

An Online Survey to Assess Impact of COVID-19 Pandemic on Medical Education and Training of Surgical Residents

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Abstract

Aim: To assess the effect of COVID-19 pandemic on medical education and training of surgical residents.

Methodology: An online survey was conducted to assess the effect of COVID-19 on the residents in various surgical specialties in Jagannath Gupta institute of medical sciences and Hospital, Budge Budge, Kolkata, West Bengal, India during the period of 6 months. All the surgical residents were invited to participate in the survey using WhatsApp and other social platforms. The questionnaire consisted of 5 sections: Demographic details, surgical residents and COVID-19 related work, impact of COVID-19 on surgical training of residents, and academic activities during COVID-19. The data was collected and analyzed.

Results: A total of 50 surgical residents completed the survey. Out of the 50 respondents, 29 (58%) were male, and 21 (42%) were female. 36% percent of respondents were in the first year of their residency, 40% in their second year, and the remaining 24% were in the final year. Residents from 8 surgical specialties participated in the survey. There was a significant reduction in working hours since the pandemic began (6.53 ± 4.28 hours) when compared to pre-pandemic time (11.45 ± 4.82 hours). 56% residents worked for 1-5 weeks, 38% worked for 5-10 weeks, and 06% residents worked for >10 weeks. Among them, 46 % were worried about getting infected and 42% were worried about transmitting infection to family members. 12% of residents had fear of death due to COVID-19. 42% reported poor visibility with goggles or face shield as most difficult part of working with PPE kits.

Conclusion: The COVID-19 pandemic has greatly affected residency training globally, particularly surgical and interventional medical fields. Decreased clinical experience, reduced case volume, and disrupted education activities are major concerns in all fields.

Keywords: Pandemic, surgeries, residents, curriculum.

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Introduction

Pandemic affects every aspect of life, including education and the economy.

Pandemics of H1N1 and H5N1 influenza, the severe acute respiratory

syndrome (SARS), and most recently, the novel coronavirus disease (COVID-19) caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). Coronavirus disease 2019 (COVID-19), the public health emergency that emerged from the city of Wuhan of China in 2019, has been declared a pandemic in March 2020 by the World Health Organization (WHO) [1]. Coronavirus disease-2019 (COVID-19) has created an unprecedented situation worldwide and has set forth an array of challenges before us medical, ethical, social, and organizational [2]. Health care workers (HCWs) are bound by ethics to provide support to patients [3].

Adhering to medical ethics, HCWs across the world are putting their fullest effort to cope with the pandemic and save lives. However, they are not immune to infection risk. Consequently, HCWs are equally vulnerable to infection as the rest of the population. In fact, the frontline workers are at a greater risk than the general population. Previous statistics clearly indicate that HCWs make a significant portion of the infected cases [4]. Health care workers (HCW) are on the frontline to fight the disease that can easily be transmitted through aerosols. They are particularly at high risk of being infected due to direct and indirect exposure with COVID-19 positive individuals [5] and also due to limited availability of personal protective equipment (PPE) [6].

In March of 2020, the American College of Surgeons (ACS) Division of Education appointed a Special Committee of the ACS Academy of Master Surgeon Educators (Academy) to address educational challenges associated with the pandemic. The Special Committee of the Academy (Special Committee) recently reported the pandemic's impact on surgical learner education and wellness as assessed through a survey administered April-June 2020 and directed to general and specialty surgery department chairs, program directors and Academy members [7].

These initial findings were complemented by a survey of general surgery residents and early career surgeons conducted in July 2020 by the ACS Resident and Associate Society (RAS) and Young Fellows Association (YFA), in consultation with the Academy's Special Committee [8]. Among 1,160 respondents, the majority reported a negative impact on their clinical and educational experiences, as well as high rates of new depression and burnout symptoms. Female gender, lack of wellness resources, reduction in case volume, caring for known COVID-19 positive patients, and being asked to provide one's own PPE were independent predictors of adverse mental health outcomes [8].

Most medical schools have struggled to come up with alternative methods to traditional learning, which comprises direct lecturing in classes, on-site clinical examinations with direct patient encounters, and clerking [9]. The academic curriculum that was designed to enhance surgical skills is facing several problems ranging from reduction of team meetings to reduced clinical and hands-on exposure to limit physician-patient encounters and ensure the safety of the team [10, 11].

When considering medical education, residency training has probably been the most affected during the COVID-19 pandemic because the core of residency training is clinical experience and clinical skill proficiency, which have been reduced because of multiple factors in the pandemic. Dedeilia et al. published a systematic review on educational challenges in the COVID-19 era and revealed that both medical and surgical education have been severely affected [12]. However, the article was published in the early stage of the pandemic when literature on the topic was limited, and the focus of the research was not only residency training but also medical students' education. Additionally, most of the included articles were nonoriginal

manuscripts and may have been insufficient to analyze the effect of the COVID-19 pandemic on residency training. So the purpose of this study was to assess the effect of COVID-19 pandemic on medical education and training of surgical residents.

Materials and Methods:

An online survey was conducted to assess the effect of COVID-19 on the residents in various surgical specialties in Jagannath Gupta institute of medical sciences and Hospital, Budge Budge, Kolkata, West Bengal, India during the period of 6 months. All the surgical residents were invited to participate in the survey using WhatsApp and other social platforms. Participation was voluntary, and no incentives were offered. After a brief introduction to the survey, participants were asked to consent before accessing the questionnaire. To maintain anonymity, no personal details were collected.

Inclusion criteria:

All the residents in surgical specialties who have performed COVID duty

Exclusion criteria:

Non-surgical residents and surgical residents not posted in COVID related duties due to various reasons.

The questionnaire consisted of 5 sections: Demographic details, surgical residents and COVID-19 related work, impact of COVID-19 on surgical training of residents, and academic activities during COVID-19. The data was collected and analyzed.

Results:

A total of 50 surgical residents completed the survey. Out of the 50 respondents, 29 (58%) were male, and 21 (42%) were female. 36% percent of respondents were in the first year of their residency, 40% in their second year, and the remaining 24% were in the final year. Residents from 8 surgical specialties participated in the survey.

Table 1: Demographic details

	Variables	N (%)
Surgical specialty	General surgery	11 (22)
	Obstetrics and gynecology	10 (20)
	Otorhinolaryngology	9 (18)
	Ophthalmology	7 (14)
	Orthopedics	5 (10)
	Plastic surgery	3 (06)
	Surgical oncology	3 (06)
	Urology	2 (04)
Gender	Male	29 (58)
	Female	21 (42)
Year of residency	1 st year	18 (36)
	2 nd year	20 (40)
	3 rd year	12 (24)

Table 2: Surgical residents and COVID-19 related work

COVID-19 related work	N (%)
How many weeks have you worked in the COVID ward?	
1-5	28 (56)
5-10	19 (38)
>10	03 (06)

What are you most worried about while working in the COVID ward?	
Getting infected	23 (46)
Transmitting the disease to family members	21 (42)
Fear of death due to COVID	06 (12)
What is the most difficult part of working with the PPE?	
Poor visibility with goggles or face shield	21 (42)
Breathing difficulty with the N-95 mask	16 (32)
Inability to communicate with assistant	09 (18)
Poor ventilation	04 (08)

Out of 50 participants, 56% residents worked for 1-5 weeks, 38% worked for 5-10 weeks, and 06% residents worked for >10 weeks. Among them, 46 % were worried about getting infected and 42% were worried about transmitting infection

to family members. 12% of residents had fear of death due to COVID-19. 42% reported poor visibility with goggles or face shield as most difficult part of working with PPE kits.

Table 3: Effects of pandemic on the surgical training of residents

Variables	Mean ± SD	P-value
If you were performing/assisting 10 elective surgeries per week before the pandemic, how many elective surgeries are you performing/ assisting per week during the pandemic?	1.97±1.63	(p<0.001)
If you were performing/assisting 10 emergency surgeries per week before the pandemic, how many emergency surgeries are you performing/assisting per week during the pandemic?	3.75±1.27	(p<0.001)

There was a significant reduction in working hours since the pandemic began (6.53±4.28 hours) when compared to pre-pandemic time (11.45±4.82 hours). Hands-on surgical training was significantly

affected. Only 34% of the participants agreed that online learning programs are more effective than in-person classes, while 66% of residents were still in favor of offline teachings.

Table 4: Changes in academic programs in the departments

Variables	N (%)
How are academic activities being conducted in your department?	
Virtual online classes	44 (88)
Vis-a-vis lectures with social distancing	06 (12)
No teaching program since the pandemic	00 (00)
Do you think an online learning platform is more effective than in-person classes?	
Yes	17 (34)
No	33 (66)

Discussion:

Each residency program has a unique curriculum, working hours, workload and number of residents. While hands-on and

adequate clinical exposure are considered necessary to train surgeons for tomorrow, the associated risks now are too high [13]. Healthcare leaders are responsible for designing dynamic operational strategies

to face the ongoing challenges and creating an infrastructure that enhances our ability to react to future threats to healthcare [14]. The COVID-19 experience is another, yet atypical, learning opportunity for surgical residents that challenges them to function as part of larger multidisciplinary teams and demonstrate commitment to public health, patient care, and inter-professionalism [15].

According to our study, a majority feared getting infected or transmitting the infection to their family more than the fear of death while working with COVID-19 patients. These fears were similar to the ones reported by other residents around the world [16, 17]. Clear and supportive discussions about preparation at home and precautions before leaving the hospital were necessary to allay such fears [18].

The majority of the studies were published in countries severely affected by the pandemic, and therefore, medical education and residency training were substantially affected in these countries. Fewer elective operations because of policies established during the pandemic were noted in some specialties, such as urology, orthopedics, plastic surgery, and diagnostic angiography [19-22]. The policies of lockdown and quarantine reduced patient volume for some diseases, such as trauma and infectious diseases, which induced less clinical exposure [23, 24]. Redeployment and reassignment of residents occurred for pandemic-related work [25]. All these factors contributed to possible inadequate training and failure to meet the requirements of training programs.

Surgical specialties were the most and first affected. Elective surgeries were cancelled or postponed during the pandemic, providing less practice and experience for the residents [20-22]. Additionally, residents in surgical specialties were redeployed to manage patients with

COVID-19 or perform other work due to medical resource reallocation, disrupting their original surgical training courses. Another disruption was the “stay at home” policy, which resulted in fewer trauma cases and related surgeries [26]. All these factors affected surgical resident training. A similar situation occurred in interventional medical fields, such as radiology, cardiology, and gastroenterology [27-29].

According to our findings, the average number of working hours per week for surgical residents are significantly reduced. It may be due to a number of causes. First, as discussed previously, the duty hours are shortened to decrease the risk of exposure. Secondly, the timely measures brought about by the government are so far helping in keeping the number of COVID-19 patients less, due to which surgical residents are not yet required to expand the workforce of emergency departments or isolation centers. The bottom line is that most of the surgical residents got enough time to catch up on their research projects and studies. The findings are similar to that observed in an orthopedic residency program in Georgia [30] and several others [31, 32].

Therefore, we need to adopt a new educational system that would be safe, sustainable, and equipped for all kinds of unexpected scenarios in the future [33-35]. Coping strategies are also needed to overcome those tough times. The world health organization recommends eating healthy food, engaging in regular physical activity, and maintaining good sleep hygiene to cope with stress [36, 37].

Conclusion:

The COVID-19 pandemic has greatly affected residency training globally, particularly surgical and interventional medical fields. Decreased clinical experience, reduced case volume, and disrupted education activities are major concerns in all fields. The decrease in

working hours due to the pandemic has provided more time for research work and reduction in burnout. But there was substantial reduction in their hands-on training and clinical exposure.

References:

1. Jebril N. World Health Organization Declared a Pandemic Public Health Menace: A Systematic Review of the Coronavirus Disease 2019 “COVID-19”, up to 26th March 2020. Available at SSRN 3566298. Last accessed on March 4, 2022.
2. Mukherjee, A., Bandopadhyay, G., and Chatterjee, S. S. (2020). COVID-19 pandemic: mental health and beyond - the Indian perspective. *Irish J. Psychol. Med.* 21, 1–5.
3. Neto, M. L. R., Almeida, H. G., Esmeraldo, J. D., Nobre, C. B., Pinheiro, W. R., de Oliveira, C. R. T., et al. (2020). When health professionals look death in the eye: the mental health of professionals who deal daily with the 2019 coronavirus outbreak. *Psychiatry Res.* 288:e112972.
4. Simonds, A. K., and Sokol, D. K. (2008). Lives on the line? Ethics and practicalities of duty of care in pandemics and disasters. *Euro. Respirat. J.* 34, 303–309.
5. Ran L., Chen X., Wang Y., Wu W., Zhang L., Tan X. Risk factors of healthcare workers with corona virus disease 2019: a retrospective cohort study in a designated hospital of Wuhan in China. *Clin. Infect. Dis.* 2020 Mar 17
6. Gareth Iacobucci. Covid-19: doctors still at “considerable risk” from lack of PPE. *BMA Warns BMJ.* 2020;368:m1 316
7. Ellison EC, Spanknebel K, Stain SC, Shabahang MM, Matthews JB, Debas HT, Nagler A, Blair PG, Eberlein TJ, Farmer DL, Sloane R, Britt LD, Sachdeva AK. Impact of the COVID-19 Pandemic on Surgical Training and Learner Well-Being: Report of a Survey of General Surgery and Other Surgical Specialty Educators. *Journal of the American College of Surgeons.* 2020;231(6):613-626.
8. Coleman JR, Abdelsattar JM, Glocker RJ. COVID-19 Pandemic and the Lived Experience of Surgical Residents, Fellows, and Early-Career Surgeons in the American College of Surgeons. *Journal of the American College of Surgeons.* 2021;232(2):119-135.e20
9. Medical student education in the time of COVID-19. *Rose S. JAMA.* 2020 ;323:2131–2132.
10. Nassar A.H., Zern N.K., McIntyre L.K. Emergency restructuring of a general surgery residency program during the coronavirus disease 2019 pandemic: the university of Washington experience. *JAMA Surg.* 2020
11. Potts J.R., III Residency and fellowship program accreditation: effects of the novel coronavirus (COVID-19) pandemic. *J. Am. Coll. Surg.* 2020 Apr 3;230(6):1094–1097.
12. Blumenthal D, Fowler EJ, Abrams M, Collins SR. Covid-19 - implications for the health care system. *N Engl J Med.* 2020;383(15):1483–8.
13. Wong J., Goh Q.Y., Tan Z., Lie S.A., Tay Y.C., Ng S.Y., Soh C.R. Preparing for a COVID-19 pandemic: a review of operating room outbreak response measures in a large tertiary hospital in Singapore. *Can. J. Anesth.* 2020:1–4.
14. B Gates. Responding to COVID-19, a once-in-a-century pandemic? *N Engl J Med,* 382 (2020), p. 18
15. LB da Motta, LC Pacheco. Integrating medical and health multiprofessional residency programs: the experience in building an interprofessional curriculum for health professionals in Brazil. *Educ Health,* 27 (2014), p. 83
16. He K, Stolarski A, Whang E, Kristo G. Addressing General Surgery Residents' Concerns in the Early Phase of the COVID-19 Pandemic. *J Surg Educ.* 2020;77(4):735-8.

17. Osama M, Zaheer F, Saeed H. Impact of COVID-19 on surgical residency programs in Pakistan; A residents' perspective. Do programs need formal restructuring to adjust with the "new normal"? A cross-sectional survey studies. *Int J Surg.* 2020;79:252-6.
18. Adams JG, Walls RM. Supporting the Health Care Workforce During the COVID-19 Global Epidemic. *JAMA.* 2020;323(15):1439-40.
19. Gabr AM, Li N, Schenning RC, Elbarbary A, Anderson JC, Kaufman JA, et al. Diagnostic and interventional radiology case volume and education in the age of pandemics: impact analysis and potential future directions. *AcadRadiol.* 2020;27(10):1481-8.
20. Bregman DE, Cook T, Thorne C. Estimated national and regional impact of COVID-19 on elective case volume in aesthetic plastic surgery. *AesthetSurg J.* 2021;41(3):358-69.
21. Lewicki P, Basourakos SP, Al Awamlh BAH, Wu X, Hu JC, Schlegel PN, et al. Estimating the impact of COVID-19 on urology: data from a large nationwide cohort. *EurUrol Open Sci.* 2021;25:52-6.
22. Swiatek PR, Weiner J, Alvandi BA, Johnson D, Butler B, Tjong V, et al. Evaluating the early impact of the COVID-19 pandemic on sports surgery fellowship education. *Cureus.* 2021;13(1):e12943.
23. Angoulvant F, Ouldali N, Yang DD, Filser M, Gajdos V, Rybak A, et al. COVID-19 pandemic: impact caused by school closure and national lockdown on pediatric visits and admissions for viral and non-viral infections, a time series analysis. *Clin Infect Dis.* 2021;72(2):319-22.
24. Donovan RL, Tilston T, Frostick R, Chesser T. Outcomes of orthopaedic trauma services at a UK major trauma centre during a national lockdown and pandemic: the need for continuing the provision of services. *Cureus.* 2020;12(10):e11056.
25. Clarke K, Bilal M, Sánchez-Luna SA, Dalessio S, Maranki JL, Siddique SM. Impact of COVID-19 pandemic on training: global perceptions of gastroenterology and hepatology fellows in the USA. *Dig Dis Sci.* 2021 Oct;66(10):3307-3311.
26. Kamine TH, Rembisz A, Barron RJ, Baldwin C, Kromer M. Decrease in trauma admissions with COVID-19 pandemic. *West J Emerg Med.* 2020;21(4):819-22.
27. Makhubele, H. D., & Bhuiyan, M. M. (2020). Primary Non-Hodgkin's Lymphoma of the bilateral Breast and review the literature. *Journal of Medical Research and Health Sciences*, 3(4), 926-930. <https://doi.org/10.15520/jmrhs.v3i4.173>
28. Gabr AM, Li N, Schenning RC, Elbarbary A, Anderson JC, Kaufman JA, et al. Diagnostic and interventional radiology case volume and education in the age of pandemics: impact analysis and potential future directions. *AcadRadiol.* 2020;27(10):1481-8.
29. Banerjee S, Tarantini G, Abu-Fadel M, Banerjee A, Little BB, Sorajja P, et al. Coronavirus disease 2019 catheterization laboratory survey. *J Am Heart Assoc.* 2020;9(15):e017175.
30. Chai N, Tang X, Linghu E, Feng J, Ye L, Wu Q, et al. The influence of the COVID-19 epidemic on the gastrointestinal endoscopy practice in China: a national survey. *SurgEndosc.* 2021;35(12):6524-31.
31. Schwartz A.M., Wilson J.M., Boden S.D., Moore T.J., Jr., Bradbury T.L., Jr., Fletcher N.D. Managing resident workforce and education during the COVID-19 pandemic: evolving strategies and lessons learned. *JBJS Open Access.* 2020;5(2).
32. Vargo E., Ali M., Henry F., Kmetz D., Krishnan J., Bologna R. Cleveland clinic akron general urology residency program's COVID-19 experience. *Urology.* 2020;140:1-3. 0090-4295.

33. Bambakidis N.C., Tomei K.L. Impact of COVID-19 on neurosurgery resident training and education. *J. Neurosurg.* 2020;1(aop):1–2.
34. COVID-19 and medical education. Ahmed H, Allaf M, Elghazaly H. *Lancet Infect Dis.* 2020;20:777–778.
35. “We signed up for this!” — student and trainee responses to the Covid-19 pandemic. Gallagher TH, Schleyer AM. *N Engl J Med.* 2020;382:0.
36. The inevitable reimagining of medical education. Emanuel E. *JAMA.* 2020;323:1127–1128.
37. WHO (2020) Mental Health and Psychosocial Considerations During the COVID-19 Outbreak. Available at: <https://www.who.int/publications/i/item/WHO-2019-nCoV-MentalHealth-2020.1>. Accessed 26 March 2022