

## Evaluating the COVID-19 impact on surgical practice in Kurdistan Region, Iraq: A cross-sectional study

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### Abstract

**Background and objective:** Surgeons and surgical practice are influenced greatly by the coronavirus disease 2019 (COVID-19) pandemic all over the world, and this impact affects patients who need surgery, especially in emergency cases. This study aimed to assess the impact of COVID-19 on surgery in the Kurdistan Region, Iraq.

**Methods:** A survey that consisted of four sections was prepared and sent by e-mail to over 1000 surgeons with different specialties. The survey was created by google forms and was kept online from 9 October 2020 to 9 November 2020.

**Results:** A total of 207 surgeons have responded to the survey, 146 (70.5%) males and 61 (29.5%) females with different specialists. The data shows that both private and public hospitals were affected by the pandemic equally. Thirty five (16.9%) surgeons indicated that surgery has entirely collapsed in some hospitals. All phases of surgical practice have been affected from partial to complete abandonment of surgery.

**Conclusion:** The pandemic greatly affected surgeons and surgical practice in the Kurdistan region. Additionally, few surgeons indicated that the pandemic did not affect the surgical practice and normal functioning of their hospital. However, most surgeons agreed that the pandemic significantly impels all stages of surgery and surgical practice. Most surgeons have adapted to the situation by using communication technology and new protective measures.

**Keywords:** COVID-19 pandemic; Kurdistan region; Pandemic effects; Surgery; Surgical practice.

### Introduction

The coronavirus disease 2019 (COVID-19) started from Wuhan city in China. It spread to the world, and the World Health Organization announced the COVID-19 outbreak as a pandemic on 12 March 2020.<sup>1</sup> The COVID-19 is a disease caused by SARS-CoV-2. This infectious virus infects the respiratory and gastrointestinal tracts in humans.<sup>2</sup>

The virus is highly contagious, and the incubation time is estimated to be around 14 days, with an average of 5.7 days.<sup>3</sup> Accordingly, many countries have started taking preventative measures to prevent the spread of the virus by reducing productive activities, quarantine, and lockdown.<sup>4</sup>

In the Kurdistan region, the lockdown started from 13 March to 17 May, which included complete lockdown and curfew within the cities. Then, the lockdown was lifted, social distancing was recommended across the region, and wearing masks became mandatory in public places.<sup>5-6</sup> These measures affected the economy, education sector, and greatly the health sector in which most of the public hospitals designated for COVID-19 patients.<sup>7</sup>

Surgeons and surgical practices are influenced greatly by the COVID-19 pandemic worldwide, affecting patients who need surgery, especially in emergency cases. Surgeons faced a huge challenge worldwide, not only in surgical practice but also in protecting themselves and the

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patient, finding new protective methods, and adapting to the situation.<sup>8-10</sup> This study aimed to assess the impact of COVID-19 on surgery in the Kurdistan Region, Iraq, and evaluate these influences caused by the pandemic and detect the degree of the impact on surgeons and surgery.

## Methods

### Study design and data collection

This study was designed to assess the impact of COVID-19 on surgery in the Kurdistan Region, Iraq. A survey was prepared by the research staff, and some of the questions were extracted and edited from another study on the impact of coronavirus disease 2019 on the practice of thoracic oncology surgery.<sup>11</sup> The survey was created by google forms and sent to over 1000 surgeons by e-mail. The survey was kept online from 9 October 2020 to 9 November 2020. The response rate was 3:1. For every three e-mails we sent, only we had one response. However, not all of them were included in this study. Only 207 responders completed the form correctly and answered all of the questions. Additionally, we included all specialties that perform surgery. The ethical approval was granted by the School of Medicine at Koya University

### Questionnaire and data processing

The survey was divided into four different sections. The first section was the demographic data and included gender, age, doctor hierarchy, hospital type, specialist, marital status. The second section was designated to the hospitals where the surgeon works and consisted of four questions. The third section was about the surgical practice during the COVID-19 pandemic and its impact; most of the questions were in this section (16 questions). The final section was categorized for the surgeons and had ten questions.

### Data analysis

The data were analyzed using the statistical package for the social sciences (SPSS version 23) program. The forms

with missing data were excluded. Initially, Cronbach's alpha technique was used to find the internal reliability for the survey. The Cronbach's alpha coefficient was 0.701, which indicates a good level of internal consistency for the survey.

## Results

After sending the survey to over 1000 surgeons, only 207 surgeons completed the survey correctly and were included for analysis. The demographic characteristic was the first section. The majority of the participants were male (146, 70.5%) compared with 61 (29.5%) females.

A total of 128 specialists, 48 under training, and 31 consultant surgeons participated in this survey. Most of the participants were at the age of 36-45 years of 89 (43.0%). The mean was 1.29, and SD was 0.829. In the Kurdistan region, most physicians work in both private and public hospitals. Our data shows identical results of 140 participants that work in both, followed by 53 working only in public hospitals and only 14 working in private hospitals, as shown in Table 1.

The surgeons' specialties varied, as shown in Table 2. Most of them were general surgeons, and ophthalmologists were the least. All gynecology surgeons were female, while cardiothoracic, neuro, maxillofacial, pediatric, trauma and orthopedic, and urology Surgeons were male-only.

**Table 1** Demographic characteristics of the participants

Characteristics	Male		Female		Total	
	No.	(%)	No.	(%)	No.	(%)
<b>Gender</b>	146	(70.5)	61	(29.5)	207	(100.0)
<b>Doctor Hierarchy</b>						
Consultant	20	(13.7)	10	(16.4)	30	(14.5)
Specialist	96	(65.8)	32	(52.5)	128	(61.8)
Undertraining	30	(20.5)	19	(31.1)	48	(23.7)
<b>Age</b>						
26 – 35	42	(28.8)	26	(42.6)	68	(32.9)
36 – 45	67	(45.9)	22	(15.1)	89	(43.0)
46 -55	30	(20.5)	12	(19.7)	42	(20.3)
≥ 56	7	(4.8)	1	(1.6)	8	(3.9)
<b>Hospital type</b>						
Private	9	(6.2)	5	(8.2)	14	(6.8)
Public	46	(31.5)	7	(11.5)	53	(25.6)
Both	91	(62.3)	49	(80.3)	140	(67.6)
Total	146	(70.5)	61	(29.5)	207	(100.0)

**Table 2** Specialties of the participants by gender

Specialty	Male		Female		Total	
	No.	(%)	No.	(%)	No.	(%)
General Surgeon	79	(54.1)	29	(47.5)	108	(52.2)
Cardiothoracic Surgeon	6	(4.1)	0	(0.0)	6	(2.9)
Gynecology Surgeon	0	(0.0)	26	(42.6)	27	(12.6)
Neurosurgeon	8	(5.5)	0	(0.0)	7	(3.9)
Maxillofacial Surgeon	9	(6.2)	0	(0.0)	8	(4.3)
Pediatric Surgeon	10	(6.8)	0	(0.0)	10	(4.8)
Plastic Surgeon	6	(4.1)	4	(6.6)	10	(4.8)
Trauma and Orthopedic Surgeon	18	(12.3)	0	(0.0)	18	(8.7)
Urology Surgeon	8	(5.5)	0	(0.0)	8	(3.9)
Ophthalmology	2	(1.4)	2	(3.3)	4	(1.9)
Total	146	(70.5)	61	(29.5)	207	(100.0)

The second section categorized the hospitals, which included four questions, as shown in Table 3.

Regarding treating COVID-19 positive patients in their hospitals, 71 (34.3%) participants responded that their hospital did not treat COVID-19 patients, and 136 (65.7%) did in different degrees. The hospitals of 14 surgeons were designated completely to COVID-19.

Only nine surgeons mentioned that the pandemic did not affect the normal function of their hospital, and 198 replied that COVID-19 did affect the normal function of their hospital in the following manner; moderately affected (71, 34.3%),

considerably affected (67, 32.4%), and extremely affected (60, 29.0%).

Thirteen (6.5%) surgeons indicated that the list of daily surgeries did not change at all. In contrast, 159 (76.8) indicated that the list had been reduced to 50% and emergency cases only due to the pandemic, and 35 (16.9%) confessed that no surgery is currently performed in their hospitals. We have used one-way ANOVA to detect whether private or public hospitals were affected more with the COVID-19, and there was no significant difference between the two. The final question was whether the health care personnel were being tested or not.

**Table 3** Second section -Effect of COVID-19 pandemic on the hospitals

No.	Questions	Answers	No. (%)
1.	Is your hospital treating COVID-19 positive patients?	a. No	71 (34.3)
		b. Yes, in different department	89 (43.0)
		c. Yes, half of the hospital designated COVID-19	33 (15.9)
		d. Yes, all department designated for COVID-19	14 (6.8)
2.	How is the COVID-19 pandemic affecting the normal functioning of your hospital?	a. Not affected at all	9 (4.3)
		b. Moderately affected	71 (34.3)
		c. Considerably affected	67 (32.4)
		d. Extremely affected	60 (29.0)
3.	Did the daily list of surgeries change in your hospital?	a. not affected at all, constant number as before	13 (6.3)
		b. partially affected, reduced by 50%	66 (31.9)
		c. Considerably affected, emergency cases only	93 (44.9)
		d. Extremely affected; no surgery is performed	35 (16.9)
4.	Are the health care personnel tested in your hospital?	a. All tested	1 (0.5)
		b. Tested after being contacted with COVID-19	71 (34.3)
		c. Tested when symptomatic	110 (53.1)
		d. Not tested at all	25 (12.1)

The third section of the survey was designated to the surgical practice, which is illustrated in Table 4.

The COVID-19 pandemic did not affect the surgical practice of 10 (4.8%) participants. However, it affected the work of 197 (93.2%), including 82 (39.6%) moderately affected, 79 (38.2%) considerably affected, and 36 (17.4%) extremely affected, respectively.

The 6<sup>th</sup> question in the sequence was about the clinical meeting before the surgery, which was abandoned according to 93 (44.9%) participants. Other surgeons used available resources such as hygiene measures (PPE) and digital meeting and video chat 76 (36.7%).

The surgical decision was not affected at all by the pandemic, according to 41 (19.8%) participants. Most surgeons (49.3%) indicated that the urgency and degree of treatment were affected, not the surgery itself. In contrast, the surgical decision was limited to emergency cases only (18.8%) and when surgery was the last resource (12.1%).

Questions 8, 9, and 10 were selected for the patient and COVID-19 tests. Most surgeons (50.2%) confessed that their patients were not tested for COVID-19, not even if they had symptoms. The majority of the surgeons (56.0%) prefer using a nasopharyngeal swab (RT-PCR) for COVID-19 testing. We also asked whether a positive case influences the surgical treatment, and 68 (32.9%) surgeons said no. In all cases, the surgery was still going on with protective equipment. Others (67.1%) confessed that it does affect surgery as treatment have different opinions.

The questions of 11 to 13 were designated to investigations, practices before surgery, and instrumental surgery. The investigations before surgery were not affected significantly, according to the majority of the surgeons (80.7%). However, investigations of suspension malignancy affected more and were limited to the private sector (38.6%).

The 14<sup>th</sup> and 15<sup>th</sup> questions were about the use of PPE during surgery. For unknown patients, 154 (74.4%) surgeons mentioned that they only use standard operating room equipment for all staff without additional PPE equipment. Only 23 (11.1%) use additional PPE equipment for all personnel in the room. This changes with positive COVID-19 patients but not significantly, 115 (55.6%) only use standard operating room equipment for all staff without additional PPE equipment, and 51 (24.6%) use additional PPE equipment for all personnel in the room.

Regarding the emergency surgeries, 102 (49.3%) surgeons indicated they were not affected by the pandemic. In contrast, no surgery is performed according to 7 (3.4%). Additionally, emergency surgeries are only performed when surgery is last resources 75 (36.2%) or done in private.

The questions 18 to 20 were categorized for post-surgical practice. Concerning intensive care, only 49 (23.7%) surgeons said they were not affected, and 71 (34.3%) confessed that patients do not receive any extra care. The discharge criteria remain the same as usual as 82 (39.6%) surgeons state. The postoperative contact was not affected, and patients still can contact the surgeon but with the use of prevention measures as revealed by surgeons 165 (79.7%). Nevertheless, other surgeons use tele-video chat to contact their patients.

**Table 4** Third section -Effect of COVID-19 pandemic on the hospitals

No.	Questions	Answers	No. (%)
5.	How is the COVID-19 pandemic affecting your practice as a surgeon?	a. Not affected at all b. Moderately affected, reduced by 50% c. Considerably affected, emergency cases only. d. Extremely affected; no surgery performed.	10 (4.8) 82 (39.6) 79 (38.2) 36 (17.4)
6.	Have the clinical meetings before surgery criteria changed due to COVID-19?	a. as usual, but with hygiene measures (PPE) b. Reduced by 50%, with hygiene measures c. Clinical meeting abandoned d. Digital meeting and video chat	20 (9.7) 18 (8.7) 93 (44.9) 76 (36.7)
7.	Surgical decision influenced by COVID-19 pandemic?	a. Not at all b. not the surgery itself, but the urgency and degree of treatment c. Yes, in emergencies only. d. Yes, when surgery is the last resource.	41 (19.8) 102 (49.3) 39 (18.8) 25 (12.1)
8.	Is your patient being tested for COVID-19 before surgery?	a. All patients being tested b. Only symptomatic patients being tested c. Only tested using immunochromatographic strip test (IgG, IgM) within 10 min d. None of the patients being tested	18 (8.7) 80 (38.6) 5 (2.4) 104 (50.2)
9.	If your patient needs to be tested for COVID-19, which test would you use?	a. nasopharyngeal swab (RT-PCR) b. Chest CT c. Blood test for antibody by strip (positive and negative) d. Blood test for antibody by immunochemistry devices (quantitative) e. none of the listed tests used	116 (56.0) 19 (9.2) 30 (14.5) 12 (5.8) 30 (14.5)
10.	Does the result influence the surgical treatment (positive COVID-19)?	a. No, in all cases the surgery still going on with protective equipment b. Yes, a COVID-19 patient with symptoms will not be operated on for 14 days. c. Yes, a COVID-19 patient without symptoms will not be operated on for 14 days d. Yes, even in urgent COVID-19 Cases, we will try a non-surgical approach.	68 (32.9) 58 (28.0) 35 (16.9) 46 (22.2)
11.	How are the required tests before surgery affected by COVID-19 (such as HIV, HBV, HCV, and others)?	a. not affected; all the required tests are still available b. Moderately affected, in some of the test's stipe is used c. Considerably affected; some tests are not available d. Extremely affected, none of the required tests are available	167 (80.7) 16 (7.7) 19 (9.2) 5 (2.4)

12.	Are the investigations of suspension malignancy such as biopsy for histopathology affected?	a. not affected at all, as usual b. limited to FNA only c. Done only in private d. none of the required tests are available	96 (46.4) 14 (6.8) 80 (38.6) 17 (8.2)
13.	are the use of instrumental surgery affected by the COVID-19 pandemic?	a. not affected at all, used as usual b. used only to non-COVID-19 patients. c. used only to emergency cases d. not used at all	102 (49.3) 47 (22.7) 46 (22.2) 12 (5.8)
14.	What kind of PPE are taken during unknown patient surgery?	a. Standard operating room equipment for all staff b. FFP2 for surgeon and anesthetist only c. FFP2 to all surgical staff only d. FFP2 to all personal in the room	154 (74.4) 16 (7.7) 14 (6.8) 23 (11.1)
15.	What kind of PPE are taken during COVID-19 positive patient surgery?	a. Standard operating room equipment for all staff b. FFP2 for surgeon and anesthetist only c. FFP2 to all surgical staff only d. FFP2 to all personal in the room	115 (55.6) 13 (6.3) 28 (13.5) 51 (24.6)
16.	Are the emergency surgeries affected by COVID-19?	a. not affected, as usual b. in extremely very urgent cases only, when surgery is last resources c. Done only in private d. No surgery is performed	102 (49.3) 75 (36.2) 23 (11.1) 7 (3.4)
17.	How intensive care/ post-anesthesia after surgery is affected by COVID-19?	a. not at all, as usual b. Patient in this unit stay shorter than usual c. patient requires to stay one night send to ward immediately d. there is no extra care for all patients	49 (23.7) 60 (29.0) 27 (13.0) 71 (34.3)
18.	Do discharge criteria for your surgery different than usual before COVID-19?	a. no same protocol as usual b. yes, most patients are discharged earlier than usual (lack of resources e.g., beds) c. Yes, most patients are discharged later than usual (to keep social distances) d. some discharged earlier and some later.	82 (39.6) 74 (35.7) 18 (8.7) 33 (15.9)
19.	How was your postoperative contact affected by COVID-19?	a. as usual but with hygiene measures b. avoiding direct contact and using tele – video contact c. all postoperative patients contact me through tele-video contact	165 (79.7) 28 (13.5) 14 (6.8)
20.	Is general anesthesia used as before?	a. yes, not affected b. no, in some cases local anesthesia applied instead c. in only extreme emergency cases used d. not used at all.	127 (61.4) 40 (19.3) 37 (17.9) 3 (1.4)

The final section of the survey was selected for the surgeons, as shown in Table 5.

Only 78 (37.7) surgeons were infected with the COVID-19, and 120 (58.0%) have been tested. As surgeons observe, most of their operational staff were infected with the virus (69.1%). The majority of surgeons' clinical outpatient was not affected with or without the PPE 151 (73%). However, 56 (27%) surgeons use video chat to contact patients.

We asked whether the surgeons talk about COVID-19 with the patients, only 22 (10.6%) demonstrated that they do not talk about COVID-19 with their patients, 49 (23.7%) of them talk when the patient asks, and a majority of them (65.7%) discuss the prevention measures with the patient especially risk group.

Regarding the surgeon's surgical plan, only 12 (5.8%) state that their surgical plans did not change while the surgical plan of 195 (94.2%) surgeons was affected differently. Most of the participants (82.1%) were taking care of COVID-19 patients in different conditions of only surgical cases 64 (30.9%), only patients from their department 33 (15.9%), all patients in the hospital from other departments as well 28 (13.5%) and in some special occasions when the patient is relative or/and close friend 45 (21.7%).

COVID-19 pandemic affected the team-work of 134 (64.7%) due to limited surgical staff. The final question was about the surgeon's feelings during the COVID-19 pandemic and confessed they could not give the best for the patient due to COVID-19.

**Table 5** Final section of the survey categorized to surgeons

No.	Questions	Answers	No. (%)
21.	Have you been infected with COVID-19?	a. Yes	78 (37.7)
		b. No	129 (62.3)
22.	Have you tested for COVID-19?	a. Yes	120 (58.0)
		b. No	87 (42.0)
23.	Have your operation staff tested positive for COVID-19	a. Yes	143 (69.1)
		b. No	64 (30.9)
24.	How is your clinic outpatient affected by COVID-19?	a. not affected, and without the use of PPE	7 (3.4)
		b. not affected, buy using proper hygienic measures.	144 (69.6)
		b. I try to avoid direct contact with the patient and use video contact as possible	47 (22.7)
		c. All the patients contact with telephone or video contact.	9 (4.3)
25.	Do you talk about COVID-19 with the patient?	a. No, COVID-19 is different from their disease.	21 (10.1)
		b. No, even when they ask.	1 (0.5)
		b. Yes, I don't want to but patients ask and I answer.	49 (23.7)
		c. Yes, I discuss the prevention measures with my patient, especially the risk group.	136 (65.7)

26	How are your surgical plans affected by COVID-19?	a. not affected at all	12 (5.8)
		b. moderately: some surgeries have been postponed, less staff and ICU beds available	100 (48.3)
		c. Only urgent medical surgeries are executed, minimal staff and ICU beds available	53 (25.6)
		d. Only emergency surgeries are executed, no staff, no ICU beds.	42 (20.3)
27	How do you feel about the current surgical plans?	a. I agree with the current situation	93 (44.9)
		b. I do not agree my patient needs more care, but I'm forced due to a lack of resources.	114 (55.1)
28	As a surgeon are you taking care of COVID-19 positive cases?	a. No, I don't take care of them	37 (17.9)
		b. Yes, but only surgical cases.	64 (30.9)
		c. Yes, only patients from my department	33 (15.9)
		d. Yes, All patients in the hospital from other departments as well.	28 (13.5)
		e. Yes, on some special occasions when the patient is a relative or/and close friend.	45 (21.7)
29	How COVID-19 affected teamwork during surgery?	a. not at all, with hygiene measures	73 (35.3)
		b. moderately: less personnel during surgery	66 (31.9)
		c. considerably: minimal staff as possible during surgery	42 (20.3)
		d. extremely: teamwork is abandoned with minimal staff as possible for emergencies only.	26 (12.6)
30	How do you feel as a surgeon during this pandemic	a. nothing is different, I do what I can for my patient	45 (21.7)
		b. I feel I can do a lot for the patients and colleague since there is a shortage of staff	51 (24.6)
		c. I feel I cannot give the best for the patient due to COVID-19	111 (53.6)

## Discussion

COVID-19 pandemic causes economic, educational, and medical crises worldwide. The pandemic influences the health sector the most not due to limited resources and staff for COVID-19 patients but also due to ignorance of other health conditions. Many studies suggest that the COVID-19 pandemic greatly impacts the normal functioning of the hospitals, patients, and health sector in general.<sup>12-14</sup> In the Kurdistan region of Iraq, the impact was even harder due to the lack of preparation for the pandemic.<sup>7</sup> In this study, we focused on the influences of COVID-19 on surgery and surgeons in general. Similarly, another study reveals the impact of the pandemic on surgery. However, we have used a different approach for understanding the level and degree of the effect.<sup>15</sup>

We have divided the survey into four sections to better understand and identify the severity of the impact on hospitals, surgery practice, and surgeons. Furthermore, we have detected that the COVID-19 pandemic affected the normal function of the hospital's private and public, the surgical practice in all phases, and surgeons. The first section was the demographic data, demonstrating that most of the participants were male surgeons than females. In terms of specialties, most of the participants were general surgeons of 108 (52.2%), and none of the gynecologists were male; this may be due to the strict culture and restrictions.

In the first part, we evaluate the implication of the pandemic on hospitals. We notice that in the Kurdistan region, the pandemic affected both the public and private hospitals equally. This is due to the medical system in the Kurdistan region, which allows the surgeons to work freely in both hospitals. Our survey also reveals that most surgeons actually work in public and private hospitals.

The third part of the questionnaire included 16 questions about the surgical practice. It was subdivided into surgical work, clinical meetings before surgery, surgical

decisions, COVID-19 tests and investigations before surgery, PPE during surgery, emergency surgeries, and post-surgical practice. According to 197 (93.2%) surgeons, the surgical practice collapsed due to the designation of hospitals to COVID-19 patients. This has been observed worldwide, surgery and patients that need surgery affected notably due to the pandemic.<sup>16</sup>

Clinical meetings before surgery were abandoned as 93 (44.9%) confessed this may be due to PPE shortage. However, other surgeons adapted to the situation. They used alternative ways to ensure the clinical meetings, including using hygiene measures PPE if available and digital meetings and video chat if PPE not available. Nearly half of the participants indicated that their patients were not being tested for COVID-19 before surgery even if they have symptoms, and this is because of the shortage of test kits or the time it would take for the outcome. In contrast, even though testing the patients for COVID-19 is not satisfactory, the surgeons do not prefer the surgical approach for COVID-19 positive cases (67.1%) even if they were asymptomatic. This may be due to the preparation of specific requirements and fear of possible surgery complications.<sup>17</sup> We observed that most surgeons and surgical staff did not use the PPE during surgery, even in positive cases. They may not need PPE because of the use of standard surgery equipment. Overall, in the Kurdistan region, the post-surgical practices have been affected by the pandemic, and new protocols are used due to lack of medical staff, beds and preventing the spread of the virus. Some studies suggest special precautions required before and after the surgery during this pandemic.<sup>18</sup> Gladly, surgeons developed alternative methods to contact the patient after the surgery to maintain the patient's follow-up.

The final section of the survey was about the surgeons. We detected the surgeon's operational staff were infected

with COVID-19 more, such as nurses and anesthesiologists. This may be because these professionals are required to care for COVID-19 patients and have more contact with these patients. Moreover, most surgeons are willing to help fight against COVID-19 and care for the patients like other medical staff.

### Conclusion

The COVID-19 pandemic influences all aspects of life, especially the economy, educational sector, and the health sector. Surgeons and surgical performance are also affected by the pandemic worldwide. We have observed that this influence affected both private and public hospitals in the Kurdistan region. Additionally, few surgeons indicated that the pandemic did not affect the surgical practice and normal functioning of their hospital. However, most surgeons agreed that the pandemic significantly impels all stages of surgery and surgical practice from preparing the patient to the postoperative phase. Most surgeons have adapted to the situation by using communication technology and new protective measures.

### Funding

None.

### Competing interests

None declared.

### References

1. World Health Organization. WHO announces COVID-19 outbreak a pandemic; 2020.
2. Ahmedi BQ, Kareem AA. COVID-19 decimate from elderly smoker male within 19 days: A case report. IJPHRD. 2020; 11(7):1120–3. <https://doi.org/10.37506/ijphrd.v11i7.10244>.
3. Wassie GT, Azene AG, Bantie GM, Dessie G, Aragaw AM. Incubation period of severe acute respiratory syndrome novel coronavirus 2 that causes coronavirus disease 2019: A systematic review and meta-analysis. Curr Ther Res Clin Exp. 2020; 93:100607. <https://doi.org/10.1016/j.curtheres.2020.100607>.
4. Wells CR, Townsend JP, Pandey A, Moghadas SM, Krieger G, Singer B, et al. Optimal COVID-19 quarantine and testing strategies. Nat Commun. 2021; 12(1):356. <https://doi.org/10.1038/s41467-020-20742-8>.
5. COVID-19: Situation Update. Kurdistan Regional Government. 2021. <https://gov.krd/coronavirus-en/situation-update/>. Accessed 19 January 2021.
6. Hussein NR, Naqid IA, Saleem ZSM, Almozori LA, Musa DH, Ibrahim N. A sharp increase in the number of COVID-19 cases and case fatality rates after lifting the lockdown in Kurdistan region of Iraq. Ann Med Surg (Lond). 2020; 57:140–2. <https://doi.org/10.1016/j.amsu.2020.07.030>.
7. Hussein NR, M Saleem ZS, Ibrahim N, Musa DH, Naqid IA. The impact of COVID-19 pandemic on the care of patients with kidney diseases in Duhok City, Kurdistan Region of Iraq. Diabetes Metab Syndr. 2020; 14(6):1551–3. <https://doi.org/10.1016/j.dsx.2020.08.013>.
8. Harky A, Chen R, Pullan M. Examining the impact of COVID-19 on cardiac surgery services: The lessons learned from this pandemic. J Card Surg. 2020; 35(9):2364–6. <https://doi.org/10.1111/jocs.14783>.
9. Megaloikonomos PD, Thaler M, Igoumenou VG, Bonanzinga T, Ostojic M, Couto AF, et al. Impact of the COVID-19 pandemic on orthopaedic and trauma surgery training in Europe. Int Orthop. 2020; 44(9):1611–9. <https://doi.org/10.1007/s00264-020-04742-3>.
10. Nasta AM, Goel R, Kanagavel M, Easwaramoorthy S. Impact of COVID-19 on General Surgical Practice in India. Indian J Surg. 2020; 82:259–63. <https://doi.org/10.1007/s12262-020-02443-0>.
11. Depypere LP, Daddi N, Gooseman MR, Batirel HF, Brunelli A. The impact of coronavirus disease 2019 on the practice of thoracic oncology surgery: a survey of members of the European Society of Thoracic Surgeons (ESTS). Eur J Cardiothorac Surg. 2020; 58(4):752–62. <https://doi.org/10.1093/ejcts/ezaa284>.
12. Iyengar K, Mabrouk A, Jain VK, Venkatesan A, Vaishya R. Learning opportunities from COVID-19 and future effects on health care system. Diabetes Metab Syndr. 2020; 14(5):943–6. <https://doi.org/10.1016/j.dsx.2020.06.036>.
13. Daodu O, Panda N, Lopushinsky S, Varghese TK, Brindle M. COVID-19 - Considerations and implications for surgical learners. Ann Surg. 2020; 272(1):e22–3. <https://doi.org/10.1097/SLA.0000000000003927>.
14. Pfefferbaum B, North CS. Mental health and the Covid-19 pandemic. N Engl J Med. 2020; 383(6):510–2. <https://doi.org/10.1056/NEJMp2008017>.
15. Hussein NR, Musa DH, Ibrahim N, Naqid IA, Saleem ZS, Jacksi K. Impact of Covid-19 pandemic on surgical practice in Kurdistan, Iraq: An online cross-sectional survey. Int J Surg Open. 2020; 27:47–51. <https://doi.org/10.1016/j.ijso.2020.10.014>.
16. Al-Jabir A, Kerwan A, Nicola M, Alsafi Z, Khan M, Sohrabi C, et al. Impact of the Coronavirus (COVID-19) pandemic on surgical practice -

- Part 2 (surgical prioritisation). *Int J Surg*. 2020; 79:233–48. <https://doi.org/10.1016/j.ijsu.2020.05.002>.
17. Balibrea JM, Badia JM, Rubio Pérez I, Martín Antona E, Álvarez Peña E, García Botella S, et al. Surgical management of patients with COVID-19 infection. Recommendations of the Spanish Association of Surgeons. *Cir Esp*. 2020; 98(5):251–9. <https://doi.org/10.1016/j.ciresp.2020.03.001>.
18. Soltany A, Hamouda M, Ghzawi A, Sharaqí A, Negida A, Soliman S, et al. A scoping review of the impact of COVID-19 pandemic on surgical practice. *Ann Med Surg (Lond)*. 2020; 57:24–36. <https://doi.org/10.1016/j.amsu.2020.07.003>.