



The Impact of “COVID-19” and “Webinar Pandemic” on Plastic Surgery Practice in Teaching Institutes and Resident Training—A Multicentric Perspective

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Abstract

Introduction The study was carried out to quantify the changes induced by the pandemic in plastic surgery practice and training and to study the impact of the webinars on plastic surgery education from a residents’ perspective.

Methods In this multicentric study, the number and type of surgeries, cause of injuries, and their regional variation during the coronavirus disease 2019 (COVID-19) period (February–September 2020) were compared with pre-COVID-19 time. An online survey on the impact of webinars was conducted for plastic surgery trainees across the country.

Results There was a significant reduction in total number of surgeries ($p = 0.003$). The procedures for hand ($p = 0.156$), faciomaxillary injuries ($p = 0.25$), and replantations ($p = 0.46$) were comparable; there was a significant reduction in combined orthopedic-plastic-surgical procedures ($p = 0.009$) during the pandemic. There was a significant reduction in road accidents ($p = 0.007$) and suicidal injuries ($p = 0.002$) and increase in assault ($p = 0.03$) and domestic accidents ($p = 0.01$) during the COVID-19 period.

A usefulness score of >8 was given for the webinars by 68.7% residents. There was no significant difference in perception of utility when correlated with the academic program at their institutes ($p = 0.109$); 92% opined webinars should continue in post-COVID times.

Conclusion There was a drastic reduction in number of elective and emergency procedures during the COVID-19 time, negatively affecting resident training program. Majority of residents felt that webinars could prove a useful adjunct to training in formal training program in post-COVID-19 scenario.

Keywords

- ▶ hand trauma
- ▶ faciomaxillary injury
- ▶ malignancy reconstruction
- ▶ aesthetic procedures
- ▶ webinar
- ▶ conferences

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Introduction

The coronavirus disease 2019 (COVID-19) pandemic has led to drastic changes in the practice and training of plastic surgery, especially in India where a prolonged lockdown was implemented.^{1,2} As a response to this, policies were formulated to address the pandemic while providing continuity of care for emergent non-COVID illnesses.^{3–5} Although the role of our specialty in direct care of COVID-19 patients is limited, our role in reconstruction following trauma, burns, and malignant tumor resection comprises a significant proportion of essential services. There has been a significant change in the surgical management protocols to ensure judicious use of resources and minimize COVID-19 exposure risk to patients and doctors.^{3,4}

Elective services are restarting in a phased manner. However, being apex centers for COVID-19 care, majority of teaching institutes are yet to return to pre-COVID-19 normalcy. The hands-on training of residents has been greatly hampered owing to a direct reduction in the surgeries.^{6,7} Although alternative modalities such as virtual and simulation training have been adopted, real-time experience and skill training cannot be matched. Hence, the teaching and practice of plastic surgery in the institutes which have also doubled up as COVID-19 centers need to be looked at with a newer perspective. The quantification of changes in the plastic surgery practice is essential to guide policies in restructuring the patient care delivery and plastic surgery education. This will enable us to achieve the twin objectives of resident training and efficient patient care. Hence, this study was undertaken to quantify the changes induced by the pandemic in plastic surgery practice and training.

There has also been such a sudden surge in number of webinars on a variety of topics during the lockdown period that this period has often been satirically referred to as the “webinar pandemic.”⁸ The potential benefits of this virtual education system may be incorporated into teaching curriculum in future after thorough assessment for content and quality.^{9,10} Although the webinars constitute a virtual knowledge boom and open new avenues, the responses to these have been varied.^{11,12} Hence, this study also attempts to look at the impact of the webinars on plastic surgery education and training from a residents’ perspective, to identify facilitating and hindering factors that can potentially be used to assess their value.

Methods

This was a retrospective analysis of a prospectively recorded database from the departments of plastic surgery of two tertiary referral centers of north and south India. The nationwide lockdown was announced on March 24, 2020. A time frame of 8 weeks before the lockdown to various unlock phases (February 1, 2020, to September 30, 2020) was included in the study referred to as “COVID-19 period.” The data from 2019 during the corresponding months were utilized as control, referred to as “pre-COVID-19 period.” The details of patients treated, diagnosis and types of

surgery, and distribution of emergency and elective procedures were obtained for both time periods from departmental databases and compared. The cause of injuries presenting to emergency and regional variation in the trends were also analyzed.

An online survey on the impact of webinars on plastic surgery was conducted for trainees across the country. Plastic surgery residents currently in training in various institutes were included in the study by snowball sampling through personal e-mails and social media platforms such as WhatsApp and Facebook. The questionnaire comprised 18 questions addressing the various aspects of training and residents’ perspectives on webinars during the pandemic. The validation of questionnaire (**Supplementary File S1**; available online only) was carried out on residents currently in training at both institutes for comprehension and relevance. The time spent on webinars or conferences by the same resident during both time periods were compared. The correlation of regular teaching at the training institution and the residents’ perception of utility of the webinars was also carried out.

Statistical Analysis

The data were analyzed using IBM SPSS Statistics version 25. The number and type of surgeries and cause of injuries were analyzed using Mann–Whitney *U* test. The survey responses were analyzed using descriptive statistics. The time spent on webinars or conferences was analyzed using chi-square test for R-by-C table. The correlation of regular teaching during pre-COVID-19 and the perception of utility of webinars were carried out using Kruskal–Wallis test. A *p*-value < 0.05 was considered significant.

Results

Trends in Surgical Case Load and Type of Surgery

There was a significant reduction in total number of surgeries (mean difference: 235.1 ± 46.5 cases; $p = 0.003$) during the lockdown (**► Fig. 1**). A significant reduction was noted in elective, emergency, and burn services (**► Fig. 1**). There was an increasing trend noted in emergency and burn surgeries during staggered release of restrictions; however, elective services continue to remain suspended with few exceptions. The comparison of cases operated in emergency and elective during two the time periods is shown in **► Figure 2**. Although there was a significant reduction in total number of emergency cases, number of surgeries for hand trauma, faciomaxillary injuries, replantations, and miscellaneous procedures such as facial lacerations, penetrating chest/abdominal wall injuries were comparable (**► Fig. 3**). There was a significant reduction in combined orthopedic and plastic reconstructive procedures ($p = 0.009$) and free-flaps ($p = 0.05$) (**► Fig. 2**). **► Fig. 3** illustrates monthly distribution of various emergency cases during both the time periods. The elective surgeries comprised semiemergency reconstructive cases such as brachial plexus injuries and peripheral nerve injuries which needed timely intervention for saving limb functions, subacute

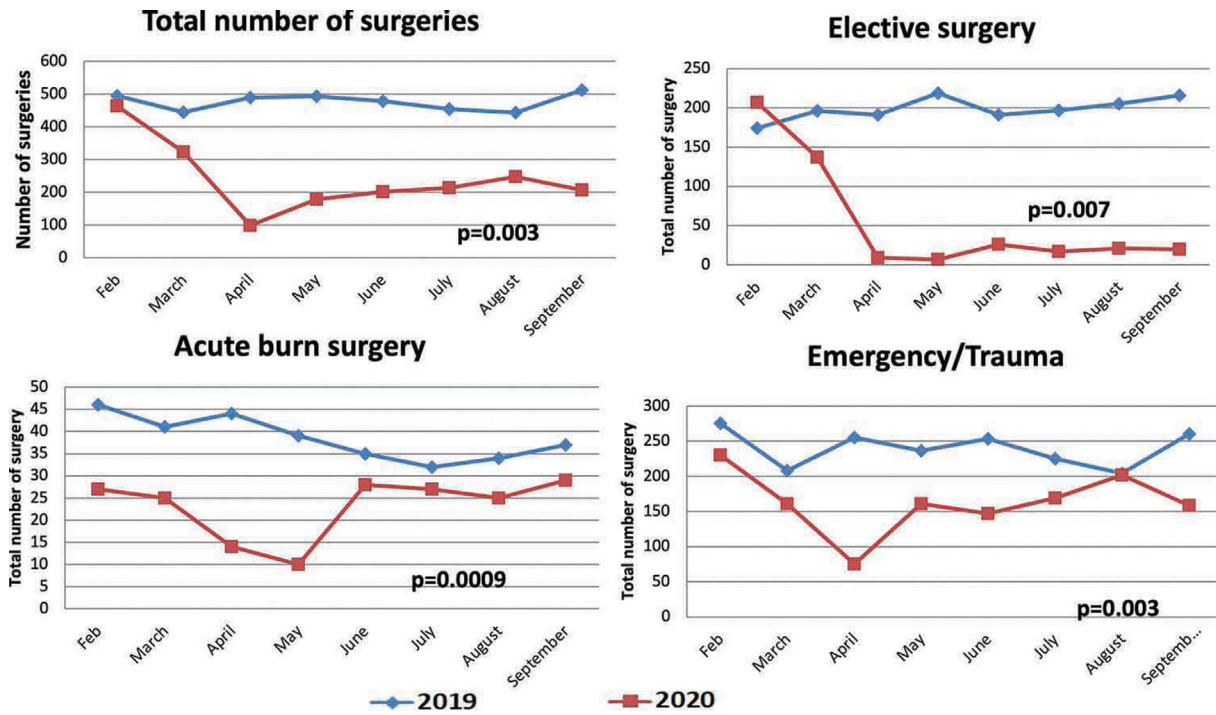


Fig. 1 Comparison of total surgical activity in elective, emergency, and burn surgery during COVID-19 with the pre-COVID-19 time (p-value by Mann-Whitney U test).

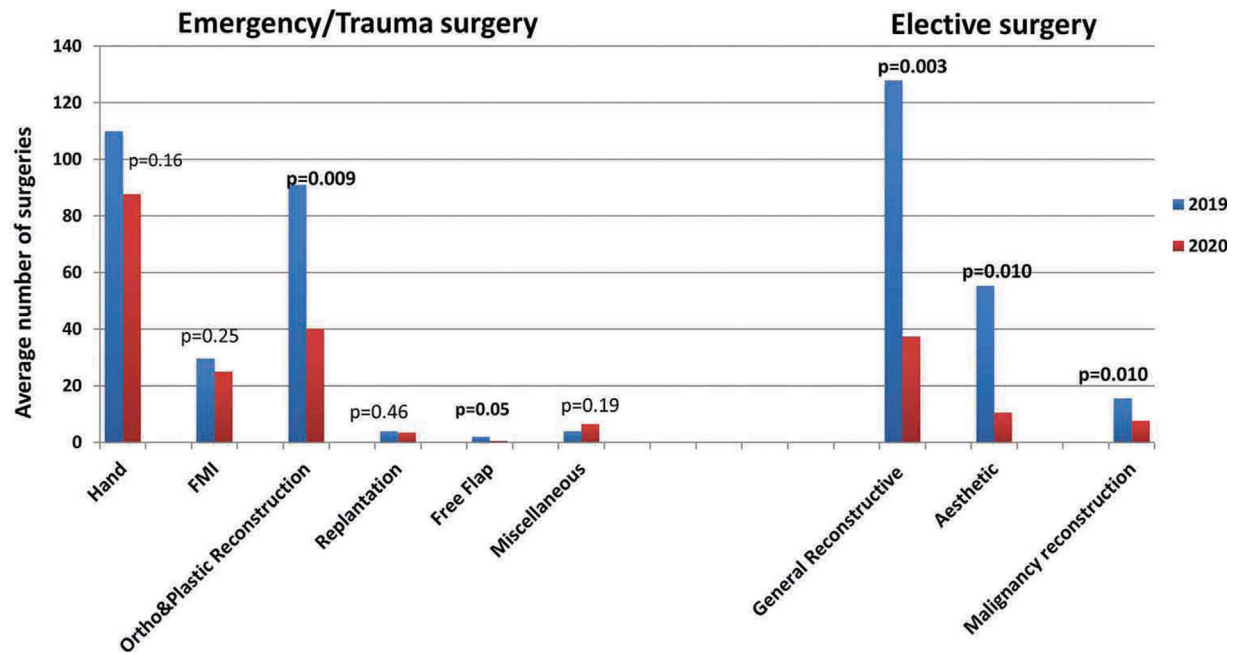


Fig. 2 Comparison of various emergency and elective surgery cases during COVID-19 with the pre-COVID-19 time (p-value by Mann-Whitney U test).

posttraumatic reconstruction, and reconstruction following excision of malignant tumors (► Fig. 4).

Assessment of Cause of Injury

The distribution of causes of emergency or burn admissions during the corresponding months is shown in ► Fig. 5. There was a significant reduction in the road accidents (87 ± 34.3 vs. 151 ± 39.2 cases; $p = 0.007$) and

suicidal injuries (6.12 ± 2.6 vs. 13.37 ± 2.6 cases; $p = 0.002$) during the COVID-19 period (► Fig. 6). A significant increase in injuries following assault (14.25 ± 6.8 vs. 6 ± 2.7 cases; $p = 0.03$) and domestic accidents (39.87 ± 7.18 vs. 16.5 ± 13.7 cases; $p = 0.01$) were noted. Although there was an increase in proportion of workplace injuries in April and May (► Fig. 6), the average between two time frames were comparable ($p = 0.638$). The regional variation

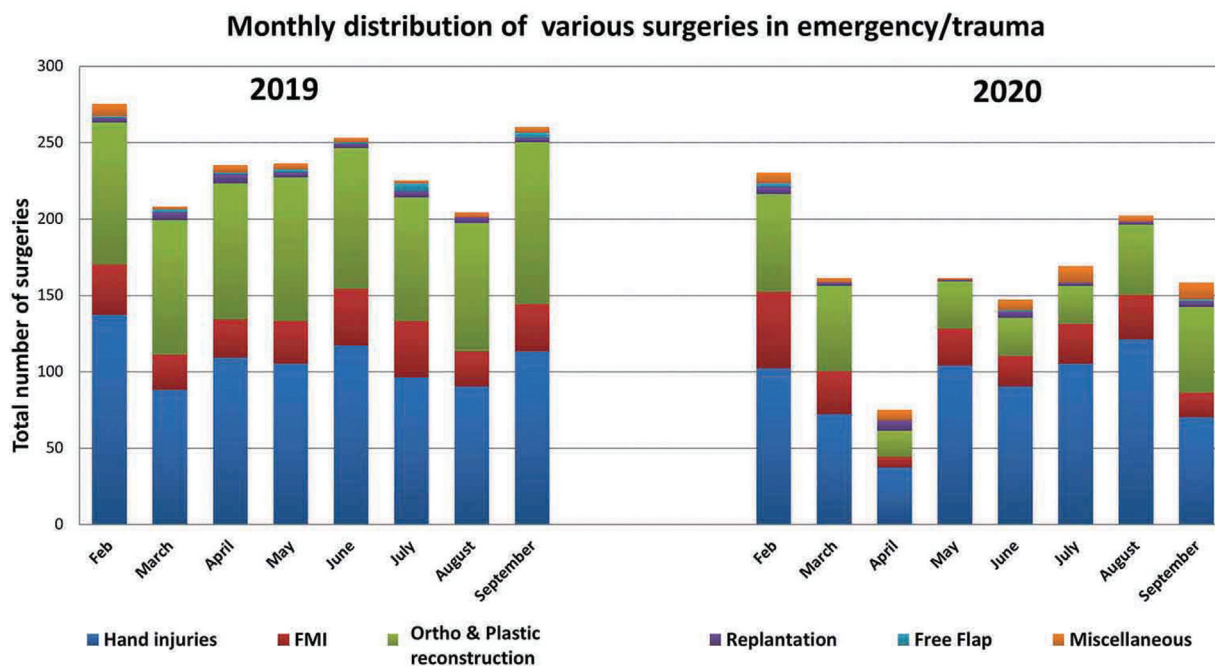


Fig. 3 Comparison of monthly distribution of various emergency procedures during the two time periods.

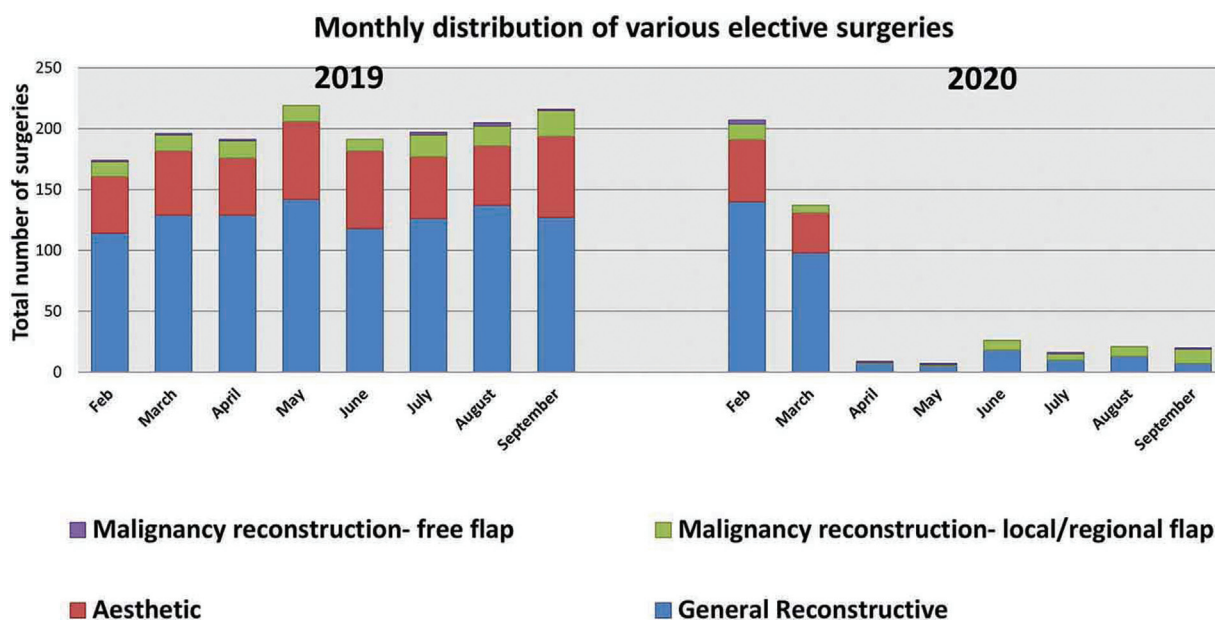


Fig. 4 Comparison of monthly distribution of various elective procedures during the two time periods.

of the trends of the injuries between the two time periods is shown in ►Fig. 6.

Online Survey on Impact of Webinars on Plastic Surgery Education from Residents’ Perspective

A total of 83 responses were received; 85.5% were MCh and 14.5% were DNB plastic surgery trainees across the country. Majority (75%) of the webinars were held by national organizations. ►Fig. 7 shows distribution of various topics and formats which trainees found useful. A usefulness score of >8 was given by 68.7% respondents and 60% felt that it

helped improve both theoretical and practical knowledge levels (►Fig. 8). There was no significant difference in the mean score of perception of utility when correlated with hours of dedicated academic program at their institutes (►Fig. 9). At least one plastic surgery conference or webinar was attended by 60% trainees during the pre-COVID-19 period. On analyzing proportion of time spent in attending conferences or webinars by the same resident between two time periods, there was no significant difference ($p = 0.614$) (►Fig. 10). Majority (88%) of the respondents felt that these webinars helped improve their awareness regarding various

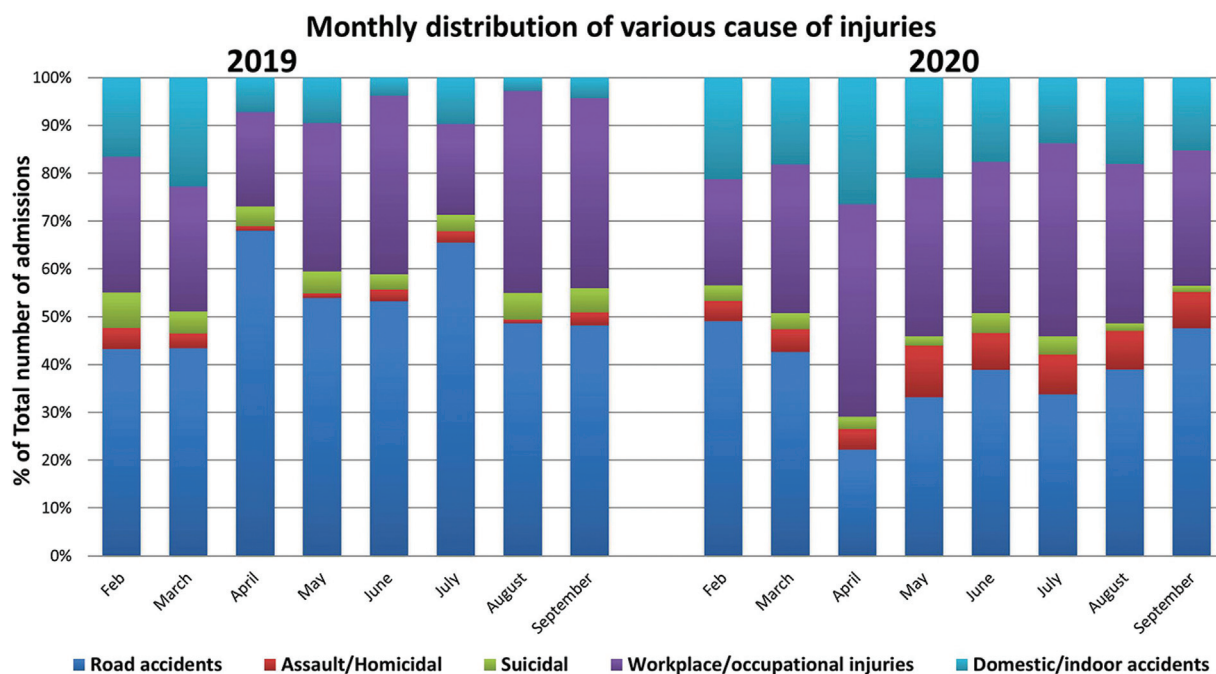


Fig. 5 Comparison of monthly distribution trends of various cause of injuries during COVID-19 with the corresponding months in pre-COVID-19 time.

procedures carried out worldwide. **Fig. 11** shows the distribution of various hindrances and factors which need improvement. Attending webinars were regarded as no added stress by 53% respondents, 14% felt it definitely added to their stress levels, 92% felt that these webinars should continue in post-COVID times, and 80% suggested a weekly frequency; 21% respondents demonstrated willingness to attend even if the sessions were paid. Majority (80%) felt that webinars should be awarded credit hours and 68% felt the need for a hybrid approach to future conferences.

Discussion

The destructive effect of COVID-19 has affected the working of hospitals, especially centers dedicated for COVID-19 care. This study compared trends of various plastic surgery procedures with that of pre-COVID time in two premier teaching institutes of the country. The effect of lockdown regulations such as restrictions on the surgical procedures was quantified to potentially help in future restructuring of training. The study also showed a change in pattern of injuries with a reduction in road accidents and suicides and an increase in the assault and domestic injuries during COVID-19 time, indirectly quantifying the social impact. A restructuring of training programs can potentially happen as we recover from pandemic and the “webinar culture” is likely to stay. A survey of the residents’ perspective helps to identify preferences and hindrances faced by trainees which can help in efficient modification of training programs. In this study, most residents found the webinars a useful adjunct, irrespective of regular teaching program at their institutes.

As expected, there was a significant reduction in total number of surgeries during COVID-19 time. There was a

drastic reduction even in emergency procedures during the complete lockdown period which later increased during unlock phases. Similar trends of a sudden reduction in plastic surgery cases followed by plateau have been reported from Brazil and Italy.¹³⁻¹⁵ Although a significant reduction in complex microsurgical and combined orthopedic and plastic surgery reconstructions was observed, proportion of hand and faciomaxillary injuries remain similar to that of pre-COVID-19 era, benefitting residents’ training.

There was a preference for local or regional flaps over complex microsurgical reconstruction to reduce operating time and patients’ hospital stay.^{5,16} Routine services were totally suspended, consequences of which is hard to foresee as conditions such as craniofacial cleft deformities, brachial plexus injuries, nerve injuries, and burn contractures can potentially become urgent within a limited time frame. Although, teleconsultation is less feasible in surgical specialties, assessment of patients through photographs and video calls has helped address problems to a limited extent.^{15,16}

The pattern of injuries when compared with pre-COVID-19 times was surprising. There was a reduction in road accidents whereas pandemic period witnessed an increase in assault and domestic accidents. These can potentially be attributed to social and economic impact of pandemic. The lockdown and circumstances of “work-from-home” could have potentially increased number of domestic or indoor accidents, especially finger-tip injuries. Studies have demonstrated worsening of psychiatric symptoms and increased psychological disturbances due to the COVID-19-induced lockdown.¹⁷⁻¹⁹ This is indirectly reflected in increase in assault injuries.

The training of surgical residents is the worst hit. Many institutions have resorted to alternate modalities such as

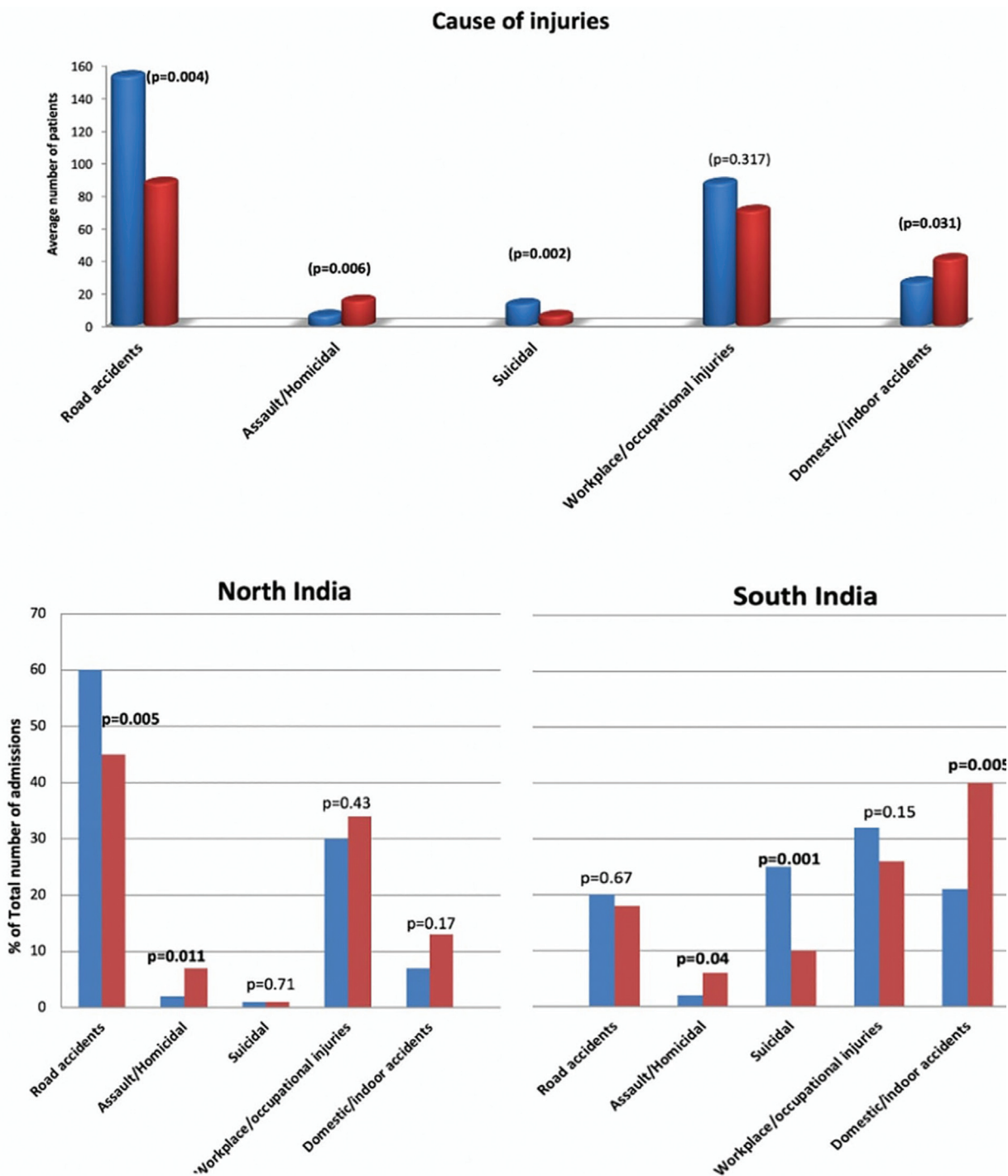


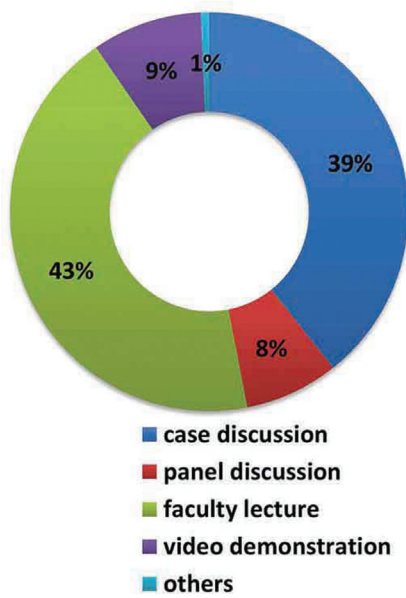
Fig. 6 Upper row: comparison of the cause of injuries between COVID-19 and pre-COVID time period (*p*-value by Mann–Whitney *U* test). Lower row: comparison of regional variation in the trends in the cause of injuries during the two time periods (*p*-value by Mann–Whitney *U* test).

virtual case discussions and simulation training.^{15,16} However, these can never match the real-time training. Although webinars were in existence in pre-COVID-19 era as part of teaching curriculums in the West, there has been a sudden surge during the lockdown both at national and international levels.^{12,20} A recent report demonstrated an increase in the Joint Committee on Surgical Training (JCST) quality indicators for webinars in terms of duration and frequency both for

new and existing webinars for plastic surgery trainees in the United Kingdom.¹¹ A 3,250% increase in the number of webinars from January to May 2020 was reported.⁸

The “webinar culture” is relatively new in the Indian scenario and has received mixed responses from both consultants and trainees. A recent survey from India demonstrated that 65% consultants and 93% residents felt the need to continue virtual teaching even after the pandemic.²¹

Format preferred by residents



Distribution of topics

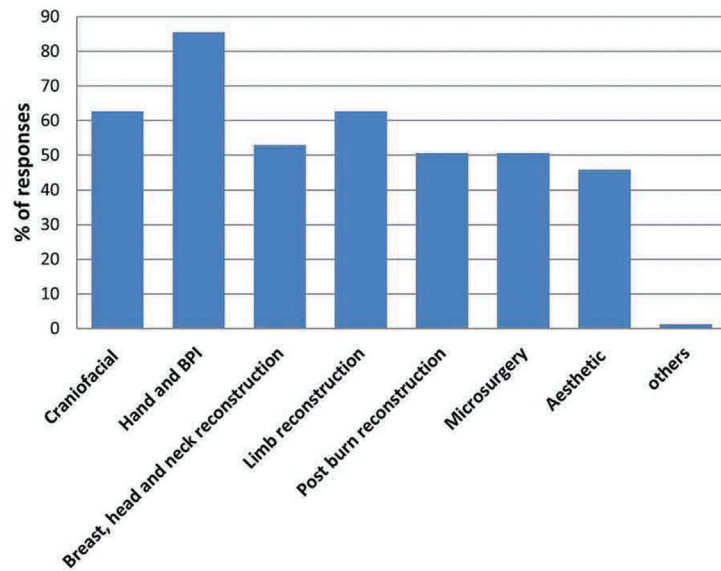
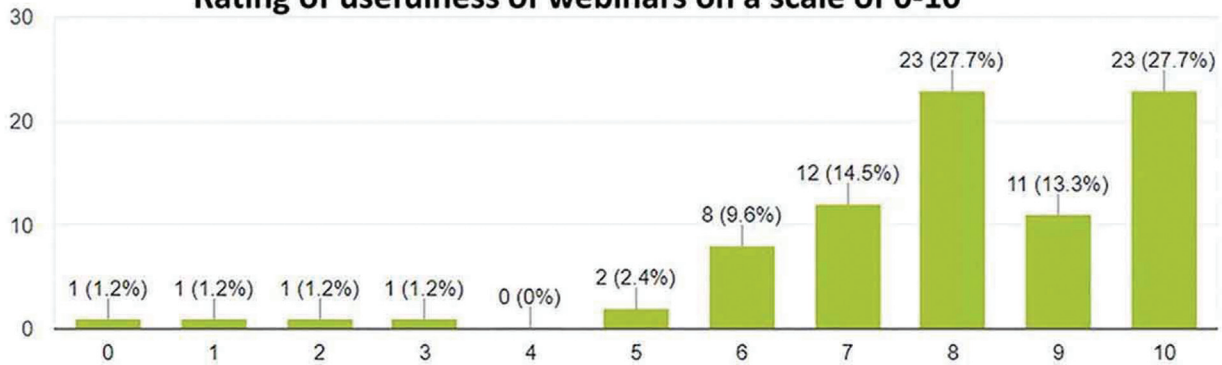


Fig. 7 Distribution of preferred webinar formats by residents and the various topics of webinars during the pandemic.

Rating of usefulness of webinars on a scale of 0-10



How webinars have helped in training?

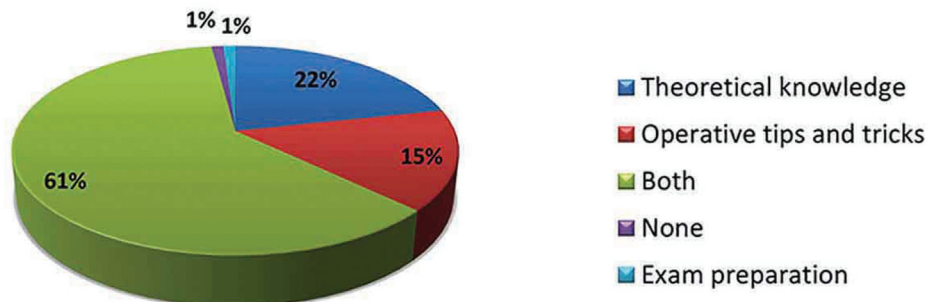


Fig. 8 Residents' perception of usefulness of webinars on plastic surgery training.

Similar results were seen in the present study. Analysis of the residents' perspective will help identify factors that students find helpful and those that need improvisation. Students found case discussions and faculty lecture formats most useful. The inadequately addressed queries due to lack of

direct interaction with speaker and poor moderation was a concern for many. Dharini et al reported that 67% of residents felt third-party webinars were better than their regular departmental teaching.²¹ In our study, the hours of structured academic program at training institutes did not affect

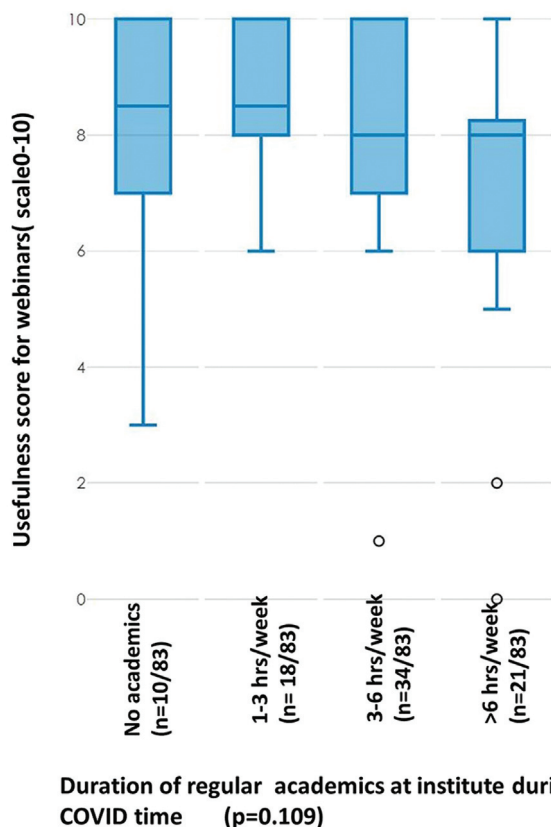


Fig. 9 Correlation of regular academics at the training institutes with the residents’ perception of utility of webinars (p-value by Kruskal-Wallis test).

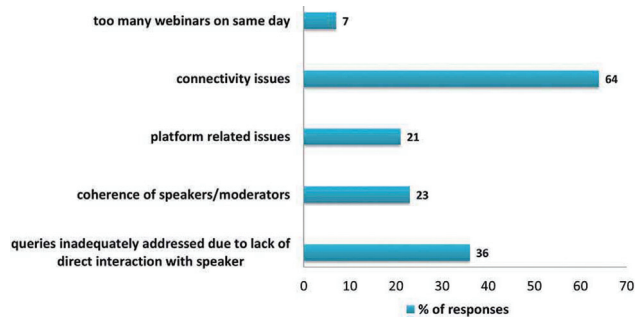


Fig. 11 Residents’ perspective on hindrances and factors that need improvisations for the conduct of webinars.

residents’ perception of the usefulness of webinar significantly. However, it was surprising that the number of conferences /webinars attended in pre-COVID time and the proportion of time dedicated for webinars by the corresponding resident during COVID-19 time were similar. This may indicate that although the awareness and frequency has increased, the perception of attending too many webinars because of the pandemic may be an apparent change. However, a detailed analysis of other factors which have a bearing such as duty schedule, travel, personal factors, and so forth is required in a larger sample. The virtual classes have a potential role as adjuncts in the training programs as well as conferences; however, the conduct has to be systematic and regulated.

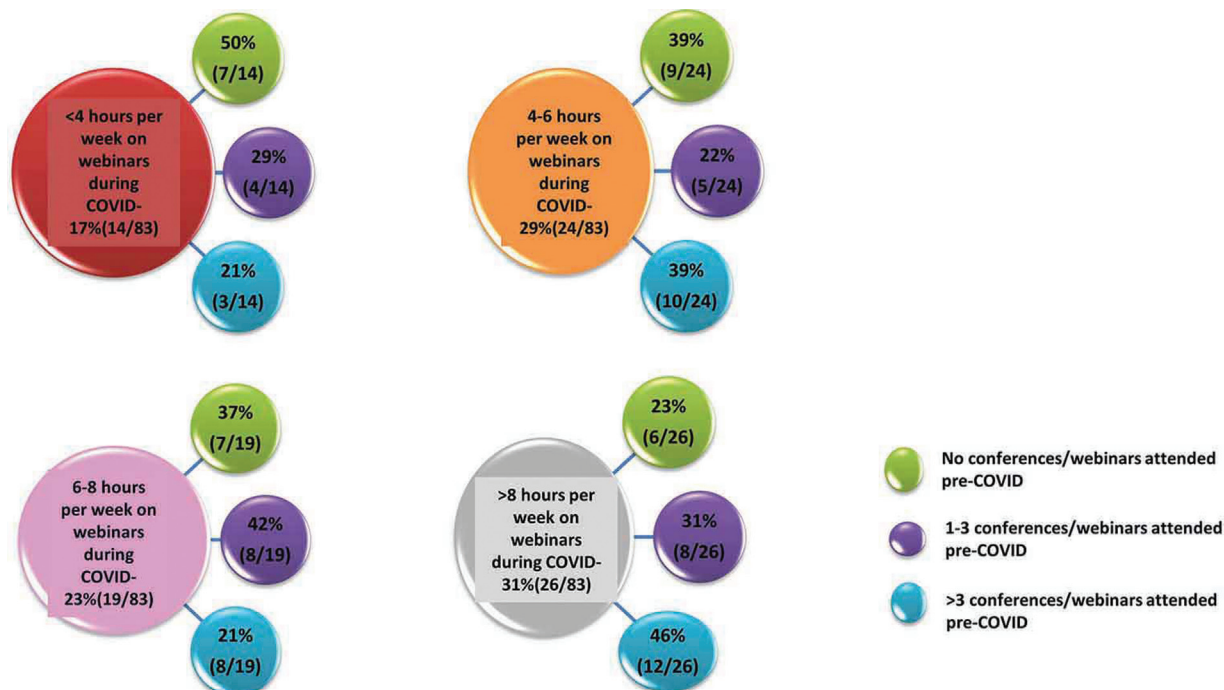


Fig. 10 Comparison of the average time spent on webinars during COVID-19 time to the number of conferences/webinars attended by the corresponding residents in the pre-COVID period (p = 0.614 by chi-square test for R-by-C table). The larger and smaller circles represent the COVID-19 and pre-COVID-19 time periods, respectively.

Conclusion

There has been a drastic reduction of elective procedures during COVID-19 time, thereby negatively affecting resident training program. The proportion of emergency procedures is comparable with that of pre-COVID-19 time. Majority of the residents felt that webinars could find a place in formal resident education program in post-COVID-19 scenario. These quantitative data can potentially help in developing guidelines for restarting of services and restructuring of the training program.

Financial Disclosures

None.

All the study procedures are conforming to the Declaration of Helsinki.

Author Contributions

Dr. Satyaswarup Tripathy, Dr. Devi Prasad Mohapatra, and Dr. Mohsina Subair were involved in the study design, data collection and interpretation, and writing of the manuscript. Dr. Ranjit Kumar Sahu and Dr. Ramesh Kumar Sharma were involved in writing of the manuscript and critically assessed the manuscript for intellectual content. Dr. Subhendu Khan, Dr. Sharda Renu, Dr. Chandra Kunwari Singh, Dr. Suraj. R. Nair, Dr. Shijina Koliath, and Dr. Imran Pathan were involved in data collection and analysis and writing of the manuscript.

Conflict of Interest

None declared.

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