, albeit in a very insignificant manner.\(^3\)

The pandemic has affected the on-site hands-on training and led to disruptions in student-teacher interactions. It has also reduced student-patient relations and interactions. Although the online platform-based training programs have tried to augment the theoretical knowledge, they have not been able to bridge the gap in the clinical knowledge obtained with the physical interactions and examinations involving the patients in the outpatient departments or wards. However, the dearth has been filled with enthusiastic teaching faculties in the branch of oncology.\(^4\)

Another difficulty in India arises from the highly heterogeneous quality of teaching and training across the country due to variations in facilities, academic and research activities, paucity of infrastructure at nonmetro cities, and so forth. Many centers still do not have access to linear accelerators and newer radiation technologies; financial difficulties cause road blocks to the use of many newer systemic therapy molecules in a significant proportion of patients; and, there is a growing perception that quality of teaching is also heterogenous. Online teaching activities could be a solution to many difficulties related to training and teaching.

In this survey conducted across the country involving the in-training residents of oncology, we aimed to understand the training patterns before the start of the pandemic, the effect of COVID-19 on the training patterns especially during the lockdown period and what the future holds in store with the advent of online continuing medical education or webinars as an alternative for classroom-based teaching programs.

Methods and Materials

The survey was designed based on 31 questions pertaining to oncology residency training patterns before the onset of COVID-19, the effect of the pandemic on educational activities, and the effect of online academic activities on residency training and learning. The survey was released online through various social platforms in June 2020 immediately after the relaxation of pandemic-related lockdown. The survey addressed the need for online academics as an alternate mode of teaching. The survey was left open for a period of 4 weeks with participation requests to the various branches of oncology, including radiation, surgical and medical oncology, onco-anesthesia, palliative oncology, neuro-oncology, and so forth. Responses to the questions were based on the numerical scaling system using the Likert scale and the same reflected the strength of opinion. The frequencies obtained in the survey were analyzed using the descriptive statistical analyses and Kendall’s rank correlation coefficient, and the Wilcoxon signed-rank test was used for the nonparametric analyses.

Results

The survey was released online, and the link was shared through various social media-based platforms, and after a 4-week period, 255 responses were received from students of oncology from various specialties, including radiation oncology, medical oncology, surgical oncology, palliative oncology, neuro-oncology, and onco-anesthesia in various stages of their training. Around 69.8.1% of respondents (n = 178) were junior residents (those who are in training in a specialized branch) followed by senior residents (defined as the residents who were post completion of oncology specialization training and within 3 years of completion) (n = 72; 28.2%). The majority of the respondents were radiation oncologists (n = 204; 80%), and the other oncology branches constituted the rest of the responses. About 61.9% (n = 158) of the responses were received from candidates associated with government academic centers, and 27.8% (n = 71) hailed from private academic centers. The details of the same are shown in Table 1.
When the in-training residents, senior residents, and those undergoing fellowship programs were asked about the pre-COVID training details, 70.9% of them responded that they have an ongoing structured teaching program related to oncology training, with the majority (40.3%) of them having more than 3 hours every week of oncology-based training. Another 31.3% reported having 1 to 2 hours of such training every week, and 60.8% of participants agreed that their training was affected because of the pandemic and related safety regulations. Of those who disagreed, 52% of them experienced an improvement in training quality due to the availability of time for training and academics. The respondents were almost equally divided as to the question pertaining to continuation of academics during the pandemic.

Even during the pandemic, the majority of the respondents agreed they had more than 3 hours of training (38.1%), and around 35% of them agreed there was a 25% to 50% increase in academics related to oncology training during the period of lockdown and the pandemic. However, 60% of the trainees said that only 25% and lesser amount of such sessions were taken by senior faculty members. Details regarding the pre-COVID training and the ongoing pandemic training status are shown in Table 2.

There were 9 questions in the survey pertaining to the online teaching programs and their effect during COVID-19 on oncology training. Almost everyone was aware of such training programs (93.7%), and of them, 98.4% were participating in these online sessions. Most students (90.9%) found these sessions helped to maintain the training qualities as much as those in the pre-COVID times. Around 43.5% responded that more than 50% of the faculty in online academics were senior faculty members, in contrast to less than 25% for onsite classroom activities, and 69.1% of the students felt that the quality of these online sessions was better compared with the institute-based onsite classroom teaching. However, as is expected, 77.6% of them agreed that their hands-on training was affected during the pandemic. Again, these online classes helped provide better access to the oncology-based training, with 82.7% agreeing to this; however, 66.7% of them did not believe this online-based training platform could be a thing for the future beyond the pandemic. There were 82.7% of the participants who agreed that online teaching provides them better access to

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**Table 1** Participant characteristics

| Characteristics       | N = 255 |
|-----------------------|---------|
| Position of participants |         |
| Junior residents       | 178 (69.8%) |
| Senior residents       | 72 (28.2%)  |
| Research associate/fellow | 5 (2%)    |
| Speciality of participants |       |
| Radiation oncology     | 204 (80%)  |
| Medical oncology       | 22 (8.6%)   |
| Surgical oncology      | 16 (6.3%)   |
| Onco-anesthesia        | 5 (1.9%)    |
| Palliative oncology    | 4 (1.5%)    |
| Neuro-oncology         | 4 (1.5%)    |
| Workplace of participants |        |
| Government academic center | 158 (61.9%) |
| Private academic center | 71 (27.8%)  |
| Multispecialty private hospital | 23 (9%) |
| Trust hospital         | 3 (1.2%)    |

**Table 2** Pre-COVID training status and current training trends

| Characteristics                                      | No. (%) |
|-----------------------------------------------------|---------|
| Structured program for in-training residents         |         |
| Yes                                                  | 181 (70.9) |
| No                                                   | 74 (29.1)  |
| Dedicated time for structured academics before pandemic |       |
| <1 hour a week                                       | 34 (13.3) |
| 1-2 hours a week                                     | 80 (31.3) |
| 2-3 hours a week                                     | 38 (14.9) |
| >3 hours a week                                      | 103 (40.4) |
| Has training been hampered due to COVID-19?           |         |
| Yes                                                  | 155 (60.8) |
| No                                                   | 100 (39.2) |
| If no, has the quality increased during COVID-19?     |         |
| Yes                                                  | 52 (52) |
| No                                                   | 48 (48)  |
| Is your institute continuing academic sessions during COVID-19? |     |
| Yes                                                  | 130 (50.9) |
| No                                                   | 125 (49.1) |
| Hours per week engaged in academic sessions during lockdown and COVID-19 | |
| <1 hour a week                                       | 71 (27.8) |
| 1-2 hours a week                                     | 38 (14.9) |
| 2-3 hours a week                                     | 49 (19.2) |
| >3 hours a week                                      | 97 (38.1) |
| How much of an increase in academics has been seen during the lockdown and COVID-19? | |
| <25%                                                 | 92 (36.1) |
| 25%-50%                                              | 89 (34.9) |
| 50%-75%                                              | 51 (20) |
| >75%                                                 | 22 (8.6) |
| Training sessions led by senior faculty members      |         |
| <25%                                                 | 153 (60) |
| 25%-50%                                              | 71 (27.8) |
| 50%-75%                                              | 28 (10.9) |
| >75%                                                 | 3 (1.1)  |

Abbreviation: COVID-19 = coronavirus disease 2019.
quality teaching and training. When asked if online teaching can replace every aspect of classroom teaching, 66.7% of respondents did not agree to that. Interestingly, almost 88% of the students wanted these online-based training sessions to continue (87.8%) even when this pandemic situation is over. These results are shown in Table 3.

There were 4 questions focusing on understanding the future need for online academic sessions. On being asked about the desired duration of sessions, the majority of the students agreed to 1 to 2 hour sessions in a day (87.1%).

| Characteristics                                      | No. (%)        |
|------------------------------------------------------|----------------|
| Are you aware of different online academic activities?|                |
| Yes                                                  | 239 (93.7)     |
| No                                                   | 16 (6.3)       |
| Do you participate in online lecture classes?         |                |
| Yes                                                  | 251 (98.4)     |
| No                                                   | 4 (1.6)        |
| Have these sessions helped maintain training qualities?|                |
| Yes                                                  | 232 (90.9)     |
| No                                                   | 23 (9.1)       |
| What percent of online sessions are led by senior faculty members? | |
| <25%                                                 | 76 (29.8)      |
| 25%–50%                                              | 58 (22.7)      |
| 50%–75%                                              | 56 (21.9)      |
| >75%                                                 | 55 (21.6)      |
| What is the quality of online academics compared with your institute? |          |
| Superior                                             | 176 (69.1)     |
| Inferior                                             | 23 (9)         |
| No difference                                        | 56 (21.9)      |
| Has hands-on training been affected?                 |                |
| Yes                                                  | 198 (77.6)     |
| No                                                   | 57 (22.4)      |
| Has COVID-19 improved access to better classroom-based training? |         |
| Yes                                                  | 211 (82.7)     |
| No                                                   | 44 (17.3)      |
| Do you think online teaching can be a replacement for all aspects of residency training program? |       |
| Yes                                                  | 85 (33.3)      |
| No                                                   | 170 (66.7)     |
| Would you prefer online academics to continue even when the situation becomes normal? |          |
| Yes                                                  | 224 (87.8)     |
| No                                                   | 31 (12.2)      |

Abbreviation: COVID-19 = coronavirus disease 2019.

Most of the attendees (58.1%) read up about the topic before attending the session. Most of the students highlighted the issue of lack of student participation in the presentation of the topics in front of a sizeable audience. The majority (83.9%) felt that students should be given the opportunity to present a given topic under the supervision of a senior faculty member experienced and expert in that topic. Also, the online seminars helped to bridge the gap in the knowledge, and even though the sessions were on an online platform, the respondents acknowledged (89.8%) that the knowledge and skills acquired from such online teaching were actually implemented in their clinical practice as well. These results are summarized in the Supplementary Materials.

On being questioned regarding the lacunae associated with such online teaching and academics, the students pointed out the lack of practical exposure as the most common deficiency, followed by a lack of direct interaction with the teaching faculty. When questioned about the positive outcomes, the respondents believed they could ask questions to the faculty without hesitation, even though for a limited period, under anonymous identity, which gave a boost to developing concepts better and enhancing their knowledge. They also believed that such sessions provided better opportunities for learning from the experts in the field on the respective topics being presented. Most of them agreed to having structured monthly teaching schedules based on disease sites, with just a handful of students wanting case-based discussion. The results are shown in Figures 1 through 3.

**Discussion**

This survey aimed to understand the status of oncology residency teaching and training in India before the pandemic, the effect of the pandemic on teaching and training, the effect of online academics on teaching and training, and the way forward to improve the online teaching module. The field of oncology is a dynamic branch, with updates on a regular basis, and both students and faculty in this field need to keep themselves abreast of developments. The online-based teaching programs were a welcome change in the time of pandemic, which warranted the need for social distancing, reduced the number of teaching staff, and allowed fewer patients to reach oncology centers. The majority of the participants were in-training members in the field of radiation oncology, with the rest from the other specialties of oncology, with the majority of respondents belonging to government-based academic institutes. There may be various reasons for this. The authors believe this could be because the study was initiated by members from the radiation oncology community, leading to greater reach to radiation oncology residents. Also, most residency programs in India are conducted by government academic
What does the Online Classroom training lack?

*Figure 1*  What does the online classroom training lack?

**Positive Outcomes of the online Classroom teaching sessions**

*Figure 2*  Positive outcomes of the online classroom teaching sessions.

**Preferences for the online classroom sessions**

*Figure 3*  Preferences for the online classroom sessions.
institutes with private medical establishments constituting a small fraction only, which is represented in this survey.

Although the pre-COVID period involved classroom-based teaching with onsite training and better interactions with the patients, currently, the students have an option between prerecorded or live streaming sessions undertaken on various topics pertaining to oncology. The concept of web-based training has been around for the last few years in India; however, the field of medicine and especially oncology warrants the need for clinical experience with patient-based teaching in the out-patient departments or the clinical wards. The various oncology-related organizations, including American Society for Radiation Oncology and European Society for Radiotherapy and Oncology, have also conducted their annual conferences on various online platforms, which led to increased numbers of participants attending in the times dictating the need for maintaining distance. These classes have helped the students to have the liberty to attend the lectures during the desired times and helped them to interact with the faculties more freely, thus helping them understand the concepts better and clear any lingering doubts related to the topic. Of the respondents, 60.8% agreed that their teaching was affected by the ongoing pandemic and asserted that the online platform gave them more flexibility in the topics they needed to attend. On analyzing the results based on the government and private hospitals, the academic structures were much better in the academic institutes ($P = .023$) and also, the senior faculty availability was much improved in these centers ($P < .001$). However, in the online platform, there was more involvement of the private hospital-based faculties in teaching sessions compared with the academic institutes ($P = .0221$).

The other specialties of the medical field have seen changes that involve more skill-based and simulation-based learning, and the same has been the need in the branch of oncology. These training sessions have been a major breakthrough for the students of oncology, as 98.4% of the respondents agreed to having attended such sessions. Also, besides the students, this online platform gave an opportunity to the senior faculty members to be involved more in the academic training sessions, as there was a significant increase in them taking part in the training modules compared with the onsite training. It was interesting that less than 25% of the onsite classroom teaching sessions were actually being attended by senior faculty members before the pandemic. This reflects the unmet need of the residents. It was also assuring to know that more than 50% of the online sessions were being attended by senior faculty members, which ensures better quality of teaching and training to the residents. This is indeed important to have more knowledgeable and efficient future generations of oncologists. Senior faculty members are more at risk to develop severe COVID-19 infection due to multiple risk factors common at that age group, and their well-being is of utmost importance. The online platform provided a rational solution to this at-risk group of senior faculty members, and they could offer their experience, knowledge, and skill for the betterment of their younger colleagues.

In the survey, the respondents agreed to the limitations of not having hands-on experience; the online platform was more of an answer for theoretical needs, but it was assuring to know that 82.7% of the respondents could improve their skills through this online activity and apply the same in their clinical practice. This warrants the need for blended or hybrid learning, which incorporates face-to-face teaching with online learning. This would lead to a more learner-oriented approach in the field of oncology and reduced reproductive learning, which incorporated the focus on the faculty and content alone. Overall, the online education platform has been well received by the students especially in the branch of oncology, and future syllabus and training modules need to be designed considering this platform for better outreach and deliverability to the students. The online education platform is a cost-effective method for both the providers and the trainees.

The study had a few limitations. It was an online survey conducted on an online platform where the respondents were not scrutinized and no internal control of the responses was possible. The other limitation was that a particular oncology specialty dominated the responses, and a robust survey could have been conducted if other specialties could have responded to the questions. However, the responses from the radiation oncology fraternity helped to assess the single branch response, which could be implied for the other allied branches, as the pandemic brought about similar learning status with the online platform available as modality.

Conclusions

The pandemic has limited the access to essential training in the branch of oncology. Though online sessions cannot replace the hands-on training and clinical exposure needed for students, online academics and webinars have proven to be an effective tool to minimize that effect and can lead to a positive outcome. This survey is unique in the way it analyzed various facts related to oncology residency training and teaching at baseline and during the pandemic and the effect of online teaching, and it has also thrown light on future directions to take. It also emphasizes the need for such sessions even beyond the pandemic, as it enumerates various advantages including the increased sense of connectivity and more relaxed environment to freely ask questions. The authors strongly
believe that proper use of technology can help disseminate quality knowledge, training, and skill in a continual manner and thus bridge the gap the pandemic has highlighted in the already-existing deficits in the process of learning. A combination of online and onsite training modules may be the future of teaching and training in our country.

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Supplementary materials

Supplementary material associated with this article can be found in the online version at https://doi.org/10.1016/j.adro.2021.100688.

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