http://medicaleducation-bulletin.ir
Original Article (Pages: 221-229)

Evaluating the Effectiveness of a Small Bowel Anastomosis Workshop during the COVID-19 Pandemic

*Chijioke Ikechi[1], Charannya Balakumar[1], Jaideep Rai[1], Roland Fernandes[1]

[1]Department of General Surgery, East Kent Hospitals University Foundation Trust, Kent, UK.

Abstract

Background: Surgical education has traditionally been implemented through both theoretical and practical training. The practical teaching, in particular, has been significantly impacted during the coronavirus disease 2019 (COVID-19) pandemic due to limited theatre time and a paucity of simulated or cadaveric courses. This study aims to evaluate the self-reported confidence and also knowledge of trainees attending a bowel anastomosis workshop.

Materials and Methods: Fifteen trainees attended a bowel anastomosis workshop at a district general hospital in September 2020. To adhere to social distancing and infection control measures, the trainees were split into three groups. Each workshop was divided into three sections: (1) end-to-end hand-sewn bowel anastomosis; (2) stapled anastomosis; and (3) stoma formation. Feedback was gathered from each attendee before and after each session using a questionnaire designed by the author that assessed self-reported confidence on a 5-point Likert scale.

Results: A total of 86% of attendees were core surgical trainees (CT). There was a measured improvement in the confidence of trainees for all three of the techniques; bowel anastomosis (1.9 vs 4.2, p = 0.0052), stapled anastomosis (2.2 vs. 3.8, p = 0.0082), and stoma formation (2.2 vs. 4.3, p=0.0036). A paired-samples t-test was used to compare the overall 'confidence' with each technique which combined the individual ratings for the theoretical and practical aspects.

Conclusion: Medical education has undoubtedly been affected by the pandemic. It is necessary that deaneries and hospitals support doctors to ensure the continuation of remote and face-to-face education by organizing sessions planned quarterly despite the pandemic with strict safety measures and improve the confidence of the trainees.

Key Words: Anastomosis, Confidence, COVID-19, Education, Social-distancing, Pandemic.

*Please cite this article as: Ikechi Ch, Balakumar Ch, Rai J, Fernandes R. Evaluating the Effectiveness of a Small Bowel Anastomosis Workshop during the COVID-19 Pandemic. Med Edu Bull 2021; 2(2): 221-29. DOI: **10.22034/meb.2021.305148.1027**

Corresponding Author:

Chijioke Ikechi, Department of General Surgery, East Kent Hospitals University Foundation Trust, Kent, UK.

Email: chijioke.ikechi@nhs.net

Received date: Apr. 15, 2021; Accepted date: Jun.22, 2021

1- INTRODUCTION

Surgical education has traditionally consisted of a combination of self-directed learning, theoretical teaching, and the acquisition of practical skills. Knowles described self-directed learning as "a process in which individuals take the initiative without the help of others in diagnosing their learning needs, formulating goals, identifying human and material resources, and evaluating the learning outcomes" (1). Traditional methods of surgical education through 'see one, do one, and teach one' have now largely been superseded by a definitive surgical curriculum based on the Surgical Royal Colleges in the United Kingdom (UK), and the Joint Committee on surgical training (2).

This involves:

1. Setting standards for what trainees should know and be able to do;

2. Developing national regulatory systems from agreed set standards;

3. Developing educational resources to support surgical training programmes;

4. Supporting the learning environment.

Core surgical training (CST) in the United Kingdom currently consists of two years of training culminating in the acquisition of required competencies enabling an application to higher speciality training programmes. Improving Surgical Training (IST) was introduced in 2018 led by The Royal College of Surgeons (RCS) and Health Education England (HEE). Trainees appointed to this programme have regular formative assessments to ensure progress against the core surgical curriculum, with appropriate feedback, personal reflection, and self-assessment before progressing directly into higher speciality training without the need for competitive selection.

Trainees are required to gain experience and proficiency both in the operating theatre and also in other clinical settings in order to progress to higher specialty training (3). The curriculum and progress of a trainee are documented on an electronic internet-based platform where clinical judgement, speciality-based knowledge, generic professional skills, and technical and operative skills are monitored. Several barriers to the provision of high-quality surgical training have been identified; these include the European Working Time Directive (limiting time in clinical settings), the new junior doctor contract, and most importantly the COVID-19 pandemic (4).

The pandemic, in particular, has caused a significant reduction in theatre exposure for all trainees and consequentially reduced operative opportunities and potential deskilling and poor development. The COVID-19 pandemic has had a major impact on patient care and on medical education in the United Kingdom (5). A national lockdown in the United Kingdom was followed by cancellation of elective operating lists and emergency theatres were largely consultant-led with a restriction to the numbers of staff allowed in theatres. There was also complete restructuring in each hospital by redeployment of staff to accident and emergency wards, intensive therapy units, and medical departments. This, understandably, has seen a disruption in medical education and training.

The re-introduction of surgical education in the form of simulation training has been shown to improve the skills of the trainees as well as instilling confidence in their surgical skills caused by the lack of operating time. Simulation allows trainees to learn and practice operating in a safe environment which is then transferable to clinical settings. Trainees are able to make mistakes in a safe environment, learn from the mistakes, and achieve fluency and

proficiency in the skill (6). The main aim of this pilot study was to assess the level of confidence the trainees had for a given task and whether this could be improved through a process of theoretical knowledge, observation of the desired technique, and hands-on practice on animal models.

2- MATERIALS AND METHODS

2-1. Study design and population

A prospective cohort study was used to compare the improvement in participant confidence with three procedural skills taught at a workshop in a District General Hospital. A total of 15 Core Surgical Trainees (CSTs), and Improving Surgical Trainees (ISTs) from across the Kent, Surrey, and Sussex Deaneries, UK, attended the workshop. A nominal fee was charged for the workshop to cover the cost of materials. Social distancing and infection control measures were adhered to at all times.

2-2. Methods

Feedback was gathered anonymously for each section of the anastomosis workshop evaluating a) their confidence of the trainees with the theoretical aspects of the technique b) their experience performing the technique and c) their confidence performing the technique. Participants were asked to rate their confidence on a 5-point Likert scale from 1 (not at all confident) to 5 (very confident). Responses were matched from participants pre- and post-session for each of the three sessions.

2-3. Measuring tool

Self-reported questionnaires handed to all the participants.

2-4. Intervention

Five trainees were placed in either morning, afternoon, and evening sessions each, respectively at a District General Hospital Education Centre in September 2020. Topics and skills covered in the workshop were: (1) hand-sewn end-to-end bowel anastomosis, (2) stapled anastomosis, and (3) stoma formation. Tissues used for the workshop were porcine bowel as well as porcine skin. Methods of teaching included the use of slide show presentations followed by live demonstrations by faculty members using Peyton's 4 steps approach of demonstration, deconstruction, comprehension, and performance (7). There were two faculty members at each session, one being a consultant and the other being a higher specialist trainee registrar. The attendees received immediate feedback on all three sections of the workshop along with completion of work-based assessments on their Intercollegiate Surgical Curriculum Programme (ISCP).

2-5. Inclusion and exclusion criteria

All CSTs and Improving Surgical Trainees ISTs from across the Kent, Surrey, and Sussex Deaneries were eligible to attend.

2-6. Ethical consideration

Consent was attained from all participants included in the study. Ethical approval was sought but not deemed necessary as the project is considered service evaluation.

2-7. Data Analyses

Data were analyzed using Microsoft Excel software (version 2016). An overall 'confidence' was calculated by averaging the responses to the three feedback questions. A paired t-test was used to compare the overall confidence before and after each session in the workshop.

3- RESULTS

There were 15 attendees in the bowel anastomosis workshop across three sessions. Of those attended, 86% (n=13) were core surgical trainees (CST). These were subdivided into 66% (n=10) core surgical trainees in year 2, and 20% (n=3)

CST1's. There was one Foundation Year 2 doctor and a final year medical student (**Figure.1**).

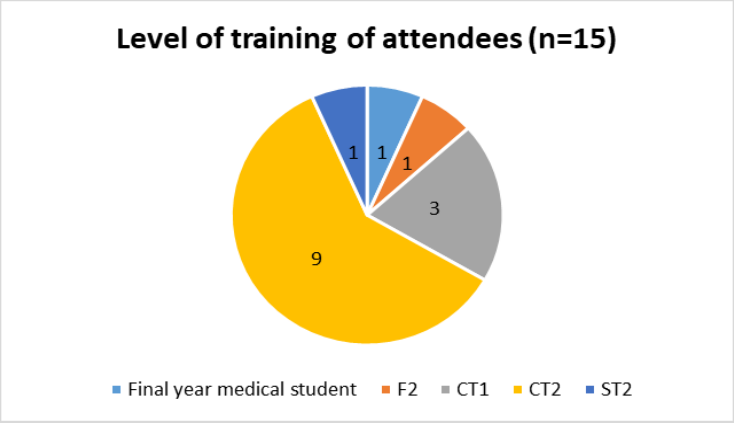

Fig.1: Level of trainees attending course.

A comparison looking into the level of confidence of the attendees in the theory of the task, their previous experience of the task, and performance prior to practice and after the practice session was collated. Across all three sessions, there was an improvement in confidence on each candidate score as seen in **Figures 2-4**.

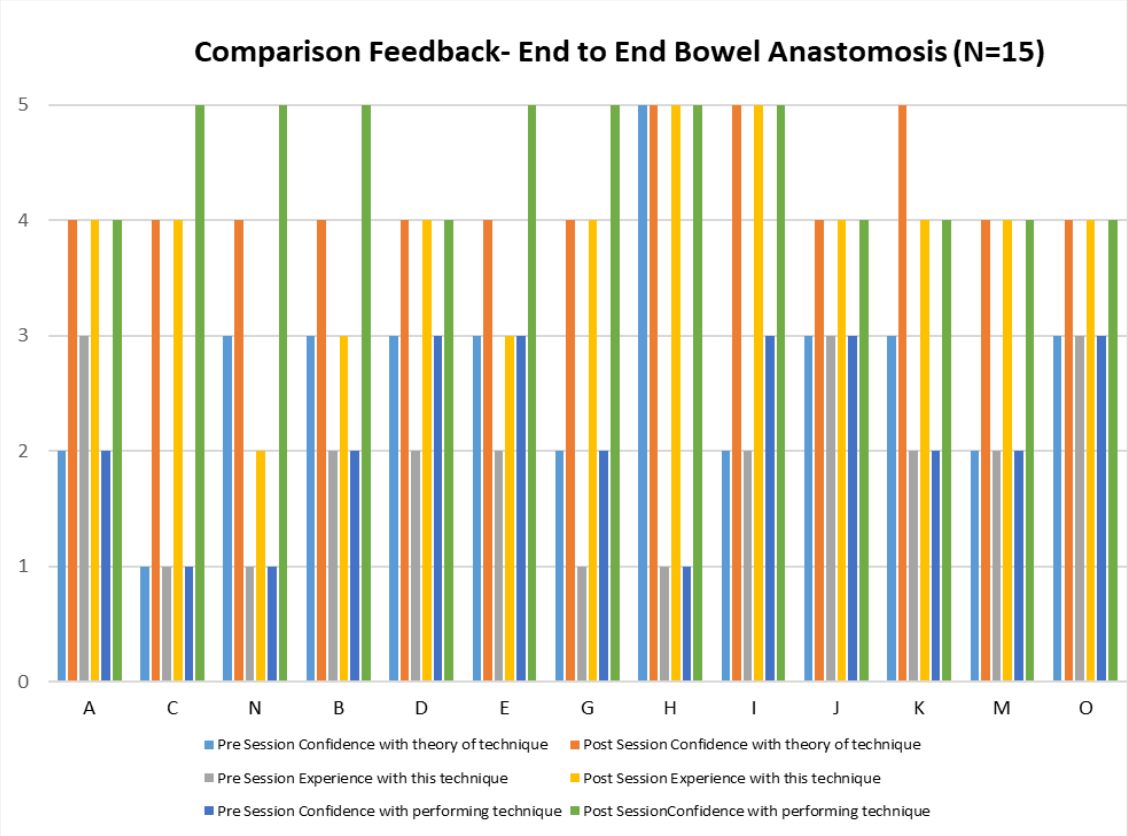

Fig.2: Pre-practice and post-practice scores of each attendee for session 1 (end to end bowel anastomosis).

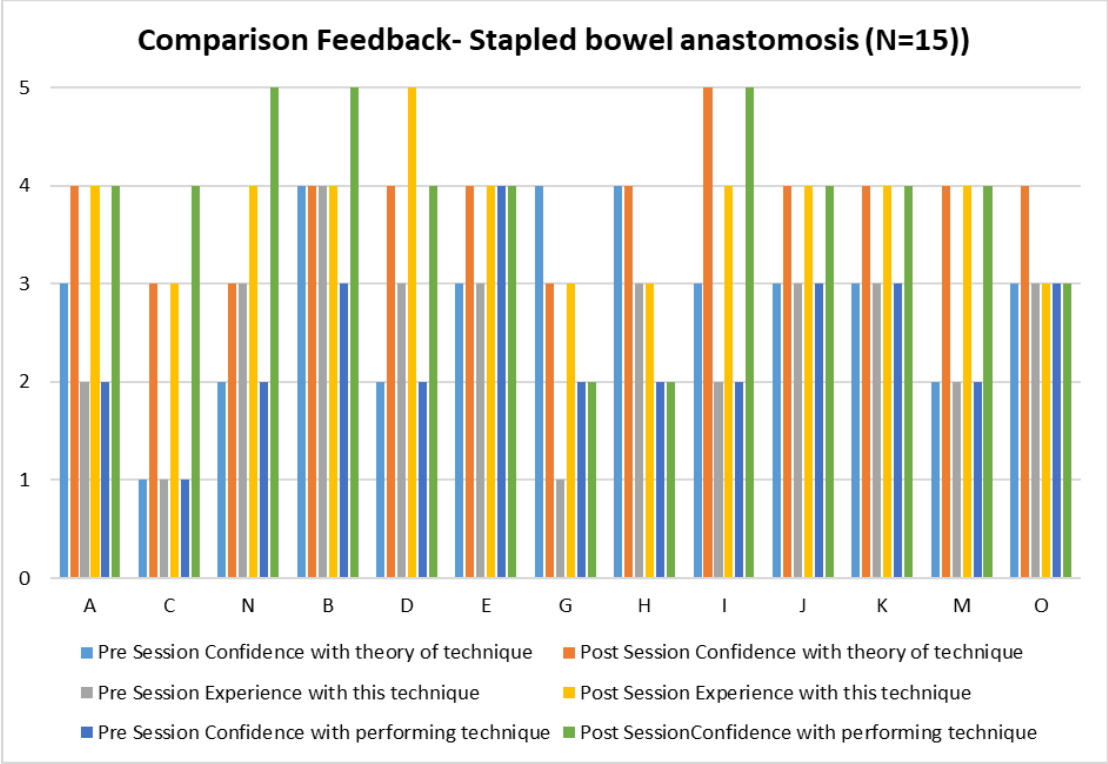

Fig.3: Pre-practice and post-practice scores of each attendee for session 2 (stapled bowel anastomosis).

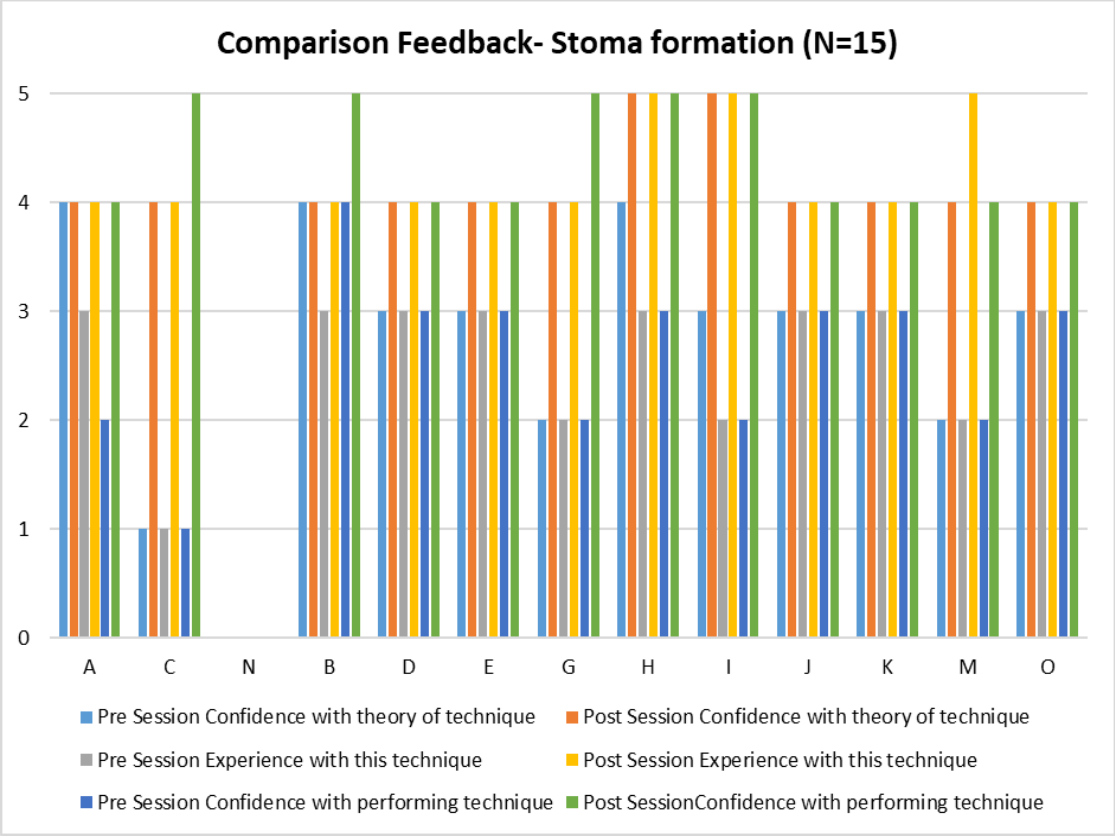

Fig.4: Pre practice and post practice scores of each attendee for session 3 (stoma formation).

The two-sample t- test revealed a statistically significantly increase in confidence amongst all attendees in pre session and post section feedback scores in performing the end-to-end bowel anastomosis (p=0.0052), stapled bowel anastomosis (p=0.0082), and stoma formation (p=0.0036) as shown in **Tables.1-3**.

Comparison between pre and post sessions of all attendees

Table-1: Comparison in confidence for end to end bowel anastomosis pre and post session.

End to End Bowel Anastomosis			
Feedback section	Number (n)	Mean (Average)	P-value
Confidence with theory			0.0052
Pre session	15	2.2	
Post session	15	4.2	
Experience with technique			
Pre session	15	1.6	
Post session	15	3.8	
Confidence with performing this technique			
Pre session	15	1.8	
Post session	15	4.6	

A paired samples t-test was used to compare the combined pre-session score and combined post-session score.

Table-2: Comparison in confidence for stapled bowel anastomosis pre and post session.

Stapled anastomosis			
Feedback section	Number (n)	Mean (Average)	P-value
Confidence with theory			0.0082
Pre session	15	2.6	
Post session	15	3.8	
Experience with technique			
Pre session	15	2.1	
Post session	15	3.7	
Confidence with performing this technique			
Pre session	15	2	
Post session	15	3.9	

A paired samples t-test was used to compare the combined pre-session score and combined post-session score.

Table-3: Comparison in confidence in stoma formation pre and post session.

Stoma formation			
Feedback section	Number (n)	Mean (Average)	P-value
Confidence with theory			0.0036
Pre session	15	2.4	
Post session	15	4.2	
Experience with technique			
Pre session	15	2.1	
Post session	15	4.1	
Confidence with performing this technique			
Pre session	15	2.1	
Post session	15	4.5	

A paired samples t-test was used to compare the combined pre-session score and combined post-session score.

4- DISCUSSION

The aim of this study was to assess the level of confidence of the trainees for a given task and whether this could be improved through a process of theoretical knowledge. At the end of the process, an overall increase was observed in the level of confidence for each of the set tasks. Surgical trainees need educational support and training through surgical skills as well as theoretical knowledge. Historically, surgical training was based on apprenticeship. However, there now exists a defined curriculum and training programme. The surgical curriculum defines trainee requirements in each stage of their training, and maps their progress through work-based assessments.

It is, therefore, important that trainees get the required core competencies for progression to higher speciality training. This has proven to be challenging during the COVID-19 pandemic with all elective operating lists being cancelled, trainees being in isolation due to sickness, as well as redeployment to other specialities to support the influx of COVID-19 patients admitted to hospitals. This disruption in training has had a considerable impact on education due to the postponement of royal college exams and the cancellation of revision courses for the MRCS exams. This pilot study has demonstrated that simple measures such as the explanation of the theory, observation of optimal techniques, and hands-on practical experience can have a significant impact on trainee confidence. These measures need not be in the theatre environment and in the current climate, one must be resourceful to continue surgical education. The fidelity of simulation refers to how closely the practice session resembles the real-life experience (8). Candidates learn from the mistakes in the simulation where it is acceptable as opposed to performing a skill that has not been witnessed or experienced by the candidate in clinical practice. Apart from learning through frequent practice, candidates are also exposed to problem-based learning curricula prior to performing the skill (8).

Surgical simulation has been encouraged through the introduction of an Intercollegiate Surgical Curriculum Project (ISCP) in 2007, by providing high-quality care for the surgical patients through systemic and competency-based progression, supervised by robust assessment processes (9). Today, simulation is centred on the adult learning theory of self-directed learning. Particularly during the pandemic, with limited access to operative lists, simulation for surgical skills plays an important role

in the confidence as well as acquiring new skills. This is reflected in the results of the present study, where there was demonstrably improved confidence in practicing a skill. CST2's showed an increased level of confidence compared to CST1's, which is expected. A study in New Orleans capitalised on simulation and artificial intelligence technologies to maintain surgical skills (10). It is worthy to note that 'face-to-face' simulation sessions are very important in the developmental stages of the trainees, but with uncertainties following rising COVID-19 infection rates and stricter measures being put in place (such as tier 1, 2, and 3 alert levels), recognition and adaptation of safety measures should be instituted as this will further increase the confidence levels and, at the same time, produce safe trainees whose goals are all focused on patient safety.

4-1. Study Limitation

Limitations of this observational pilot study include the number of trainees that participated in the workshop, as well as disparity in the number of Core trainees in year 1 as well as year 2. The restrictions in the numbers of attendees due to social distancing measures were a factor that contributed to this limitation. This course was also directed mainly to the CST2 more than the CST1 to give them the opportunity to improve on operative skills as well as build on their portfolio prior to higher speciality training applications for 2021.

5- CONCLUSION

This observational pilot study showed that such workshops targeted at a specific task have a positive effect on trainee confidence despite limitations imposed by social distancing measures. These measures are not only effective but are feasible to be implemented in most settings to the benefit of surgical trainees. Trainees had better confidence in the procedure once the skills were practiced compared to before practising. The lack of operative time in theatre and face-to-face surgical teaching has put a damper on the spirits of trainees through these challenging times. A BMA national survey reported that one-third of UK doctors suffered a worse mental health condition compared to before the pandemic (11). Where COVID-19 has been seen as a disruption to hospital activities as well as medical education it also acts as a catalyst incorporating data and technology for the transformation of medical education (12, 13). It is therefore paramount that the deaneries and medical education departments of each trust ensure that there is continued medical education and that trainees are not missing out on building the skills needed for their future surgical career.

6- AUTHORS' CONTRIBUTIONS

Study conception or design: CB, CI, and RF; Data analysing and draft manuscript preparation: CB, and CI, Critical revision of the paper: JR and RF, Supervision of the research: RF; Final approval of the version to be published: CI, CB, JR and RF.

7- CONFLICT OF INTEREST: None.

8- REFERENCES

1. Knowles M S, Self-directed learning A guide for learners and teachers, N.Y Cambridge books 1975.

2. Thomas W, The making of a surgeon Surgery 2008; 26(10): 400-2.

3. Heneghan C, Oke J, Jefferson T, COVID-19 how many Healthcare workers are infected? Nuffield Department of Primary Health Sciences, 2020.

4. Khan K, Keay R, McLellan M, Mahmud S, Impact of the COVID-19 pandemic on core surgical training Scottish Medical Journal 2020; 65(4):133-37.

5. Aggarwal R, Mytton O, Derbrew M, Hananel D, Heydenburg M, Ssenberg B, etal

6. Training and simulation for patient safety BMJ Quality & Safety 2010; (19): 34-43.

7. Münster T, Stosch C, Hindrichs N, Franklin J, Matthes J, Peyton's 4-steps-approach in comparison: Medium-term effects on learning external chest compression - A pilot study German Medical Science Journal of Medical Education 2016; 33(4): Doc 60.

8. Hughes J, Katsogridakis E, Junaid-Siddiqi A, Pollard J, Bedford J, Coe P, et al. The development of cadaveric simulation for core surgical trainees. The Bulletin of the Royal College of Surgeons of England 2019;101(1): 38-43.

9. Brown D, the Role of Simulation in the Learning of Surgical Skills the Bulletin of the Royal College of Surgeons of England 2013; 95: 292-95.

10. Bernardi L, Germani P, Del otto G, Scotton G, De Manzini N, Impact of COVID-19 pandemic on general surgery training program: An Italian experience. American Journal of Surgery 2020; 220(5): 1361-63.

11. British Medical Association. 2020. Available from: https://www.bma.org.uk/media/3070/bma-covid-tracker-survey-full-results-aug-2020.pdf.

12. Lucey C R, Johnston S C. The Transformational Effects of COVID-19 on Medical Education Journal of the American Medical Association 2020; 324(11):1033-34.

13. Al Samaraee A. The impact of the COVID-19 pandemic on medical education. Br J Hosp Med (Lond). 2020 Jul 2;81(7):1-4. doi: 10.12968/hmed.2020.0191. Epub 2020 Jul 20. PMID: 32730144.