

An Online Questionnaire Based Survey to Assess the Effect of COVID-19 Pandemic on Medical Education and Training of Surgical Residents

Diwakar Yadav¹, Sanjay Kumar Chaurasia², Tarak Baxla³

¹Senior Resident, Department of General Surgery, Shaheed Nirmal Mahto Medical College and Hospital, Dhanbad, Jharkhand, India

²Associate Professor and HOD, Department of General Surgery, Shaheed Nirmal Mahto Medical College and Hospital, Dhanbad, Jharkhand, India

³Associate Professor, Department of General Surgery, Shaheed Nirmal Mahto Medical College and Hospital, Dhanbad, Jharkhand, India

Received: 12-10-2021 / Revised: 28-11-2021 / Accepted: 17-12-2021

Corresponding author: Dr. Diwakar Yadav

Conflict of interest: Nil

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 Shaheed Nirmal Mahto Medical College, Dhanbad, Jharkhand. 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 70 surgical residents completed the survey. Out of the 70 respondents, 42 (60%) were male, and 28 (40%) were female. 34.3% percent of respondents were in the first year of their residency, 38.6% in their second year, and the remaining 27.1% were in the final year. Out of 70 participants, 54.3% residents worked for 1-5 weeks, 35.7% worked for 5-10 weeks, and 10% residents worked for >10 weeks. Among them, 42.8 % were worried about getting infected and 41.4% were worried about transmitting infection to family members. 15.7% of residents was afraid of death due to COVID-19. 29 (41.4%) reported poor visibility with goggles or face-shield as most difficult part of working with PPE kits. There was a significant reduction in working hours since the pandemic began (6.84 ± 3.66 hours) when compared to pre-pandemic time (12.65 ± 3.54 hours). Hands-on surgical training was significantly affected. Only 30.1% of the participants agreed that online learning programs are more effective than in-person classes, while 69.9% of residents were still in favor of offline teachings.

Conclusion: The decrease in working hours due to the pandemic has provided more time for research work but the limited hands-on experience and lesser clinical exposure are worrisome for which a substitute or a balanced midpoint is needed.

Keywords: Pandemic, Surgeries, Residents, Online Education, Curriculum, Training

This is an Open Access article that uses a funding model which does not charge readers or their institutions for access and distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>) and the Budapest Open Access Initiative (<http://www.budapestopenaccessinitiative.org/read>), which permit unrestricted use, distribution, and reproduction in any medium, provided original work is properly credited.

Introduction:

Pandemic is defined as “an epidemic occurring worldwide, or over a very wide area, crossing international boundaries and usually affecting a large number of people” [1]. It 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) [2]. 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 [3, 4] and also due to limited availability of personal protective equipment (PPE) [5, 6].

It has forced governments and authorities around the world to implement protective and preventive measures such as school closure and mandatory quarantine of cases as social distancing is considered to be the most effective preventative strategy until the development of a vaccine, treatment, or both [7-10]. 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 [10]. 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 [11, 12].

The majority of medical schools have developed pedagogical innovations that involve technology and simulation-based teaching, including online lectures, video clinical vignettes, virtual simulators, webcasting, and online chat-rooms to continue the educational process. On the other hand, the rest of the medical schools have closed their doors until further notice [13]. However, such crises provide a great opportunity for medical educators to power the technology and to engage medical students and faculty in transforming the current pandemic-imposed remote medical education into an evidence-based paradigm [14].

Residents and fellows in training formed the bulk of HCW in the frontline. The increase in cases increased the workload and disrupted the residents' training [15]. Residents in surgical specialties were affected due to sudden cessation of surgical training. Surgical residents were also called on to care for patients with COVID-19 [16]. The prolonged physical, emotional and mental exhaustion among HCWs led to numerous psychological problems [17]. Surgical training forms the important part of medical education for surgical residents. Understanding the effects of this interruption

of surgical training is essential for addressing the training gaps [18].

Materials and Methods

An online survey was conducted to assess the effect of COVID-19 on the residents in various surgical specialties in Shaheed Nirmal Mahto Medical College, Dhanbad, Jharkhand, India.

Methodology

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 was all the residents in surgical specialties who have

performed COVID duty. Exclusion criteria was 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 70 surgical residents completed the survey. Out of the 70 respondents, 42 (60%) were male, and 28 (40%) were female. 34.3% percent of respondents were in the first year of their residency, 38.6% in their second year, and the remaining 27.1% were in the final year. Residents from 8 surgical specialties participated in the survey.

Table 1: Demographic details

	Variables	N (%)
Surgical specialty	General surgery	17 (24.3)
	Obstetrics and gynecology	14 (20.0)
	Otorhinolaryngology	11 (15.7)
	Ophthalmology	9 (12.9)
	Orthopedics	7 (10.0)
	Plastic surgery	5 (7.14)
	Surgical oncology	4 (5.71)
	Urology	3 (4.29)
Gender	Male	42 (60)
	Female	28 (40)
Year of residency	1 st year	24 (34.3)
	2 nd year	27 (38.6)
	3 rd year	19 (27.1)

Out of 70 participants, 54.3% residents worked for 1-5 weeks, 35.7% worked for 5-10 weeks, and 10% residents worked for >10 weeks. Among them, 42.8 % were worried about getting infected and 41.4% were worried about transmitting infection to family members. 15.7% of residents was afraid of death due to COVID-19. 29 (41.4%) reported poor visibility with goggles or face shield as most difficult part of working with PPE kits.

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	38 (54.3)
5-10	25 (35.7)
>10	07 (10.0)
What are you most worried about while working in the COVID ward?	
Getting infected	30 (42.8)
Transmitting the disease to family members	29 (41.4)
Fear of death due to COVID	11 (15.7)
What is the most difficult part of working with the PPE?	
Poor visibility with goggles or face shield	29 (41.4)
Breathing difficulty with the N-95 mask	22 (31.4)
Inability to communicate with assistant	13 (18.6)
Poor ventilation	06 (8.6)

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

Variables	Mean \pm 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?	2.05 \pm 1.85	(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?	3.84 \pm 1.26	(p<0.001)

There was a significant reduction in working hours since the pandemic began (6.84 \pm 3.66 hours) when compared to pre-pandemic time (12.65 \pm 3.54 hours). Hands-on surgical training was significantly affected. Only 30.1% of the participants agreed that online learning programs are more effective than in-person classes, while 69.9% 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	53 (86.7)
Vis-a-vis lectures with social distancing	17 (5.6)
No teaching program since the pandemic	00 (7.5)
Do you think an online learning platform is more effective than in-person classes?	
Yes	23 (30.1)
No	47 (69.9)

Discussion

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 [19]. 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 [20].

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 [21]. Amidst the chaos and uncertainty that is brought by COVID-19, a method of organization is required that will allow the residency programs to train the residents on academic, social, professional and personal levels. The daily virtual meetings to stay up to date regarding recent developments in response to COVID-19 and to remain on top of the cases admitted in the ward are so far getting positive reviews from the residents and attending.

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 [22, 23]. Clear and supportive discussions about preparation at home and precautions before leaving the hospital were necessary to allay such fears [24].

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 [25] and several others [26, 27].

When global pandemics emerge, they strike the whole world all of a sudden and affect every aspect of life with no one being prepared or ready for such a situation. The impact of the current pandemic on medical education has been unprecedented, far-reaching, and presents unique challenges to medical schools. It is frightening to consider that probably nothing will return to the way it was before even when the current pandemic eventually subsides. 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 [28-30].

Conclusion

The decrease in working hours due to the pandemic has provided more time for research work but the limited hands-on experience and lesser clinical exposure are worrisome for which a substitute or a balanced midpoint is needed. Getting infected and spreading the infection to the family members is a major concern of most of the surgery residents which can affect the residents' mental health, so, trainee's mental health should be safeguarded, and medical students can be involved in the COVID-19 clinical treatment if needed.

References

1. A dictionary of epidemiology. Feinleib M. *Am J Epidemiol.* 2001; 154:93–94.
2. Jebri 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 January 2, 2022.
3. Chang D., Xu H., Rebaza A., Sharma L., Cruz C.S. Protecting health-care workers

- from subclinical coronavirus infection. *Lancet Respir. Med.* 2020 Mar 1;8(3): e13.
4. 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
 5. Gareth Iacobucci. Covid-19: doctors still at “considerable risk” from lack of PPE. *BMA Warns* *BMJ.* 2020;368:m1316
 6. Newman Melanie. Covid-19: doctors' leaders warn that staff could quit and may die over lack of protective equipment. *BMJ.* 2020;368:m1257.
 7. The risk of seasonal and pandemic influenza: prospects for control. Monto AS. *Clin Infect Dis.* 2009; 48:0.
 8. Epidemiology and control of SARS in Singapore. Goh KT, Cutter J, Heng BH, et al. http://www.annals.edu.sg/pdf/35VolNo5200606/V35N5p301.pdf?mod=article_inline *Ann Acad Med Singap.* 2006; 26:301–316.
 9. 2019 novel coronavirus—important information for clinicians. Del Rio C, Malani PN. *JAMA.* 2020; 323:1039–1040.
 10. Medical student education in the time of COVID-19. Rose S. *JAMA.* 2020; 323:2131–2132.
 11. 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.
 12. 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.
 13. SARS and its effect on medical education in Hong Kong. Patil NG, Chan Y, Yan H. *Med Educ.* 2003;37:1127–1128.
 14. Challenges to online medical education during the COVID-19 pandemic. Rajab MH, Gazal AM, Alkattan K. *Cureus.* 2020; 12:0.
 15. Chang Liang Z, Wang W, Murphy D, Po Hui JH. Novel Coronavirus and Orthopaedic Surgery: Early Experiences from Singapore. *J Bone Joint Surg Am.* 2020;102(9):745-9.
 16. Giulio M, Maggioni D, Montroni I. Being a Doctor Will Never Be the Same After the COVID-19 Pandemic. *Am J Med.* 2020;133(6):652.
 17. Xiang YT, Jin Y, Cheung T. Joint International Collaboration to Combat Mental Health Challenges During the Coronavirus Disease 2019 Pandemic. *JAMA Psychiatry.* 2020;77(10):989-90.
 18. Ahmed H, Allaf M, Elghazaly H. COVID-19 and medical education. *Lancet Infect Dis.* 2020;20(5):e79.
 19. B Gates. Responding to COVID-19, a once-in-a-century pandemic? *N Engl J Med,* 382 (2020), p. 18
 20. 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
 21. 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.
 22. 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.
 23. 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.
24. Adams JG, Walls RM. Supporting the Health Care Workforce During the COVID-19 Global Epidemic. *JAMA.* 2020;323(15):1439-40.
25. 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).
26. 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.
27. Bambakidis N.C., Tomei K.L. Impact of COVID-19 on neurosurgery resident training and education. *J. Neurosurg.* 2020;1(aop):1–2.
28. COVID-19 and medical education. Ahmed H, Allaf M, Elghazaly H. *Lancet Infect Dis.* 2020;20:777–778.
29. “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.
30. The inevitable reimaging of medical education. Emanuel E. *JAMA.* 2020; 323: 1127-28.