CHAPTER 7

Wellbeing of Resident Doctors During the COVID-19 Pandemic; Its Impact on Medical Education and Its Future

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1 Background

The coronavirus disease 2019 (COVID-19) pandemic has had a negative impact on the mental health and subjective psychological wellbeing of a majority of studentsand teachers across all educational institutions Doctors who are medical residents are one of the groups most impacted. Normally, resident doctors are affected by work-related stressors including lack of control, unpredictable case load, stressful work conditions, financial remuneration, work-life conflicts and burnout. But with the added impact of

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COVID-19 they experienced even greater degrees of stress. Further adding to the already stressful situation was the dire shortage of trained manpower. Hence a study was conducted to understand the prevalence of psychological symptoms of COVID-19 on resident doctors as well as taking a look into the other studies and relevant literature pertaining to the same. Depression, anxiety and stress were found to be prevalent in the resident doctors. The mental health needs of the resident doctors are serious and will not disappear even when the COVID-19 does; hence, it is important to prioritize their wellbeing immediately and after the pandemic. The pandemic has forced all educational institutions to be in the online/virtual mode but created a major challenge for training and teaching of medical professional graduates and those dealing with specialties. This chapter also addresses the future manpower requirements in the health sector and how medical education has to be re-designed for the future. This chapter also presents a comprehensive analysis of the existing structural and systemic challenges applicable to medical students and teaching/training programmes and the impact of COVID-19 on medical students and education.

2 Introduction

The World Health Organization (WHO) declared coronavirus disease 2019 (COVID-19) as pandemic on 11 March 2020 (WHO, 2020). As with rest of the world, India is one of the countries to have suffered the worst of the COVID-19 pandemic. In India, from 3 January 2020 to 6:09 pm CEST, 10 June 2022, there have been 43,205,106 confirmed cases of COVID-19 with 524,747 deaths, reported to WHO (WHO, 2020).

This surge in cases put a huge burden on the healthcare system. The surge of COVID-19 cases almost put the healthcare system on the brink of a breakdown (Menon et al., 2020). With healthcare workers being the first responders in this crisis, the resident doctors faced the brunt of the pandemic Literature suggests that there is a high prevalence of mental health problems such as burnout, insomnia, anxiety and depression among HCWs (The Lancet, 2021; Maunder, 2004). In the context of the current pandemic, the ever-increasing patients, the rising deaths, the endless hours of work, the helplessness at the lack of resources, the fears of contracting COVID-19 or infecting their families, all these have added fuel to the already emerging mental health crisis in the healthcare sector(6). Mental health issues among resident doctors impact their competency and

motivation and further increase risk of burnout and emotional drainage, hampering their healthcare response to COVID-19 (Kang et al., 2020). As mentioned by Angres et al. (2003) and Kalmoe et al. (2019), healthcare workers have comparably higher rates of psychiatric comorbidity, substance use and suicidality as compared to other professions (Angres, 2003 and Lamoe, 2019).

Government regulations of social distancing and lockdowns have impacted medical training and education significantly. Lower inputs of non-COVID-19 patients in the outpatient and inpatient care, reduced elective surgical and medical procedures, and has led to reduced learning experiences hampering the academic progression (Reena Jatin et al., 2021). This disruption in medical education and training has adversely impacted traditional medical education and medical students and is likely to have long-term implications beyond the pandemic (Sharma & Bhaskar, 2022). Medical education is traditionally based on hands-on learning via clinical postings, lectures and demonstrations; the pandemic has thus posed a huge challenge for continuing this method. This has given rise to other methods like online and remote learning via virtual lectures and teaching medium. This chapter aims to discuss the impact of the pandemic on wellbeing of resident doctors as well as its impact on their medical education and training; to make recommendations to accept the new normal which is inclusive of the mental health needs of medical students and their continued education.

3 Literature Review

Relevant literature was identified via PubMed, Google Scholar and Medline review, including original, opinion and perspective articles, topic reviews, official national medical associations/bodies and societal guidelines and media sources. The search was performed using the keywords "Medical Students", "COVID-19" and "Medical Education". The PICO template, with population (medical students), intervention (COVID-19), comparator (standard medical education pre-COVID-19) and outcome (impact on medical students/education and changes adopted due to COVID-19), was used. Mentioned below are a few studies relevant to the same:

A study from Vietnam to find the fear of COVID-19 among medical students from eight medical colleges having a sample size of 5423 found that factors such as better health literacy, older age, later academic years,

male gender and better financial status were protective from fear. Those with greater scores in fear were more likely to smoke and drink at the same or higher level than before the pandemic (Nguyen et al., 2020). Collado-Boira et al. did a study in Spain regarding willingness to participate in the health workforce; fears about infection, familial transmission and lack of PPE; confidence in terms of knowledge and skills and coping. The study included 62 final-year medical students and nursing students. They found that there were profound fears in all domains, particularly with respect to familial transmission, their practical knowledge and skills, and coping with the death of patients (Collado-Boira et al., 2020). A study by Khanna et al. from India on 2355 ophthalmologists and ophthalmologist trainees was conducted with the objective to study the impact of training on professional work, financial implications, and to find symptoms of depression. Their study reported that 52.8% felt their training or professional work would be seriously affected by COVID-19, 37% reported difficulties meeting financial commitments and 32.6% had some degree of depression (Khanna et al., 2020). In a study on 115 plastic surgery residents in Italy which aimed to find the impact of COVID-19 on didactics and preparedness for surgery, Zingaretti et al. found that although residents reported increased didactic activities compared to pre-COVID-19, the majority reported them as insufficient. Additionally, most reported their preparedness for operations as either "Not at all" or "Not Much" (Zingaretti et al., 2020).

Garcia et al. did a study in the United States among 315 medical students and foreign medical graduates to determine the impact of the COVID-19 pandemic on medical students who were either considering or were already transitioning to neurosurgical careers. Their study reported that approximately two-thirds of respondents reported postponement of clinical placements and suspended in-person teaching. Greater than 50% of respondents reported reduced academic productivity. One in five first-year medical students reported that they are less likely to pursue neurosurgery as a career option (Garcia et al., 2020). A study on 1442 health professional students to find factors associated with psychological distress during the COVID-19 pandemic in China by Li et al. found that 26.63% of students had psychological distress that was clinically significant, whilst 11.10% had a probable acute stress reaction. They found that those who had experienced childhood adversity, stressful life event experiences in the past year and internet addiction were at greater risk of developing distress whereas good family functioning was found to be a protective factor (Li

et al., 2020). In another study on 217 medical students in China by Liu et al. on mental health status in medical students, it was found that 35.5% of students were in a state of depression and 22.1% had experienced anxiety. The majority of affected students had symptoms in the mild to moderate range (Liu et al., 2020). Meo et al. did a study in Saudi Arabia, which included 625 participants. The study aimed to find psychological wellbeing, stress and learning behaviours in first-to fifth-year medical students. They reported that feelings of emotional detachment and disheartenment were prominent. Additionally, they also found that students felt their work performance and time spent studying were reduced (Meo et al., 2020). Similarly, there are many studies on the impact of COVID-19 on postgraduate teaching and learning. Notably an Indian study by Wani et al. on the impact of COVID-19 on PG teaching and learning found that there was a decrease in PG teaching, as felt by 250 postgraduate students in terms of frequency and modality of classes. The study also looked into the difficulties and problems faced by the residents during the pandemics in terms of the progress in dissertation, lectures, seminars, clinical case discussions, surgical training, re-deployment challenges and the effect on their mental health. They found that a majority had a problem with their thesis and encountered problem in some form, 80.99% felt that their teaching was affected due to the pandemic and 42.6% of the participants felt stress all the time (Wani, 2021). In Pakistan, Abbasi et al. did a study to find attitudes and perceptions surrounding e-learning in medical and dentistry students. The study had 382 participants. They concluded in their study that most students had negative perceptions surrounding e-learning and preferred face-to-face learning (Abbasi et al., 2020).

The literature was examined to critically analyse existing structural and systemic challenges of medical education, with an emphasis on the use of technologies such as telemedicine or remote education, and formulate a synthesis on the impact of COVID-19 on medical education, students and training.

4 Research Methodology

A prospective cross-sectional survey was conducted at a Tertiary Municipal Medical college of Mumbai via an online method with the objective to assess the prevalence of depression, anxiety and stress among resident doctors. A questionnaire was made through Google Forms consisting of multiple questions regarding clinical training and workplace details, and the

DASS-21 scale was used to study the prevalence of depression, anxiety and stress. This was circulated using the WhatsApp application to the resident doctors. Data was collected and was analysed using the SPSS software.

Convenient sampling was done and the study participants were recruited as per the inclusion and exclusion criteria below.

Inclusion Criteria:

- Age of 18–35 years.
- Resident doctors actively engaged in management of COVID-19 patients.

Exclusion Criteria:

- Participants who did not give consent to be a part of the study.

After identifying the eligible participants as per the recruitment criteria, participants were approached for volunteering in the study. A self-administered questionnaire in the format of Google Forms link was used. The link was shared via social media platform for self-reporting the survey. There were three sections in the questionnaire. Section-I was the informed consent. Section II contained brief personal sociodemographic details and questions based on previous COVID-19 infection and COVID-19 vaccination. The DASS-21 questionnaire (by the University of New South Wales) made up Section-III (21). The questionnaire was created in English. All data was entered into a computer by giving a coding system, proofed for entry errors. Data obtained was compiled on a MS Office Excel Sheet (v 2019, Microsoft Redmond Campus, Redmond, Washington, United States). Data was subjected to statistical analysis using a statistical package for social sciences (SPSS v 26.0, IBM). All procedures performed in the study involving human participants were in accordance with the ethical standards of the Institutional Ethics Committee Human Research, the Staff and Research Society, and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards.

5 Results

The present study included 120 resident doctors who were involved in management of COVID-19 patients. A majority (80.1%) of them were between 25 and 33 years of age and females (68.9%). More than half of

them were unmarried (55.8%) and about 65 (54.2%) had 1–3 family members dependent on them. All of them had taken their both doses of COVID-19 vaccine. About 30.7% healthcare workers had been infected with SARS CoV-2 in the past.

As per the morbidity parameters, up to 54% of healthcare workers had depression and anxiety. Of the 65 healthcare workers affected by depression, 41.6% were mild, 35.2% moderate and 23.2% were severe to extremely severe; and of the 50 healthcare workers affected by anxiety, 50.3% were mild, 24.8% moderate and 24.9% were severe to extremely severe. More than a third (36%) of healthcare workers had stress, of which 41.6% had mild form, 37.7% moderate and 20.7% had severe to extremely severe stress.

The results of this study clearly demonstrate that the prevalence of stress, anxiety and depression within resident doctors caring for COVID-19 patients is high.

6 Discussion

Looking at the alarming figures from the above study and the rampant prevalence of stress, anxiety and depression within resident doctors, strong measures are recommended for their wellbeing and mental health. Considering the severity of the pandemic scenario and the overburden of healthcare services, resident doctors' mental health deserves special care. Stakeholders and authorities concerned need to provide effective strategies to improve the mental health of these individuals.

Apart from affecting the mental health of resident doctors, COVID-19 has also deeply and affected the medical education system. There has been reduction in the amount of clinical teaching and number of classes taken for residents since the start of COVID-19 pandemic (Wani, 2021). Most medical schools in the country had cancelled face-to-face lectures, clinical postings, practical classes and demonstrations, and had moved to online lectures. This made it challenging for the hands-on approach for learning. Clinical placements offer students a valuable first-hand experience of medicine, with opportunities to develop history-taking and examination skills under the supervision of senior clinicians. It also offers students the ability to consolidate and apply their scientific knowledge beyond the classroom. Students may also have been disproportionately affected due to the increasing reliance on clinical exposure as they approached completion of their degree. This sudden interruption has had severe implications on both their academic performance and their mental health. With most

resident doctors being posted in the care of COVID-19 affected patients, there was a lack of patient input in non-COVID-19 clinics, thus leading to lack of clinical postings and rounds, which form an essential part of learning. Loss in hospital clinical postings has caused added fears surrounding deficiency in practical skills and training. This extends beyond just medical students, with surgical trainees being undertrained or underprepared or due to cancellation of elective surgeries, thus impacting even training of specialists. Resident doctors reported that their basic learning was affected due to cancellation of elective OTs, speciality OPDs, lab and research work for surgical branches, medical branches and para clinical branches respectively (Wani, 2021). There has also been a delay in thesis work, which is an essential criterion for postgraduation qualification, due to lack of available cases for recruitment. There was a delay in the conduction of examinations. Traditionally, medical training was well rounded but due to the pandemic the focus of the resident doctors training has shifted to COVID-19. The fact is that if had continued for a longer period, resident doctors in medical specialties could have lost or never developed skills in managing a broad range of medical pathologies. Resident doctors in specialized non–primary care specialties were on standby for COVID-19 wards due to markedly reduced patient volume in these specialties, further reducing the learning opportunities for them to become competent in their respective fields. There has been an overall uncertainty regarding their future and professional life.

It is not just the impact of the pandemic on the mind-sets of budding doctors that was worrisome; it was also the uncertainty that hung over the future prospects of these medical postgraduate students. With international licensing exams being called off, admission processes halted within and outside the country, examinations for many postgraduate medical courses postponed, there have been huge doubts, making the mental impacts of the pandemic on some medical postgraduate students worse than the others. Postponement of national-level competitive entrance exams proposes another threat to continuity of the supply of trained doctors and health workforce, which might result in a crunch in trained workforce in a few years. Hence, the impact is being experienced not just by existing medical students, but by future medical aspirants as well.

7 Future of Medical Education

COVID-19 has already triggered the introduction of new methods of learning in medical education. COVID-19 has led to a rapid uptake and development of online teaching to minimize disruption to student learning. Telecommunication technologies are an important component in this, with several institutions having implemented online teaching webinars, simulations and educational clinical skill videos. One popular method which has emerged is the use of streaming technology to deliver online lectures or tutorials. Education has changed dramatically in the internet age, with an increasing range of online resources and accessible content beyond the traditional textbooks. In an effort not to distract the educational process, the academic institutions worldwide have accelerated the development of online learning environment. Online distance education (ODE) can be generally delivered to medical students in two main formats: asynchronous distance education, such as recorded videos and podcasts, and synchronous (live) distance education (SDE), such as video conferences and virtual classrooms (He et al., 2021). One of the new models is the "flipped classroom", which is a blended type of learning mode with an asynchronous component that could allow medical students for more schedule flexibility, and a synchronous component that offers interaction between medical students and faculty members (Dedeilia et al., 2020). The adoption of online learning in medical education can have several benefits: one of the most positive aspects of ODE is the flexibility of time and location and the subsequent increased convenience, which means medical students are able to adapt their schedule in an easier way. Besides schedule flexibility, ODE can also be much more cost-effective than classroom-based learning, as it does not require educators to move, while more individuals across different institutions (or even countries) can participate in virtual courses. In addition, e-learning assists medical students to better adapt to a web-based medical world that increasingly uses digital health services. Multimodal teaching approaches catering to various aspects of learning have been implemented (Ruthberg et al., 2020), along with flipped learning methodologies, which involve students engaging with content prior to class and using later face-to-face time to clarify concepts. This is useful for teaching anatomy using online 3D modelling applications considering suspension of traditional cadaver-based anatomy demonstration at several institutions (Moszkowicz et al., 2020). Online teaching can be made more engaging and effective for students through

interactive tools such as voting polls, chat functions and videos (Singh et al., 2020). Additionally, intensive anatomy and clinical skills workshops, building on online learning resources, can be run when students return to in-person teaching to address deskilling and imposter syndrome concerns. Virtual tools such as virtual reality simulations, homemade simulations and smartphone modalities could benefit surgical trainees (Hoopes et al., 2020). These approaches, reliant on effective use of telecommunications technology, facilitate enhanced student pedagogy, and thus address the stressors of deskilling, progression and hindered knowledge. Involvement of students in telehealth to provide clinical exposure and help triage patients during the pandemic has been well received and facilitates controlled patient exposure with feedback (Chandra et al., 2020). Telehealth-based services to partially replace overseas elective placements, although not equivalent, may allow students to gain an enhanced understanding of another healthcare system. Webinars by experts from various medical disciplines have set a benchmark towards upskilling students and trainees and maintaining their interest and motivation. Using staggered timings to overcome issues related to time zones has been highly effective and can contribute to a global sense of community. Numerous institutions have also successfully implemented volunteering initiatives including research, assisting hospital triage, contact tracing and support hotlines to support medical services during the pandemic but also boost student morale as they develop skills and feel "useful" (Cerqueira-Silva et al., 2020). Telehealth service forms the backbone of such initiatives, allowing students to develop skills safely (Santos et al., 2020). Several tele psychiatry and support services have been started worldwide.

Considering increasing reports of mental health consequences of the pandemic on medical students and trainees, telemedicine can be harnessed to provide constant support to these individuals and resultantly safeguard our future generations of medical professionals from longer-term sequelae (Sharma & Bhaskar, 2022).

8 Conclusion

There has been a disruptive effect of COVID-19 pandemic on the education and training of medical students and the impact on their mental health. The pandemic has firmly challenged the healthcare system.

Attention to these issues for our future doctors is of utmost importance and this will help in developing a stable healthcare infrastructure to combat COVID-19. The only way forward is having regular meetings, audits and discussions to facilitate our resident doctors' training and work patterns, and measure to keep their mental wellbeing stable. The future of healthcare in India, and the world at large, depends on how our institutions collectively mitigate the damage to healthcare education caused as a result of this pandemic. There ought to be administrative interventions into the functioning of medical institutes across the nation to ensure that concrete efforts are made to help students cope with stress, anxiety and the academic losses they incurred due to the pandemic. There is a warranted need to accept and integrate the use of technology for medical education as the "new normal". The urgency of the pandemic has rapidly brought on the development of many innovative educational strategies across the world, the majority of which encompass the use of a variety of digital tools. Such initiatives must act as a stepping stone for evidence-based medical education to thrive even more in the future. Medical students, the future of our healthcare system, are vulnerable during the current pandemic, so targeted support for these students is warranted. COVID-19 has exposed systemic issues within our healthcare and education systems. Recognizing these issues and developing strategies to combat them are pivotal to our response to an infectious outbreak in the future.

Declaration

Ethical Consideration All procedures performed in the study involving human participants were in accordance with the ethical standards of the Institutional Ethics Committee Human Research, the Staff and Research Society, and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards.

Conflicts of Interest There are no conflicts of interest.

Disclosure Consent was taken from the participating students as well as an information sheet was made available for the students about the study.

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References

Abbasi, S., Ayoob, T., Malik, A., & Memon, S. I. (2020). Perceptions of Students Regarding E-Learning during COVID-19 at a Private Medical College. *Pakistan Journal of Medical Sciences*, *36*(COVID-1919-S4), S57. https://doi.org/10.12669/pjms.36.COVID-1919-s4.2766. http://www2.psy.unsw.edu.au/Groups/Dass/down.htm.

Angres, D. H., McGovern, M. P., Shaw, M. F., & Rawal, P. (2003). Psychiatric Comorbidity and Physicians with Substance use Disorders: A Comparison between the 1980s and 1990s. *Journal of Addictive Diseases, 22*(3), 79–87.

Cerqueira-Silva, T., Carreiro, R., Nunes, V., Passos, L., Canedo, B., Andrade, S., & et al. (2020). *Bridging Learning in Medicine and Citizenship During the COVID-19 Pandemic: A Telehealth-Based Strategy.*

Chandra, S., Laoteppitaks, C., Mingioni, N., & Papanagnou, D. (2020). Zooming-out COVID-19: Virtual Clinical Experiences in an Emergency Medicine Clerkship. *Medical Education, 54*, 1182. https://doi.org/10.1111/medu.14266

Collado-Boira, E. J., Ruiz-Palomino, E., Salas-Media, P., Folch-Ayora, A., Muriach, M., & Baliño, P. (2020). "The COVID-19 Outbreak"—An Empirical Phenomenological Study on Perceptions and Psychosocial Considerations Surrounding the Immediate Incorporation of Final-Year Spanish Nursing and Medical Students into the Health System. *Nurse Education Today, 92*, 104504. https://doi.org/10.1016/j.nedt.2020.104504

Dedeilia, A., Sotiropoulos, M. G., Hanrahan, J. G., et al. (2020). Medical and Surgical Education Challenges and Innovations in the COVID-19 Era: A Systematic Review. *In Vivo, 34*, 1603–1611. https://doi.org/10.21873/invivo.11950

Garcia, R. M., Reynolds, R. A., Weiss, H. K., Chambless, L. B., Lam, S., Dahdaleh, N. S., & Rosseau, G. (2020). Letter: Preliminary National Survey Results Evaluating the Impact of COVID-19 Pandemic on Medical Students Pursuing Careers in Neurosurgery. *Neurosurgery, 87*(2), E258–E259. https://doi.org/10.1093/neuros/nyaa214

He, L., Yang, N., Xu, L., et al. (2021). Synchronous Distance Education vs Traditional Education for Health Science Students: A Systematic Review and Meta-Analysis. *Medical Education, 55*, 293–308.

Hoopes, S., Pham, T., Lindo, F. M., & Antosh, D. D. (2020). Home Surgical Skill Training Resources for Obstetrics and Gynecology Trainees During a Pandemic. *Obstetrics and Gynecology, 136*, 56–64. https://doi.org/10.1097/AOG.0000000000003931

https://www.thehindu.com/society/medical-minds-the-pandemic-is-taking-a-toll-on-themental-health-of-indias-healthcare-workers/article34612828.ece

Kalmoe, M. C., Chapman, M. B., Gold, J. A., & Giedinghagen, A. M. (2019). Physician Suicide: A Call to Action. *Missouri Medicine., 116*(3), 211.

Kang, L., Li, Y., Hu, S., Chen, M., Yang, C., Yang, B. X., Wang, Y., Hu, J., Lai, J., Ma, X., & Chen, J. (2020). The Mental Health of Medical Workers in Wuhan, China Dealing with the 2019 Novel Coronavirus. *The Lancet Psychiatry, 7*, e14. https://doi.org/10.1016/s2215-0366(20)30047-x

Khanna, R., Honavar, S., Metla, A., Bhattacharya, A., & Maulik, P. (2020). Psychological Impact of COVID-19 on Ophthalmologists-in-Training and Practising Ophthalmologists in India. *Indian Journal of Ophthalmology, 68*(6), 994. https://doi.org/10.4103/ijo.ijo_1458_20

Li, Y., Wang, Y., Jiang, J., Valdimarsdóttir, U. A., Fall, K., Fang, F., Song, H., Lu, D., & Zhang, W. (2020). Psychological Distress Among Health Professional Students During the COVID-19 Outbreak. *Psychological Medicine, 51*(11), 1952–1954. https://doi.org/10.1017/s0033291720001555

Liu, J., Zhu, Q., Fan, W., Makamure, J., Zheng, C., & Wang, J. (2020). Corrigendum: Online Mental Health Survey in a Medical College in China During the COVID-19 Outbreak. *Frontiers in Psychiatry, 11*, 1–6. https://doi.org/10.3389/fpsyt.2020.00845

Maunder, R. (2004). The Experience of the 2003 SARS Outbreak as a Traumatic Stress Among Frontline Healthcare Workers in Toronto: Lessons Learned. *Philosophical Transactions of the Royal Society of London. Series B: Biological Sciences, 359*(1447), 1117–1125.

Menon, V., Kar, S. K., Ransing, R., & Arafat, S. Y. (2020). Impending Second Wave of COVID- 19 Infections: What India Needs to do? *Asia-Pacific Journal of Public Health, 33*(4), 456–457.

Meo, S. A., Abukhalaf, D. A. A., Alomar, A. A., Sattar, K., & Klonoff, D. C. (2020). COVID-19 Pandemic: Impact of Quarantine on Medical Students' Mental Wellbeing and Learning Behaviors. *Pakistan Journal of Medical Sciences, 36*(COVID-1919-S4), S43. https://doi.org/10.12669/pjms.36.COVID-1919-s4.2809

Moszkowicz, D., Duboc, H., Dubertret, C., Roux, D., & Bretagnol, F. (2020). Daily Medical Education for Confined Students During Coronavirus Disease 2019 Pandemic: A Simple Videoconference Solution. *Clinical Anatomy, 33*, 927–928. https://doi.org/10.1002/ca.23601

Nguyen, H. T., Do, B. N., Pham, K. M., Kim, G. B., Dam, H. T., Nguyen, T. T., Nguyen, T. T., Nguyen, Y. H., Sørensen, K., Pleasant, A., & Duong, T. V. (2020). Fear of COVID-19 Scale—Associations of Its Scores with Health Literacy and Health-Related Behaviors among Medical Students. *International Journal of Environmental Research and Public Health, 17*(11), 4164. https://doi.org/10.3390/ijerph17114164

Reena Jatin, W., Hema Prakash, R., Sayali, W., & Yashashree, S. (2021). Impact of COVID-19 Pandemic on Post Graduate Medical Residency in a Medical

College of Mumbai. *International Archives of Public Health and Community Medicine, 5*(2). https://doi.org/10.23937/2643-4512/1710058

Ruthberg, J. S., Quereshy, H. A., Ahmadmehrabi, S., Trudeau, S., Chaudry, E., Hair, B., et al. (2020). A Multimodal Multi-Institutional Solution to Remote Medical Student Education for Otolaryngology During COVID-19. *Otolaryngology and Head and Neck Surgery, 163*, 707–709. https://doi.org/10.1177/0194599820933599

Santos, J. J., Chang, D. D., Robbins, K. K., Cam, E. L., Garbuzov, A., Miyakawa-Liu, M., et al. (2020). Answering the Call: Medical Students Reinforce Health System Frontlines Through Ochsner COVID-19 Hotline. *The Ochsner Journal, 20*, 144. https://doi.org/10.31486/toj.20.0065

Sharma, D., & Bhaskar, S. (2022). Addressing the COVID-19 Burden on Medical Education and Training: The Role of Telemedicine and Tele-Education During and Beyond the Pandemic. *Frontiers in Public Health, 8*, 589669. https://doi.org/10.3389/fpubh.2020.589669

Singh, K., Srivastav, S., Bhardwaj, A., Dixit, A., & Misra, S. (2020). Medical Education During the COVID-19 Pandemic: A Single Institution Experience. *Indian Pediatrics, 57*, 678–679. https://doi.org/10.1007/s13312-020-1899-2

The Lancet. (2021). Health and Care Workers are Owed a Better Future. *The Lancet, 397*(10272), 347.

WHO. (2020). Coronavirus Disease (COVID-19) Pandemic. WHO Dashboard, 5th July 2022, https://COVID-1919.who.int/region/searo/country/in

Zingaretti, N., Contessi Negrini, F., Tel, A., Tresoldi, M. M., Bresadola, V., & Parodi, P. C. (2020). The Impact of COVID-19 on Plastic Surgery Residency Training. *Aesthetic Plastic Surgery, 44*(4), 1381–1385. https://doi.org/10.1007/s00266-020-01789-w