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EDUCATION AND TRAINING UPDATE

The impact of virtual medical student surgical conferences

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Abstract

Background In recent years, the number of people pursuing a surgical career in the UK has decreased. The COVID-19 pandemic has led to the cancellation of surgical placements for medical students and has affected surgical education. This study evaluates the perceptions and impact of a 1-day virtual surgical conference for medical students considering pursuing a surgical career.

Methods All delegates of the 2021 Barts and The London International Surgical Conference were invited to participate in two online surveys pre- and post-conference. Data were collected and analysed to evaluate delegates' reasons for attending the conference, and attitudes towards virtual conferences and a surgical career before and after the conference.

Results Out of 132 participants, 106 (80.3%) completed both the pre- and post-conference surveys. Clinical students showed a statistically significant difference in interest in pursuing a surgical career after the conference than before (P=0.03), unlike pre-clinical students (P=0.12). Post-conference, 43 (40.6%) preferred a virtual to a face-to-face conference, which was a slight increase from 40 (37.7%) pre-conference, while 73 (68.9%) and 80 (75.5%) participants favoured virtual talks and presentations respectively. In contrast, only 12 (11.3%) and 21 (19.8%) students preferred workshops and networking virtually. Furthermore, delegates liked the global accessibility and environmentally-friendly nature of virtual conferences but found they can be less engaging and be disrupted by a poor internet connection.

Conclusions Virtual surgical conferences have many benefits and can help encourage medical students towards a surgical career. They could help bridge the surgical educational gap in medical school during these unprecedented times. Virtual conferences, which have a broader and more inclusive reach, could be an important complement to conventional conferences after the pandemic.

Key words: Conferences; Medical education; Online; Surgical education; Virtual

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Introduction

In the UK, the attraction towards surgery, which comprises a unique combination of intellectual and technical challenges, has been diminishing in recent years (Twigg, 2017). Trends show a decrease in the number of applications for core surgical training, which is the first stage of surgical training in the UK (Health Education England, 2020; Patel et al, 2020). In addition, applications to higher surgical specialty training have seen a significant decline (Green et al, 2017). The ageing and comorbid population in the UK increases the demand for surgeons, which emphasises the need to encourage and support future surgeons (Patel et al, 2020).

Factors such as personality traits, academic interests, perceptions of work–life balance, duration of training and quality of clinical placements can influence the specialty that medical students and junior doctors choose (Vaidya et al, 2019; Yang et al, 2019). Motivation of students may be crucial in resolving the imminent dwindling interest in surgical specialties (Twigg, 2017). Medical schools can play a key role in promoting students' interest in surgery by offering early exposure to practical surgical procedures and addressing negative perceptions that students may have regarding a career in surgery (Makama and Ameh, 2010). In UK medical schools, a median of 15 weeks is spent in surgical specialties, where only

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minimal basic surgical training is provided (Ologunde et al, 2015; Yang et al, 2019). Very few medical schools provide clinical placements in cardiothoracic surgery, maxillofacial surgery or neurosurgery, demonstrating the reduced exposure to surgical specialties in the medical school curriculum (Vaidya et al, 2019). In contrast, students found conferences, surgical skills workshops and career talks organised by student-led surgical societies to be the most useful events for career planning (Ologunde et al, 2015). Surgical conferences are effective in encouraging students to pursue a surgical career (Al Omran et al, 2017).

The COVID-19 pandemic has shone light on the frailties of surgical training, and how mitigating measures have had a profound impact on many aspects of surgical education. Traditional teaching and training methods for medical students, including lectures, clinical placements and elective opportunities, were deemed unsafe because of the need for social distancing measures. They have been replaced by either synchronous or asynchronous online modalities (Dedeilia et al, 2020). Therefore, it becomes more important in this context to create opportunities for medical students to pursue their interest in surgery.

Surgical conferences have been a platform for guest speakers and students to share their research and breakthroughs in the specialty, which serve as important learning moments for all attendees. In addition, gathering of clinicians, trainees and students offers networking opportunities, which can promote career-defining mentorship relationships and academic collaborations. Last, hands-on workshops enable participants to learn about technical skills relevant to the surgical field (Vervoort et al, 2021). As many conventional conferences and meetings were cancelled as a result of the pandemic, virtual conferences and webinars have been a useful platform for continuing surgical education during this time. Saving time, money and resources, virtual conferences are more than an alternative to conventional conferences. Apart from attracting international participants for local events, virtual conferences help increase worldwide collaborations and offer students an opportunity to present their research on an international stage. As a result, increased access to high-quality virtual meetings may turn out to be an effective alternative for education, research and information dissemination (Rubinger et al, 2020).

Virtual conferences, which have a broader and more inclusive reach, could be an important complement to conventional conferences after the pandemic. As far as the authors are aware, there are no studies in the literature on virtual surgical conferences for medical students. Therefore, the authors evaluated the perceptions of virtual surgical conferences targeted at medical students worldwide and their impact on participants' future career aspirations.

Methods

The Barts and The London Surgical Society has been running an annual 1-day National Undergraduate Surgical Conference for medical students since 2011. This consisted of a series of talks and workshops covering a wide array of surgical specialties, which were primarily delivered by consultant surgeons and junior surgeons respectively. There were also oral and poster presentations by medical students. The 2021 conference took the same format, delivered for an online audience via Zoom (Zoom Video Communications Inc., San Jose, CA, USA).

On the day of the conference, delegates were asked to fill out two online surveys, designed on Google Forms. Both questionnaires were sent to the 132 delegates who registered for the conference via email and through the Zoom chat box. The first and second questionnaires were sent out to participants' emails before and after the conference. The pre-questionnaire (**Appendix 1**) was live from the day before the conference until 2 hours after the conference started. The post-questionnaire (**Appendix 2**) was live for a 48-hour period starting as soon as the conference ended. Delegates were asked to complete both questionnaires for feedback and research purposes.

The surveys aimed to assess whether the participants found the virtual conference impactful in inspiring them to pursue a surgical career, and whether they would prefer futures conferences to be fully online or to have certain aspects online. The data were anonymised, analysed, tabulated and are displayed as proportions of the final results. Common themes from the free-text responses were noted and categorised into various groups following discussion between two of the authors (CC and KL).

In the UK, there are pre-clinical and clinical medical students. Year 1, year 2 and graduate entry programme year 1 (an accelerated pathway for postgraduates) students are considered pre-clinical as most of their curriculum is lecture-based, whereas year 3, 4, 5 and graduate entry programme year 2, 3 and 4 students are considered clinical year students, as most of their teaching is primarily based in hospitals or community placements. The results have been analysed as per these definitions.

Continuous variables were presented as means±standard deviation (SD) and compared using unpaired (Student's) *t*-test, to evaluate differences between pre-clinical and clinical groups. Categorical variables were compared using Chi-squared and Fisher's exact test. A probability of <0.05 was considered to be statistically significant.

As per the NHS Health Research Authority's online decision tool (Medical Research Council, 2020), this study did not require formal ethical approval.

Results

The virtual surgical conference was attended by 132 students, of which 106 (80.3%) completed both the pre- and post-conference survey. Of these respondents, 61 (57.5%) were female and 45 (42.5%) were male, with 48 (45.3%) being preclinical students and 58 (54.7%) being clinical students. Participants comprised students from 12 out of the 33 medical schools in the UK, as well as nine international students from four different countries (Ukraine, Bulgaria, Malta and India).

The students' interest in pursuing a career in surgery was assessed before and after the conference, using a Likert scale of 1–10, with 1 being no interest in surgery and 10 being extremely interested. The average interest level in surgery of all the students before the conference was 8.37±1.53, this increased to 8.87±1.27 after the conference (P=0.01). The clinical cohort illustrated a statistically significant increase in interest levels in pursuing a career in surgery before and after the conference, 8.40±1.56 and 8.95±1.19 respectively (P=0.03). However, the pre-clinical cohort did not demonstrate a significant increase, as it changed from 8.33±1.52 to 8.77±1.19 (P=0.12).

Almost 60% of participants (n=63) chose general surgery as one of the three surgical specialties that they are most interested in pursuing at this stage. This was followed closely by 51.9% (n=55) of participants interested in trauma and orthopaedic surgery, and cardiothoracic surgery in third place with 42.5% (n=45). All ten surgical specialties presented in order of students' top three interests are shown in Figure 1.

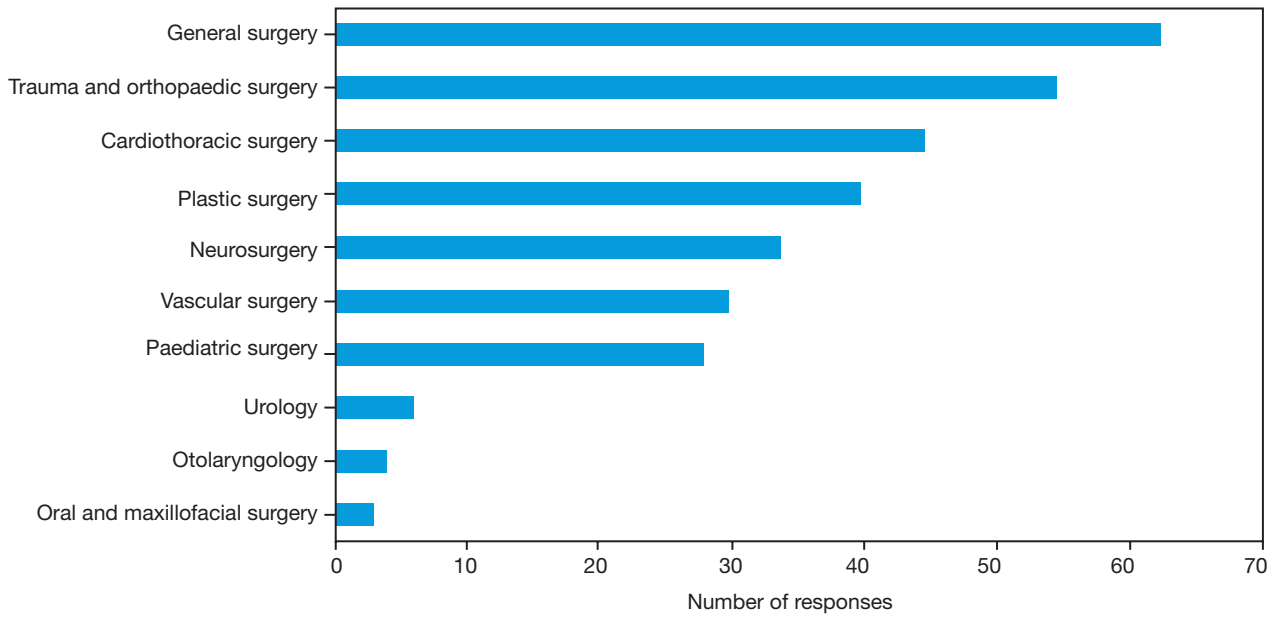

Figure 1. Surgical specialties ranked on basis of students' top three interests.

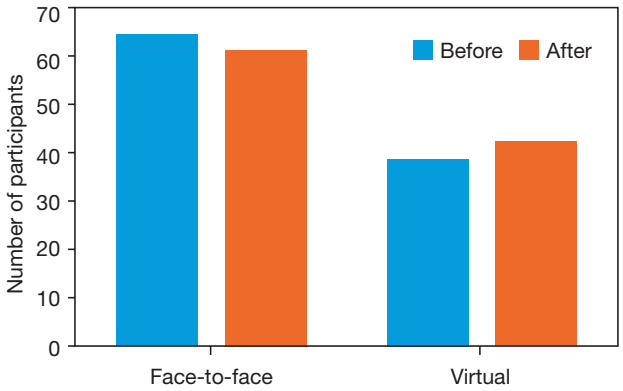

Figure 2. Preference of face-to-face vs virtual conferences before and after the conference.

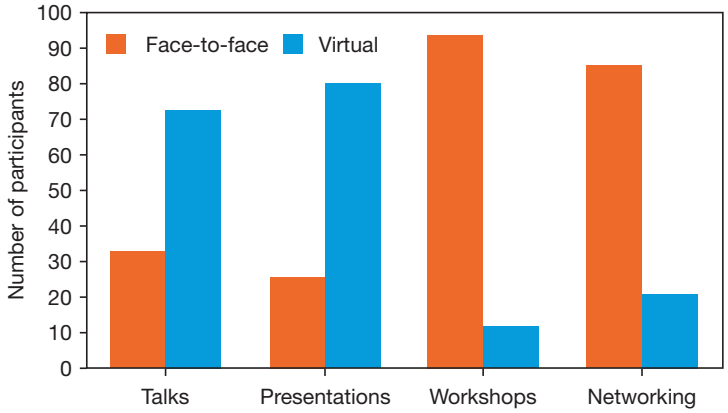

Figure 3. Preference of face-to-face vs virtual in categories of conference content.

Before the conference, 40 (37.7%) people preferred virtual compared to face-to-face conferences, which only increased to 43 (40.6%) after the virtual conference (P=0.78) (Figure 2).

The Chi-squared test statistics was 61.60 with an associated P<0.001, indicating that the preference of face-to-face and virtual modality is associated with the delivery of different conference elements. The number of students that preferred talks and presentations in a virtual format were 73 (68.9%) and 80 (75.5%) respectively. In contrast, only 12 (11.3%) and 21 (19.8%) students preferred workshops and networking to be delivered in a virtual manner (Figure 3).

Students responses for what they like and dislike about virtual conferences are shown in Table 1.

A total of 59 (55.7%) students thought that there was a lack of surgical education in the medical school curriculum, 41 (38.7%) answered not sure, and 6 (5.7%) responded that there was adequate surgical education. A total of 81 (76.4%) students, primarily from the clinical cohort, reported that COVID-19 affected their surgical experience for reasons such as a lack of theatre time and clinical exposure, reduced opportunities to meet patients and cancellation of medical school placements including electives.

Discussion

Interest in a surgical career

This study evaluated the effectiveness of virtual conferences with regards to pursuing a surgical career among medical students, and whether virtual conferences would be dominating such events in the future. The interest in pursuing a surgical career among clinical students increased significantly after the virtual conference, which differs from a similar study based on face-to-face conferences (Vervoort et al, 2021). Traditionally, clinical students gain more exposure during clinical placements in the final 3 years of medical

Table 1. Students' responses regarding what they like and dislike about virtual conferences

Likes	■ Easy access ■ Ability to collaborate in real time ■ Environmentally friendly ■ Ability to see presentations clearly
Dislikes	■ Connectivity and technological issues ■ Less engaging ■ Lack of hands-on experience ■ Lack of interaction

school, allowing them to see both the appeal and downsides of a surgical career. However, the pandemic has disrupted clinical placements for medical students, especially as a result of the cancellation of elective surgery, redeployment of surgical staff to the COVID-19 frontline and only essential workers being present for social distancing purposes (Lucey and Johnston, 2020). Conferences such as this one allow students who have had reduced surgical exposure as a result of missed placements to learn about surgery.

Although medical students in pre-clinical years did exhibit an increase in interest in surgery, this was not statistically significant. This may be because they have had predominantly online teaching, and minimal practical exposure compared to their clinical counterparts. Therefore, they are less likely to associate the virtual experience with the real-life hands-on aspects of surgery. It is important to note that the baseline interest for both these subgroups were high at an average of 8.37±1.53 pre-conference, indicating that students who attend academic conferences such as these have an initial interest that could have influenced their decision to attend.

There are many factors that influence career decisions in medical students. This includes positive experience and sufficient early exposure as undergraduates, followed by lifestyle factors, mentorships, income and prestige (Yang et al, 2019). This study showed that general surgery, trauma and orthopaedics, and cardiothoracic surgery were the more popular specialty choices. This could be a result of the set up of the conventional MBBS curriculum, where there are few surgical placements, which tend to only include general surgery and trauma and orthopaedics. Exposure to other, more niche specialties is usually gained from extracurricular activities or student-selected components. For example, Kielty et al (2017) showed that there is a lack of understanding of what a career in oral and maxillofacial surgery entails among Irish students. The majority indicated that they had no previous exposure, thus this could potentially influence their awareness and understanding of the specialty. It is important for students to have exposure to a wide variety of surgical specialties in order to make an informed decision regarding their future career.

Virtual conferences vs in-person conferences

The impact of COVID-19 has driven medical education to adapt quickly, using online platforms to compensate for reduced or cancelled in-person teaching and placements (Lucey and Johnston, 2020). Online conferences are a more environmentally-friendly option with reduced need for travel, increased accessibility and reduced cost, as demonstrated by Kruger and Chowers (2020). This study found an increased preference for virtual compared to in-person conferences. Attendees also cited environmentally-friendliness, real-time collaboration and easy access as some of the advantages of a virtual setting.

Infrastructure and technology have been identified as a barrier for online events. As seen in this article, poor connections and technology issues affected participants' online experience. O'Doherty et al (2018) expressed that the lack of appropriate infrastructure and internet connection, depending on personal and geographical context such as seen in low-income families or countries, can negatively impact the individual's experience.

Attendees preferred talks and presentations to be done online, citing that they were able to see the presentations clearly. However, this preference did not translate to other conference elements, as attendees preferred workshops and networking to be done in person.

This could be because of the lack of interaction and limitations to hands-on experience when using a virtual platform. Dost et al (2020) demonstrated that the lack of interaction between students during online events has been a barrier to the success of virtual medical education, in addition to the detrimental effect on mental health.

Future research

The large number of online events as a result of the pandemic means that a direct comparison on overall effectiveness over in-person teaching cannot be accurately assessed. This would be a consideration in the post-pandemic future when in-person events can be done concurrently with virtual events.

Furthermore, students' perceptions change over time as they begin foundation training. This could be a result of changing personal circumstances, inflexible working hours and other lifestyle factors which have previously been reasons for leaving surgery (Hampton et al, 2020). Thus, it is important to assess the long-term effects of undergraduate conferences on choosing a career in surgery by conducting follow-up studies at regular intervals following graduation.

This article has identified two factors which may have an impact on students' perception of a surgical career: gender and experience (preclinical and clinical). This conference was attended by more female than male students, and more clinical than pre-clinical students. However, the differences between the numbers of males and females and clinical and preclinical students was negligible. Moving forward, further steps in examining the cohort and dissecting the potential perceived or hidden barriers to pursue a career in surgery should be undertaken. This includes obtaining a cross-sectional baseline interest level of medical students for comparison, as well as detailed demographics and diversity information about participants, including their ethnicity, sexuality and religious beliefs. Although multiple efforts are being made to widen access into surgery, it would also be interesting to explore students' alternative specialty choices to help them navigate their career options. The authors are looking to collaborate with other university student societies to give a more representative picture.

Limitations

This study is not without its limitations. The sample population is relatively small with only 106 participants completing both questionnaires. The study population is not entirely representative of the UK medical student population, as they have a pre-existing interest in surgery as evidenced by the high baseline interest. Furthermore, this evaluation was based on a 1-day conference. A lack of resurvey after an interval does not consider medical students' wavering interests in specialties. Although the conference is valuable in increasing exposure, it is merely a taster of a surgical career that is not sufficient on its own to influence career decisions.

Conclusions

Virtual surgical conferences for medical students are valuable in gaining an insight into a career in surgery. It would be beneficial for key stakeholders such as the medical schools

Key points

- Virtual conferences can encourage medical students towards a surgical career.
- Students still prefer face-to-face conferences, but want more virtual elements.
- Students prefer virtual talks but favour face-to-face workshops and networking.
- Greater accessibility and environmental friendliness are advantages of virtual conferences.
- Virtual conferences can be an important complement to conventional conferences after the pandemic.

and the Royal colleges to continue to support and endorse such events at local, regional and national levels.

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Conflicts of interest

The authors declare that they have no conflicts of interest.

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Appendix 1. Pre-conference questionnaire

Please note that this is an anonymous questionnaire. Please use the same email address for both questionnaires. All data will be anonymised for analysis and dissemination.

Email

Gender
- Male
- Female

Age

Which medical school do you go to?

What year of medical school are you in? If you are doing an intercalated BSc, please select the recent year you were in. GEP = Graduate Entry Programme
- 1st
- 2nd
- 3rd
- 4th
- 5th
- GEP Year 1
- GEP Year 2
- GEP Year 3
- GEP Year 4
- Other:

On a scale of 1–10, how interested are you in pursuing a career in surgery before this event?
1 – Not interested at all
10 – Extremely interested

Which three surgical specialties are you interested in?

Please only click on three.
- Cardiothoracic surgery
- General surgery
- Neurosurgery
- Oral and maxillofacial surgery
- Otolaryngology (ENT)
- Paediatric surgery
- Plastic surgery
- Trauma and orthopaedic surgery
- Urology
- Vascular surgery

Would you want surgical conferences/symposiums to be virtual or face-to-face even after the pandemic?
- Virtual
- Face-to-face

Please explain why you would want surgical conferences/symposiums to be either virtual, face-to-face or both even after the pandemic?

What are the two main reasons for attending the conference?
- Learn more about the different surgical specialties
- Purposes related to career progression
- Virtual workshop skills, eg coding, 3D printing

- Opportunity to present work
- Opportunity to listen/see the work generated by the medical students presenting

Has COVID 19 affected your surgical experience during medical school?
- Yes
- No

How has COVID 19 affected your surgical experience? eg lack of theatres, clinics, ward rounds?

Do you think there is a lack of surgical teaching in the medical school curriculum?
- Yes
- No
- Not sure

Any other comments?

Appendix 2. Post-conference questionnaire

Please note that this is an anonymous questionnaire. Please use the same email address for both questionnaires. All data will be anonymised for analysis and dissemination.

Email

On a scale of 1–10, how interested are you in pursuing a career in surgery after this event?
1 – Not interested at all
10 – Extremely interested

Would you want surgical conferences/symposiums to be virtual or face-to-face even after the pandemic?
- Virtual
- Face-to-face

What do you like about virtual conferences/symposiums?
- Easy access
- Collaborate in real time – can send documents online
- Able to see presentation clearly
- Environmentally friendly – no travelling to venues
- Increased productivity and efficiency
- Asking questions anonymously
- Other:

What do you dislike about virtual conferences/symposiums?*
- Poor internet connection
- Less engaging
- Visual and audio only – lack of hands-on experience
- Less interaction between fellow delegates and presenters
- Other:

How would you like the following to be delivered: face-to-face or virtual?
- Talks
- Presentations
- Workshops
- Networking

Any other comments?