

# Surgical training during the COVID-19 pandemic – a single institution’s trainee survey

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**Background:** Few studies have assessed the impact of COVID-19 on surgical training in low- and middle-income countries. The aim of this study was to survey the effect of the COVID-19 pandemic on postgraduate surgical training, research and registrar wellbeing in South Africa.

**Methods:** A cross-sectional study was conducted as an online survey from 5 October 2020 to 1 December 2020. The study population was registrars from all surgical disciplines at the Faculty of Medicine and Health Sciences of Stellenbosch University. The survey consisted of 26 multiple-choice and five open-ended qualitative questions on the impact of COVID-19 on physical and mental wellbeing, skills acquisition and postgraduate research.

**Results:** Of 98 surgical registrars, 35 (36%) responded. Twenty-three (65.7%) reported missed planned surgical rotations, 30 (85.7%) decreased surgical training time, and 22 (62.9%) reported a perceived decrease in training quality. Simulated skills training was only available to eight (22.9%) participants. Twenty-four (68.6%) experienced burnout and/or depression symptoms during the pandemic. Twenty-seven (77.1%) reported that postgraduate research was unaffected by the pandemic.

**Conclusion:** During the COVID-19 pandemic, surgical trainees at this institution reported a decrease in the quality of surgical training and skills acquisition and a negative impact on their mental wellbeing.

**Keywords:** COVID-19, education, medical, graduate, specialties, surgical

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## Introduction

South Africa is the epicentre of COVID-19 in Africa, with 1 774 312 COVID-19 cases as of 17 June 2021, accounting for over half the cases on the continent.<sup>1</sup> During the height of the pandemic, the public healthcare system restructured and redeployed staff to maximise intensive care facilities and provide an increased number of physicians to meet a rise in COVID-19 patient numbers.<sup>2</sup> This was achieved by suspending non-urgent services, such as out-patient clinics and elective surgery, resulting in 71% of elective operations being cancelled.<sup>3</sup> We hypothesise that this radically reduced the operative experience of surgical trainees, and was further exacerbated by the redeployment of a significant fraction of surgical trainees to high dependency respiratory care and intensive care facilities, to support COVID-19 in-patient care. Studies from high-income countries (HICs) have reported on the effects of the pandemic on surgical education; formal teaching was initially cancelled but increasingly moved to virtual platforms.<sup>4-8</sup> In HICs, the decrease in surgical training time allowed for more time to study, attend online webinars

and conduct research.<sup>4-8</sup> Few studies have been conducted to understand the impact of COVID-19 on surgical training in low- and middle-income countries (LMICs) which have fewer specialist surgeons per capita than HICs.<sup>9</sup> The aim of this survey was to investigate the impact of the COVID-19 pandemic on surgical registrars at Stellenbosch University.

## Methods

A prospective cross-sectional survey was undertaken of registrars in the Department of Surgery in the Faculty of Medicine and Health Sciences at Stellenbosch University. Data was collected as an online survey from 5 October 2020 until 1 December 2020. Potential participants were recruited through an email and WhatsApp invitation by the division heads. In addition, the Department of Surgery, the postgraduate research office, and the postgraduate student council sent weekly reminders via email.

The online survey was created via REDCap<sup>10,11</sup> and included 26 multiple-choice and five open-ended qualitative questions around skills acquisition, physical and mental wellbeing, and postgraduate research. An additional free

**Table I: Perceived impact of COVID-19 on surgical training at Stellenbosch University, South Africa**

Skills acquisition	Number	% of total (35)
Unchanged time to study material/review new guidelines	18	51.4
Less time to study material/review new guidelines	10	28.6
Decreased surgical hours/theatre time	30	85.7
Unchanged surgical hours/theatre time	5	14.3
Received simulated skills training	8	22.86
<b>Physical and mental wellbeing</b>		
Redeployed to a non-surgical related area due to COVID-19	23	65.7
Inadequate training and supervision during redeployment	15	42.9
Experienced symptoms of anxiety/depression/burnout (lack of empathy, poor concentration, fatigue)	24	68.6
<b>Postgraduate research</b>		
Participant's research unaffected	27	77.1
Participant's research on hold	4	11.4
Participants who had to start a new project	1	2.9

text box allowed trainees to declare other pertinent information. These categories were based on the areas of training impacted by the pandemic as reported in other studies.<sup>4,8</sup> The survey instrument was piloted by the authors before formal distribution. All responses were anonymous, and no demographic data was collected. Data was analysed in Microsoft Excel. Descriptive statistics were used for counts and percentages.

An explanation of the study was provided in the preface of the online questionnaire, and informed consent was implied if the participant completed the questionnaire. Ethics approval was given (information blinded for peer review).

## Results

Of 98 surgical registrars, 38 (38.8%) responded. Three were excluded due to incomplete responses leaving 35 (36%) for analysis. Results are summarised in Table I. Training was interrupted because of re-assignment to non-surgical areas due to COVID-19 for 23 (65.7%) participants. Of these, 15 (65.2%) did not feel that they had received adequate training and supervision for their new tasks during their redeployment.

Direct effects of the pandemic on surgical education included a decrease in didactic teaching ( $n = 8$ , 22.9%) with 23 (65.7%) of registrars reporting use of online learning. Thirty-three (94.3%) also reported attending virtual conferences. Responses around study time were mixed. Ten (28.6 %) respondents reported less dedicated study time, including time to learn new guidelines, while 51.4% reported no change in the amount of time available for studying. Opportunity for skills acquisition was affected in 24 (68.6%) of the respondents, with 30 (85.7%) participants experiencing a decrease in theatre time. Simulated skills training was only available to eight (22.9%) participants.

Thirty-four (97.1%) participants reported direct contact with confirmed COVID-19 positive patients. Since March 2020, only five (14.3%) reported that their training was interrupted by a 'quarantine/isolation' order from the government. Twenty-five (71.4%) study participants reported rationing of PPE, with 18 (51.4%) indicating that this occurred frequently.

Financial concerns due to the pandemic were reported by 22 (62.9%) of the respondents. Twenty-four (68.6%) experienced symptoms of anxiety/burnout/depression.

Of the 28 (80%) participants scheduled to take examinations, 14 (50%) reported postponement. Eighteen (51.4%) indicated that they were not concerned about these exam postponements. The majority ( $n = 27$ , 77.1%) of participants reported no impact on their MMed research, whilst four (11.4%) respondents' research had been placed on hold, and one (2.9 %) had to start a new research project. Two (5.7%) participants noted that there was increased research time available, one (2.9%) started a second research project, and one (2.9%) was able to fast track his/her MMed research. Twenty-two (62.9%) felt that, due to the COVID-19 pandemic, the quality of training had decreased, while nine (25.7%) felt that it had remained unchanged. The main cause, as reported by nine (25.7%) participants, was the dramatically reduced elective surgical training time.

## Discussion

This self-reported dataset of a small cohort of surgical trainees at Stellenbosch University provides insight into the negative impact on surgical training as a result of the restructuring of a provincial public health system in South Africa to provide capacity for COVID-19 cases.<sup>4,8,12</sup>

Our reported rate of redeployment to non-surgical areas (65.7%) was higher than those found in a systematic review (6–46%), which included 29 national or multi-national surveys.<sup>13</sup> We found that fewer than one in four participants were able to replace the decrease in operative volume with simulated skills training. In contrast, in HICs such as Belgium, training programmes focussed on simulation models as a method of continued skills-based training during the pandemic.<sup>6</sup> While 52.7–100% of surgical registrars in three HICs<sup>6,14,15</sup> reported more time to study and conduct research as part of their training and postgraduate degree, half of our participants reported no change in study time and 29% stated that their study time had decreased. Similar to other studies,<sup>6,14,15</sup> we found that most registrars could continue with their required postgraduate research projects during the pandemic, with one able to fast-track his/her study and another able to start a second project.

Our study showed that the COVID-19 pandemic had a negative impact on the health and mental wellbeing of surgical registrars, with 62.9% reporting burnout which was higher than some previously reported studies, 54.8% in India<sup>16</sup> and 33.1% in the USA.<sup>17</sup>

### **Study limitations**

Firstly, this was a single-centre study with a low response rate which limits the generalisability of our findings. However, our sample size is comparable to six studies included in a systematic review.<sup>13</sup> Secondly, the sample size was too low to compare responses between specialities. Thirdly, the self-reporting responses are susceptible to response bias. Future research would profit from objective data from individual surgical logbooks to better evaluate lost training time. Despite these limitations, the results of this study highlight the diverse, but important impacts of the COVID-19 pandemic on surgical trainee education in an African lower- to middle-income country.

### **Conclusion**

The COVID-19 pandemic has had an unparalleled negative impact on the education and wellbeing of surgical trainees at this South African university. Some studies have shown that operative volume in the South African public sector was significantly decreased, especially amongst elective surgical conditions.<sup>18,19</sup> The long-term impact that the decrease in operations as well as redeployment to non-surgical disciplines during their training will have is unknown. In addition, these training challenges could be sustained over years as currently, South Africa is in a third wave which threatens the return to full operating care at most public sector hospitals. Tailored educational solutions, such as simulated skills training, could possibly maintain surgical skills during this challenging time and ensure the future of the surgical workforce, which is already deficient in many LMICs, including South Africa.

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### **Conflict of interest**

The authors declare no conflict of interest.

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### **Ethical approval**

Ethics approval was given by the Stellenbosch University Undergraduate Research Ethics Committee, a subdivision of the Health Research Ethics Committee, (ref. no. U20/08/086, project ID 17346). An explanation of the study was provided in the preface of the online questionnaire, and informed consent was implied if the participant completed the questionnaire.

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