



## Impact of COVID-19 on Undergraduate Surgical Education in the UK

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### Abstract

**Background & Aims:** *The main aim of the study was to assess the impact of COVID-19 pandemic on surgical education for the medical students.*

**Methods:** *Final year medical students of Manchester University who had completed their surgical placement were invited to participate in the study. All participants were given a questionnaire through the University social media platform. Responses to the questionnaire were analysed to evaluate the outcome.*

**Results:** *The surgical education for medical students during the pandemic was analysed on various aspects like ward-based learning, out-patient clinic, theatre sessions and various teaching methods that were employed. Sixty-four percent of students felt that COVID-19 had a significant negative impact on ward-based learning, while forty percent felt that their learning in out-patient clinics was affected. All of them had an opportunity to attend at least one theatre session during the pandemic. On the other hand, forty eight percent of students felt that the theatre learning activities were adequate during this period while twenty four percent of students remained neutral in their view. Webinars remained the most attended teaching sessions with about eighty-eight percent of students receiving some form of online teaching, while simulation-based approach remained the most popular among the students.*

**Conclusion:** *Ward based learning has been significantly affected by the pandemic. Students were satisfied with the learning opportunities in theatre. Newer methods including actor-based simulation using MS teams, out-patients' clinics and simulation-based assessments were regarded the best teaching modalities and were highly appreciated by students.*

### Introduction

The index case of COVID-19 arrived in the UK in late February 2020<sup>(1)</sup>. Within a month, the UK was placed under strict lockdown measures,

including the closure of academic institutions across the UK<sup>(2)</sup>. Though there was much discussion about the potential role medical students could play during the pandemic<sup>(3)</sup>, it was

decided that they should be removed from placement for their own safety; so the medical staff could focus on the increased service demands.

The cancellation of placement was of particular concern for students in the penultimate year of their medical education due to the uncertainty surrounding when and how they were going to sit their final exams and the ramifications this may have for the junior doctor workforce going forwards. Despite being allowed to return to placement in August 2020, these issues still have no definite solution at the present time.

Due to the nature of the practice, the pandemic created specific problems for surgical specialties. The main issues involved cancellation of elective operations, personnel protective equipment (PPE) shortages and the removal of non-essential staff from theatres<sup>(4)</sup>. Surgery is widely regarded as one of the most practical specialties and it is known that engaged supervisors and hands-on opportunities contribute to the creation of future surgeons<sup>(5)</sup>.

Owing to a significant loss of learning period in the year 4 of academia, we aimed to evaluate the students' opinion of the impact of COVID-19 on their final year surgical placement and identify any practicable improvements that have been made by to enhance their education and learning as the students now have been permitted to return to placements

### Materials & Methods

A cross-sectional study was conducted with help of a structured questionnaire involving the final year medical students at the University of Manchester who attended the surgical placement at The Royal Oldham Hospital NHS Trust. The questionnaire was disseminated using a social media group for University of Manchester medical students known as One Med Buzz and their email address. Participation in the study was voluntary and no incentive was provided. Participating students had the option to leave their name and

email address to receive updates on the progress of the study.

The data were collected regarding the students' base training hospital and their respective specialty. Students were asked regarding the impact of COVID-19 pandemic on their surgical placement in terms of ward-work, clinics and theatres. The questionnaire also included information about teaching methods plus any other means employed to enhance their experience and training. Free response questions were also part of the survey. The students were invited to suggest improvements that could be made to their placement. The full questionnaire is attached as appendix 1.

The responses were collated into a spreadsheet and systematically organised into positive, negative and neutral opinions. The data were tallied and the mean and range calculated. The authors then reviewed the responses to identify recurrent themes in the opinions provided and scrutinised opinions that varied from the consensus.

### Results

Twenty-five students responded to the questionnaire, including the author (AC). The surgical placements were situated across various tertiary centres and district general hospitals in Greater Manchester. The participants' base hospital site and their specialty are listed in Table 1.

The number of students who remained absent from their placement due to COVID-19 illness or isolation secondary to a positive contact was 32%. (Figure 1)

The responses to questions regarding the impact of COVID-19 on ward-based learning were variable and regarded as positive, neutral and negative. The percentage of students who reported a Negative impact on their learning opportunities in terms of ward-based learning (history taking, examination and procedural skills) was 64%. The most commonly reported issue was fewer opportunities to examine patients due to the

pandemic. It was very difficult to organise the teaching sessions on the ward, with even fewer ward-based opportunities to learn procedural skills on the wards due to the potential risk of disease transmission. Interestingly, 16% of students reported that they felt the pandemic had positively affected their placement as they were given increased responsibility and opportunities to help the ward teams. A proportion of students (20 %) felt that the pandemic hadn't affected their placement in terms of ward-based learning activities.

The students were asked to suggest improvements to their learning on the wards. Students mentioned that a few initiatives undertaken during the pandemic including skill courses, simulation and video assisted teaching sessions during the ward placement enhanced their learning. Hence fourteen students (56 %) suggested no improvements to their placement in terms of ward-based learning although there was some suggestion to conduct more case-based scenarios and bed side teachings as soon as feasible. The students also mentioned that they accompanied the Consultants during ward rounds and also actively participated in morning handovers where majority of case discussion took place in a safe environment.

The attendance at the out-patient clinics (OPC) was quite variable. On an average, students attended 3 outpatient clinics during the rotation. Fifteen students (60 %) had an opportunity to attend 1-5 clinics during their placement. Three students (12 %) attended six to ten clinics while one of them had more than 10 clinics to attend. Six students (24 %) did not attend any out-patient clinics. Ten students (40 %) felt that their learning opportunities in the out-patient clinic were decreased in the wake of the pandemic. The main reason highlighted was the reduced opportunities for face to face consultation owing to the introduction of telephone appointments to help curtail the number of hospital attendances. A few felt that cancellation of OPC and social distancing norms were the main attributes for poor learning

outcomes in clinics. Seven students (28%) of the students reported that the changes to outpatient clinics in light of the pandemic had no effect on their learning. Interestingly, 32% of students mentioned that opportunities from the out-patient clinics had a significant positive impact on their learning. The reasons mentioned were fewer face-to-face appointments and more time allocated for teaching by the clinicians. The other reasons were that students had an opportunity to understand the way telephone clinics were carried out and they learnt how patients who were referred as suspected cancer were triaged to various battery of investigations.

Regarding any proposed improvements 14 students (56 %) had no suggestions for improvement. They felt that most of the opportunities wherever possible were used in teaching them. However, 11 students (44%) gave suggestions to make learning better for them in the clinics. They suggested more opportunities to take histories themselves, instead of only observation and a far greater number of such clinics and possible training in telephone consultations.

All students were able to attend at least one theatre session during their placement. Regarding the total numbers of sessions, fourteen students (56%) attended between one and five, eight students (32%) attended six to ten whilst three (12 %) had attended more than ten sessions. Nearly half of the students (48 %) felt that attending the theatre sessions has had a positive impact on their learning this was further enhanced by opportunities like scrubbing, learning skills (including catheterisation), surgical anatomy as well as anaesthetic agents.

Six students (24%) remained neutral in view of theatre learning experience during the pandemic. However, 28% (7/25) of students reported that COVID-19 had negatively affected their theatre experience. The reasons included reduced number of elective theatres, cancellations and fewer opportunities to scrub when compared with the previous year students. (Figure: 2).

Regarding any improvements, 11 (44 %) students did not recommend any changes, whilst few suggested more opportunities to scrub, organisation of simulation/ basic surgical skills course to improve skills like suturing and bladder catheterisation.

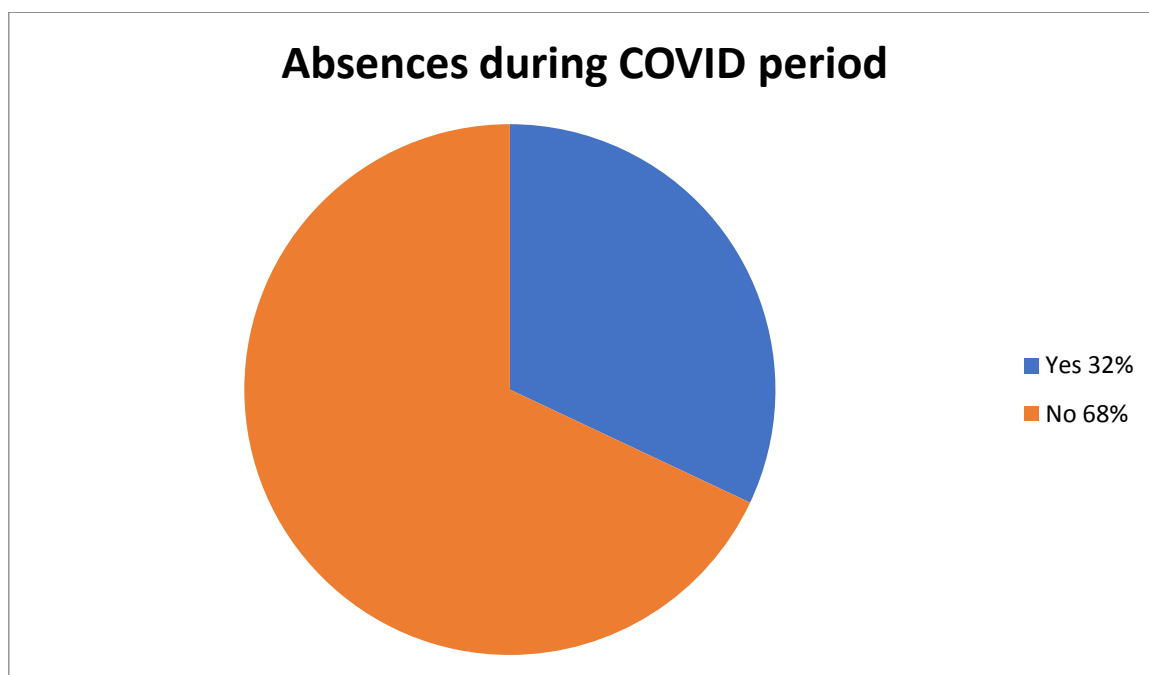
A variety of teaching methods were reported by the students that were used during their placements. This was multi-modal and included informal ward-based teaching, simulation based that included actors, webinars and case-based learning (Figure 3). The other highly liked method by the students was Objective Structured Clinical Skill Examination (OSCE) practice. Webinars remained the most used approach for teaching the medical students. Twenty-two students (88 %) received some form of teaching through webinars. Sixteen students (64 %) also underwent simulation based learning. The most popular teaching method was simulation based approach (Mock On-call Sessions) (Figure 4).

Finally, students were enquired if they had any general suggestions for an overall improvement in general surgery posting. About thirty two

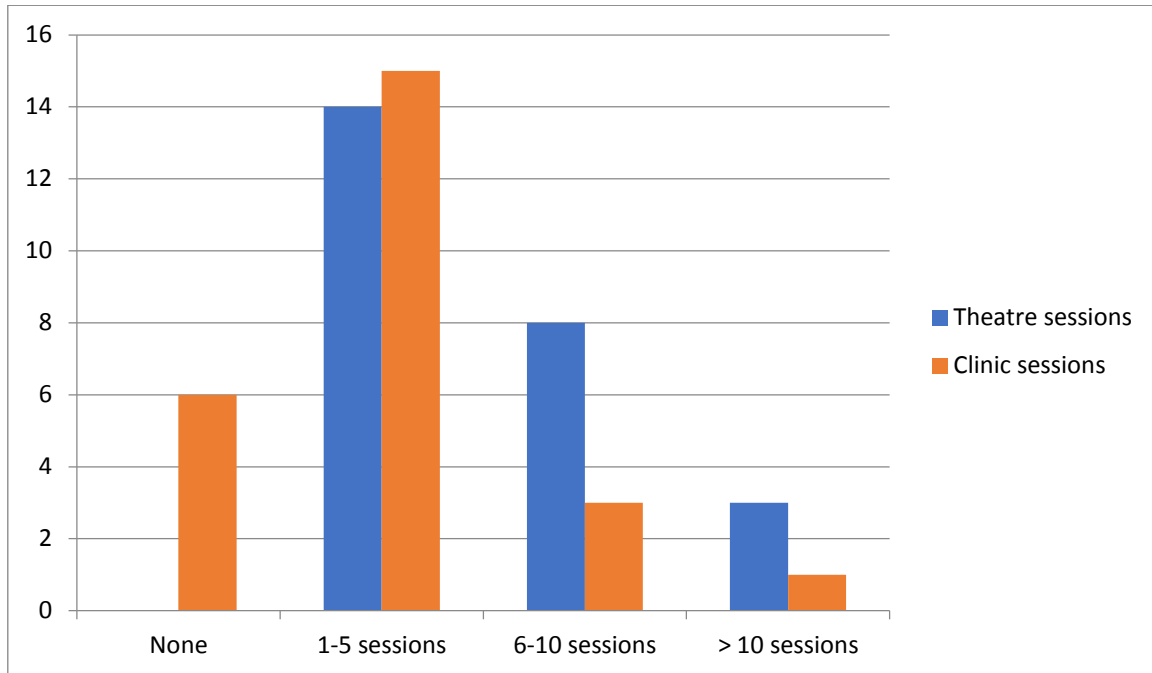
percent of students were completely satisfied with the quality of learning in their rotations. In general, the students felt that they would benefit from more theatre opportunities and simulation programs. Some of them recommended a greater availability of Personal protective equipment (PPE) so as to have a greater patient interaction (Figure 5).

**Table 1** The base hospital training site of participating students and surgical specialty of the placements

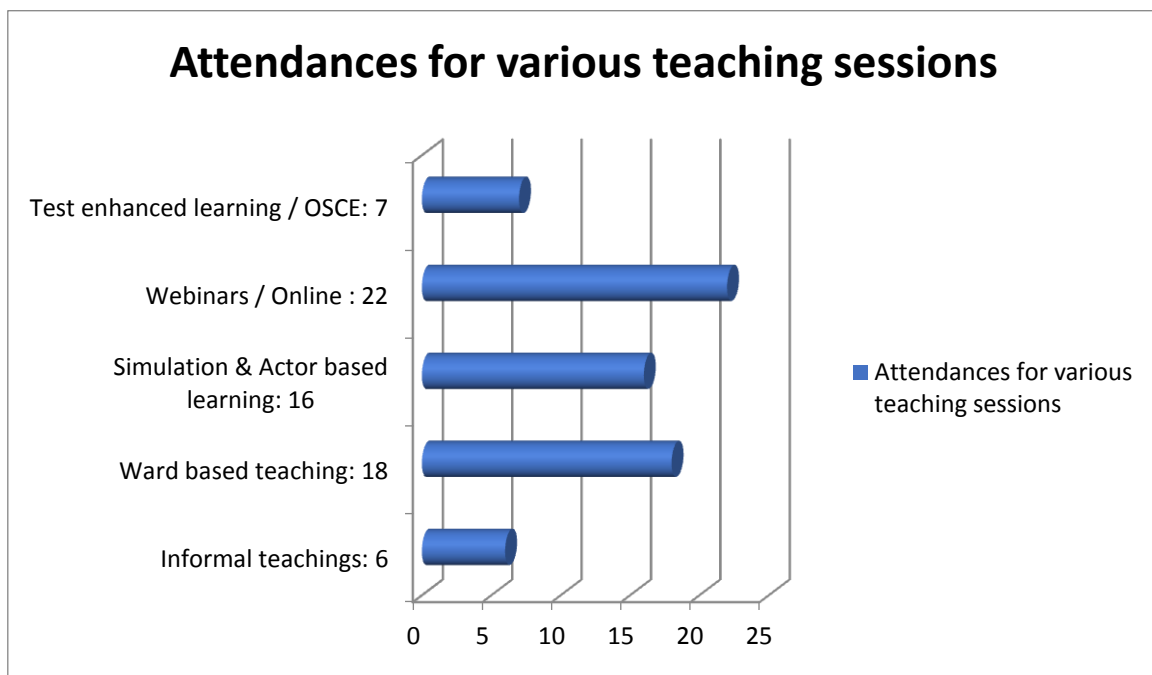
Base Hospital	Number of Participants
Salford	12 (48%)
MRI	9 (36%)
Wythenshawe	2 (8%)
Royal Preston	1 (4%)
Royal Bolton	1 (4%)
Surgical Specialty	
General surgery & sub-specialities	13 (52%)
Trauma & Orthopaedics	7 (28%)
Urology	3 (12%)
Cardio-thoracic surgery	1 (4%)
Paediatric surgery	1 (4%)



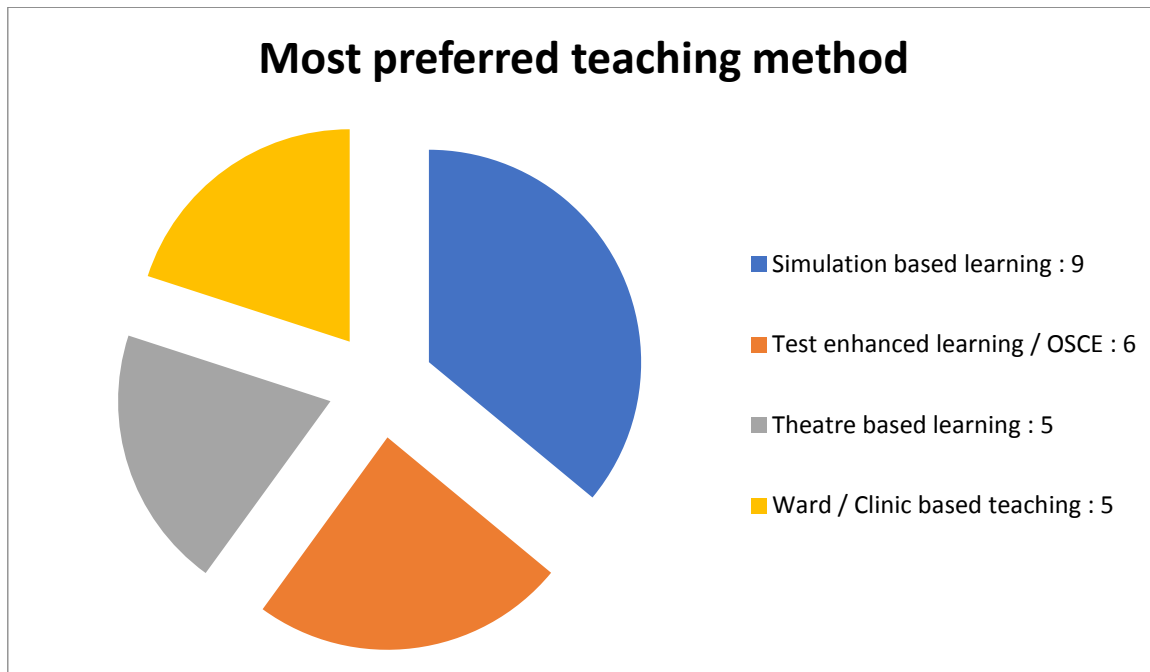
**Figure 1:** Sickness absence record



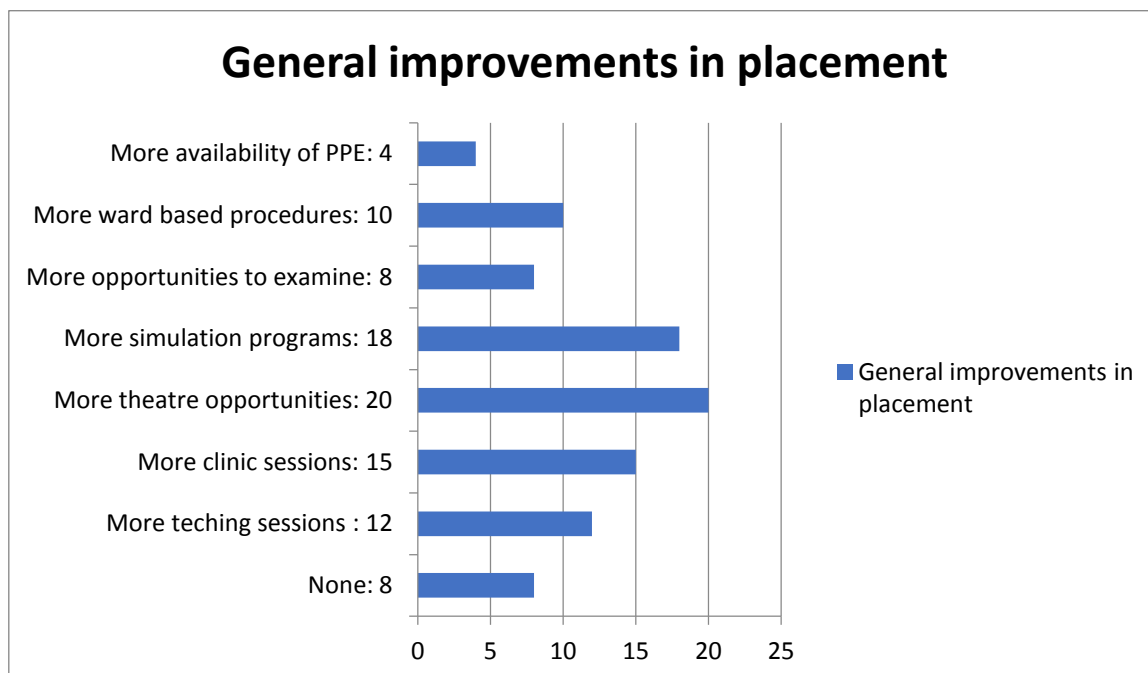
**Figure 2:** Attendances in theatre/ clinic sessions



**Figure 3:** Attendees for various teaching methods



**Figure 4:** Preferences among various teaching methods.



**Figure 5:** Various suggestions for better placement.

**Discussion**

This study aimed to assess the impact of Covid-19 pandemic on the overall experience of medical students during their surgical placements. The authors also assessed the impact and effectiveness of newer teaching modalities that were employed during this period so as to be used for future students who regularly rotate during their placements.

During the start of the pandemic, the statement issued by General Medical Council (GMC) was to remove medical students from placements.<sup>(6)</sup> More recently, the narrative from the GMC has put more stress to ensure that medical schools were suitably equipped to continue delivering the curriculum<sup>(7)</sup>. UK Medical School Council (UKMSC) and British Medical Association also maintained the same stand as GMC<sup>(8,9)</sup>.

Covid-19 has had a significant negative impact on health care systems around the world<sup>(10)</sup>. In United States, the medical education changed from time bound clerkships to competency-based time variable medical education<sup>(11)</sup>. A study highlights the challenges of health science education during COVID-19 pandemic which include maintaining an appropriate delivery of the intended curriculum, reliability of students' assessment and preparedness for transition from campus-based delivery of education to newer online curriculum delivery models<sup>(12)</sup>.

Ward based learning and experiences on the wards are very essential for medical students to acquire necessary skills and competencies before starting as Foundation doctors. About two-thirds of students reported that the ward-based learning was significantly affected during the pandemic. The most commonly reported concern among was reduced opportunity to perform patient clinical examinations. Similar outcomes have been reported by Joshua et al<sup>(13)</sup>. Various measures were employed to maximise the exposure and learning on the wards. Accompanying the consultant on ward rounds and observing them performing clinical examinations were attempted to improve learning. In addition to this, we also tried to incorporate actor-based simulation learning to make the overall experience more rewarding. Students felt that the actor-based simulation teachings were extremely beneficial. Video assisted learning and utilisation of web-based platforms like Microsoft Teams® (MS-Teams) were also effective to improve learning.

Before the start of the pandemic, students accompanied clinicians to avail the opportunity of learning patient histories and examination followed by discussions. Since the COVID-19 outbreak in the UK, most outpatient clinics have turned to virtual telephone consultations and fewer face to face consultations thus leading to a direct impact on a medical student's learning. We organised the clinics in a manner that the students would rotate amongst the clinicians thus maximising the number of patients they saw

physically. Additional time was spent subsequently to discuss the case so as to improve their learning. It was also considered that the medical students could conduct telephone consultations under direct supervision hence, giving them the opportunity to speak to patients individually. This would eventually boost the efficiency of light staffed clinics, providing education to patients and make enquiries about COVID-19.<sup>(14)</sup>

With a widespread cancellation of elective non-urgent surgeries, reduction in the number of people in operating room and fear of spreading the virus during Aerosol Generated Procedures (AGP) like laparoscopy had a significant reduction in number of theatre sessions that medical students attended. The teaching resources have been extremely limited with larger cancellations of elective list and fewer emergencies happening. With so many hurdles on the way, it was ensured that learning and medical teaching in the operating room still be carried on. The students were asked to attend the on-going emergency theatres and were given every possible opportunity to scrub and assist surgical procedures under supervision. They were also provided opportunities to learn about anaesthesia whilst they were in the operating room. Recent development to facilitate the practical skills using virtual or augmented reality is being considered<sup>(15)</sup>.

Regular teaching sessions were carried out by online teaching methods. This was to compensate for loss of learning and teaching sessions during the pandemic. Over half of the students who received simulation Teaching using mannequins and fake patients to simulate real clinical scenarios found it to be extremely enjoyable and effective. A recent study recommended tele-teaching technologies would be a valuable substitute to in-person lecture and clinic-based teaching.<sup>(16)</sup> To further enhance the experience of surgical placement various steps were taken to mitigate common issues including small group teachings, increased duration of sessions in clinics for an in-depth discussion, involving students

within-patients' care and conducting practical workshops and simulation courses so as to get them signed off for practical skills wherever possible was employed.

The feedback from students highlighted that more theatre opportunities, simulation teaching and increased number of out-patient clinics and teaching sessions would help to further enhance the surgical experience. All the above suggestions are plans are in the pipeline to address these concerns. One of the limitations of our study is a small sample size in the Greater Manchester area and it is possible that, with the variation in COVID-19 rates and lock-down rules in the UK, their views may not be representative of students in the rest of the country. The latest and advanced teaching methods have been the highlight of the pandemic which are very much appreciated by the students. Our recommendation would be to conduct future studies which should compare the difference in experience between tertiary centres and district general hospitals which may help to improve the student experience.

### Conclusion

In conclusion, many of the new challenges facing the provision of quality surgical placements can be mitigated by good communication between student, supervisor and other staff members about what learning opportunities are safe and achievable in the current climate. The results of the study suggest that students should expect some change from their previous experiences, but it should still be possible to have an engaging and inspiring surgical placement.

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### Appendix 1

#### Proforma- COVID impact on Surgical education

##### Name of the participant:

1. What is your base hospital?
2. What surgical speciality are you currently working in?
3. Have you had to miss any placements during COVID-19 pandemic?
4. In terms of ward-based learning, how do you think COVID-19 pandemic has affected your placement?
5. In terms of ward-based learning (history taking, examination, procedural skills), are there any improvements that could have been made to your placement?
6. How many outpatient clinics did you attend during your placement?
7. What new things that you learnt during COVID regarding patient management in Outpatient clinics?
8. In terms of outpatient clinics, are there any improvements that could have been made to your placement?
9. How many theatre sessions have you attended during your placement?
10. Please mention about positive learnings from Operating Room during COVID pandemic?
11. In terms of learning surgical skills, are there any improvements that could have been made to your placement?
12. Overall, how has your placement been affected by COVID 19?
13. What is the positive learning outcomes achieved during COVID 19? What are the methods employed to achieve them?
14. What teaching methods were employed during the pandemic?
15. Which teaching method you found to be most useful? Why?