



Clinical Medical Education in Iran During and After the COVID-19 Pandemic: A Review of Challenges, Opportunities, and Strategic Responses

Fatemeh Shoaee¹, Gholamreza Khademi², Ali Khakshour², *Masumeh Gazanfarpour³

¹Gynecologist, Fellowship in Minimally Invasive Gynecologic Surgery, Kowsar Hospital, Shiraz University of Medical Sciences, Shiraz, Iran. ²Associate Professor of Pediatrics, Department of Pediatrics, Faculty of Medicine, Mashhad University of Medical Sciences, Mashhad, Iran. ³Associate Professor of Reproductive Health, Kerman University of Medical Sciences, Kerman, Iran.

Abstract

Background: Clinical medical education is essential for training healthcare professionals and supporting health systems. The COVID-19 pandemic restricted in-person training in Iran, necessitating urgent adaptations. This study reviews the challenges, opportunities, and responses in clinical education during and after the pandemic, and proposes practical strategies to enhance education quality and preparedness for future crises.

Materials and Methods: This narrative review involved a systematic search independently conducted by two reviewers using Persian and English keywords across PubMed, Scopus, ERIC, Web of Science, CIVILICA, and SID databases up to March 2025. Studies were screened according to inclusion criteria, and thematic analysis was employed to synthesize findings on clinical medical education in Iran.

Results: The findings indicate that clinical medical education faced significant structural, technological, and psychological challenges. Structural challenges included restricted access to in-person training and inadequate technological infrastructure; technological challenges involved reduced efficiency of digital systems; psychological challenges comprised increased anxiety and stress among students and faculty. These issues adversely affected education quality, stakeholder mental health, and system resilience. In response, strategies such as blended learning models, faculty development programs, flexible policy-making, and the establishment of the Educational Incident Command System (EICS) effectively mitigated these impacts, promoting sustainability and responsiveness. The pandemic also accelerated digital innovation and heightened attention to mental health support. Therefore, continued investment in technology, institutionalized crisis management, and enhanced psychological support are essential for future preparedness.

Conclusion: Clinical medical education in Iran faced structural, technological, and psychological challenges during and after COVID-19, reducing quality and resilience. Limited in-person training and weak infrastructure were key issues. Strategies like blended learning, faculty empowerment, flexible policies, and the Educational Incident Command System mitigated impacts and promoted innovation.

Key Words: Clinical Medical Education, COVID-19, Challenges, Iran, Opportunities.

*Please cite this article as: Shoaee F, Khademi Gh, Khakshour A, Ghazanfarpour M. Clinical Medical Education in Iran During and After the COVID-19 Pandemic: A Review of Challenges, Opportunities, and Strategic Responses. Med Edu Bull 2025; 6(1): 1083-91. DOI: [10.22034/MEB.2025.537431.1118](https://doi.org/10.22034/MEB.2025.537431.1118)

*Corresponding Author:

Masumeh Ghazanfarpour, PhD, Kerman University of Medical Sciences, Kerman, Iran.

Email: Masumeh.ghazanfarpour@yahoo.com

Received date: Mar. 21, 2025; Accepted date: Jun.22, 2025

1- INTRODUCTION

Clinical medical education constitutes a foundational pillar in the training of specialized healthcare professionals and plays an indispensable role in ensuring the quality, effectiveness, and sustainability of health systems globally (1). Despite significant progress in recent years, Iran's clinical medical education system continues to face critical challenges, including inadequate alignment of curricula with the practical demands of the healthcare system, persistent gaps in students' clinical competencies, and notable limitations in technological infrastructure and educational governance (2–4).

The advent of the COVID-19 pandemic—a profound global health crisis—exacerbated these longstanding issues by imposing stringent restrictions on face-to-face clinical training within hospitals and educational institutions. These restrictions necessitated urgent adoption of innovative educational technologies and the implementation of flexible, adaptive teaching models such as online and hybrid learning to mitigate disruptions in clinical education (5–8). The rapid transition to virtual platforms revealed infrastructural deficiencies and faculty unpreparedness, while psychological stress and health concerns posed additional challenges for both students and educators, further complicating the educational process (9, 10).

Nevertheless, this crisis acted as a catalyst for transformative change. It created a crucial opportunity for educational policymakers and administrators to reassess and redesign managerial frameworks to ensure continuity, adaptability, and enhancement of education quality during crises. Key initiatives identified include the expansion of hybrid learning modalities, comprehensive faculty development programs focused on digital pedagogy, and

the establishment of robust educational crisis management systems—such as the Educational Incident Command System (EICS)—which together aim to strengthen the resilience and responsiveness of Iran's clinical medical education infrastructure (11–14).

This study aimed to review the challenges, opportunities, and adaptive responses of Iran's clinical medical education system during and after the COVID-19 pandemic, and to propose practical strategies to enhance education quality, resilience, and preparedness for future crises.

2- MATERIALS AND METHODS

2-1. Study Design

This study was conducted as a narrative review aiming to collect, analyze, and qualitatively synthesize the existing literature on the challenges and strategies for improving the quality of clinical medical education in Iran, with particular focus on experiences during and after the COVID-19 pandemic. The narrative approach was chosen for its flexibility and ability to integrate both theoretical and practical insights, providing a comprehensive understanding of the topic.

2-2. Literature Search

A systematic and comprehensive literature search was independently conducted by two reviewers to ensure accuracy and reliability in selecting relevant studies. The search covered Persian and English publications up to March 2025 from reputable national and international databases, including PubMed, Scopus, ERIC, Web of Science, CIVILICA, and SID.

2-3. Search Terms

Search terms were chosen to capture the full scope of the study and included combinations of keywords such as:

- Clinical Medical Education

- COVID-19
- Iran
- Challenges
- Strategies
- Virtual Learning
- Educational Crisis Management as well as their Persian equivalents.

2-4. Inclusion and Exclusion Criteria

Inclusion criteria encompassed peer-reviewed original research articles (quantitative, qualitative, and mixed methods), systematic and narrative reviews, official reports, and policy documents published in Persian or English that directly addressed clinical medical education in Iran during or after the COVID-19 pandemic. Exclusion criteria included unrelated studies, non-peer-reviewed preprints, duplicates, and low-quality or incomplete studies to ensure rigor and validity.

2-5. Study Selection

Two reviewers independently screened titles, abstracts, and full texts based on the criteria. Discrepancies were resolved through discussion and consensus meetings to maintain methodological rigor and consistency.

2-6. Data Extraction and Analysis

The final selected studies were independently reviewed by two researchers, and relevant data were extracted to enhance accuracy and reduce the risk of bias. The data were then systematically categorized and analyzed using both descriptive and thematic approaches. The descriptive analysis helped summarize the general characteristics of the studies and preliminary findings, while the thematic analysis (15) focused on identifying key themes. These themes included structural and content-related challenges, implemented policies and interventions, the role of innovative educational technologies and crisis management, and

psychological and educational factors influencing resilience.

2-7. Ethical Considerations

Throughout the review, ethical standards were rigorously upheld, including respect for intellectual property rights, honest citation practices, avoidance of data misrepresentation, and full transparency in referencing to ensure scholarly integrity.

3- RESULTS

This review identified multifaceted challenges experienced by clinical medical education in Iran during the COVID-19 pandemic and its aftermath, significantly affecting educational quality, psychological well-being of stakeholders, and systemic resilience. The findings are categorized into four primary thematic areas: structural and technological challenges, psychological and human factors, responses and operational solutions, and opportunities and future outlook.

Structural and technological challenges included the sudden disruption of traditional in-person clinical training, inadequate technological infrastructure especially in underserved regions, and the absence of integrated crisis management systems, which collectively resulted in delayed and fragmented responses (6, 11, 16–18). Psychologically, increased anxiety and stress among students and faculty, coupled with insufficient systematic mental health support, adversely affected motivation and learning outcomes (19–24).

In response to these challenges, rapid implementation of hybrid learning models and faculty capacity building initiatives improved educational delivery. The establishment of the Education Incident Command System (EICS), along with the formulation of flexible multilayered educational policies, facilitated coordinated task allocation, expedited decision-making, and sustained

instructional continuity during fluctuating pandemic conditions (6, 11, 16, 18, 25–29). Additionally, accelerated digital innovation and heightened attention to mental health needs emerged as critical avenues for future improvement. The necessity of institutionalizing robust crisis

management frameworks to strengthen preparedness was also emphasized (11, 25, 26, 30-33).

Detailed descriptions of these themes, subthemes, key findings, and supporting references are summarized in **Table 1**.

Table-1: Key Findings on Challenges and Responses in Clinical Medical Education in Iran during COVID-19.

Theme	Subthemes	Key Findings	References
1. Structural and Technological Challenges	<ul style="list-style-type: none"> - Sudden Disruption of Traditional In-Person Training - Insufficient Technological Infrastructure - Lack of Crisis Management Systems 	<ul style="list-style-type: none"> - Pandemic restrictions limited direct patient contact and clinical practice, impacting clinical skills acquisition. - Many institutions faced inadequate hardware, unstable internet, and low technical skills among faculty/students. - Absence of integrated crisis management frameworks led to delayed and inefficient responses to challenges. 	(6, 11, 16-18)
2. Psychological and Human Factors	<ul style="list-style-type: none"> - Increased Anxiety and Stress Levels - Deficiency in Systematic Psychological Support 	<ul style="list-style-type: none"> - Concerns about health and uncertainty reduced motivation and learning outcomes for students and faculty. - Limited mental health support hindered coping with pandemic stressors. 	(19-24)
3. Responses and Operational Solutions	<ul style="list-style-type: none"> - Expansion of Hybrid Learning Models - Faculty Capacity Building - Establishment of EICS - Formulation of Flexible Educational Policies 	<ul style="list-style-type: none"> - Rapid adoption of virtual + limited in-person teaching maintained continuity. - Workshops improved digital teaching skills. - EICS introduced to enhance task allocation, decision-making, and resilience. - Adaptive policies ensured safe, sustainable education amidst pandemic fluctuations. 	(6, 11, 16, 18, 25-29)
4. Opportunities and Future Outlook	<ul style="list-style-type: none"> - Acceleration of Digital Innovation - Recognition of Mental Health Importance - Necessity of Institutionalizing Crisis Management 	<ul style="list-style-type: none"> - Digital tools, remote assessments, and interactive e-learning platforms fostered educational resilience. - Growing awareness led to developing psychological support interventions. - Embedding robust crisis management frameworks is necessary for future preparedness. 	(11, 25, 26, 30-33)

Abbreviations: COVID-19: Coronavirus Disease 2019, EICS: Education Incident Command System.

4- DISCUSSION

This study aimed to comprehensively examine the challenges, adaptive responses, and future directions of clinical medical education in Iran during and after the COVID-19 pandemic. By synthesizing evidence from national experiences and international literature, the study identified critical vulnerabilities revealed by the crisis, evaluated the effectiveness of adaptation strategies, and proposed recommendations to enhance resilience and educational quality under emergency conditions.

The COVID-19 pandemic profoundly disrupted clinical medical education in Iran, exposing significant structural and infrastructural weaknesses. The abrupt suspension of traditional hands-on clinical training—long recognized as the cornerstone of medical education—highlighted a critical lack of preparedness for maintaining clinical competencies during public health emergencies (6, 16, 25). This disruption was further exacerbated by inadequate technological infrastructure, particularly in underserved regions where unstable internet access and insufficient digital devices hindered

effective implementation of virtual and hybrid learning modalities (8, 34). Additionally, gaps in digital literacy among faculty and students impaired the quality of distance education, underscoring an urgent need for targeted capacity-building initiatives (16, 29).

Moreover, the absence of integrated and agile crisis management frameworks within educational governance structures impeded timely decision-making and resource allocation, worsening the pandemic's impact on educational continuity. The lack of a coherent command system delayed coordinated responses, emphasizing the necessity for dedicated crisis management models such as the Education Incident Command System (EICS), designed to streamline operational roles and expedite institutional reactions during emergencies (6, 11, 27, 28).

Psychological stressors accompanied these operational challenges. Students and faculty experienced heightened anxiety and uncertainty due to concerns about personal health, interrupted academic progression, and social isolation, adversely affecting motivation and learning outcomes (21-24, 35). The limited availability of systematic psychological support services restricted the academic community's capacity to cope effectively, highlighting the importance of embedding mental health resources as a fundamental component of educational systems (22, 36).

Despite these considerable challenges, Iranian medical education demonstrated remarkable adaptability. The rapid adoption and expansion of hybrid learning models—combining virtual platforms with limited, safe in-person clinical experiences—helped sustain instructional continuity amid fluctuating epidemiological conditions. Concurrently, targeted faculty development programs enhanced instructors' digital competencies,

which was essential for improving the quality and effectiveness of remote teaching (16, 25).

Strategically, the establishment of the EICS framework has been proposed and preliminarily evaluated as an effective operational solution to enhance coordination, resource distribution, and rapid decision-making in medical education during crises. This system facilitates harmonization of educational, clinical, and administrative functions to strengthen resilience. Complementarily, the formulation and implementation of multi-layered, flexible educational policies enabled institutions to dynamically adapt to evolving pandemic challenges, ensuring the continued provision of safe and high-quality education (6, 11, 27-29).

Furthermore, the crisis accelerated digital innovation within medical education, fostering broader adoption of interactive e-learning platforms, remote assessment tools, and virtual simulations. These technologies not only mitigated immediate disruptions but also offer sustainable improvements in accessibility and pedagogical diversity (25, 26). Enhanced recognition of learner and faculty well-being led to initial steps toward integrating mental health interventions within the educational environment, reinforcing a holistic and preventative approach to crisis preparedness (22, 37).

In summary, while the COVID-19 pandemic revealed profound structural, technological, and psychosocial vulnerabilities in Iran's clinical medical education system, it also acted as a catalyst for innovation, adaptation, and systemic reform. To consolidate these advances and better prepare for future emergencies, sustained investment in technological infrastructure, formal institutionalization of crisis management frameworks such as EICS, and expansion of comprehensive mental health support services are imperative. Collectively, these measures

will enhance the resilience, responsiveness, and quality of clinical medical education in Iran, ensuring its capacity to withstand and thrive amid future public health crises (16, 25, 29, 37-41).

5- CONCLUSION

This review demonstrates that clinical medical education in Iran faced multifaceted challenges during the COVID-19 pandemic and its aftermath, which substantially affected educational quality, stakeholder mental health, and system resilience. Structural and technological obstacles—including the sudden suspension of traditional in-person clinical training, inadequate technological infrastructure, and the absence of integrated crisis management systems—impaired effective educational delivery. Psychologically, increased anxiety and stress among students and faculty, compounded by limited systematic mental health support, further undermined motivation and learning outcomes.

Despite these challenges, adaptive responses such as the rapid implementation of hybrid learning models, targeted faculty capacity building, and the proposed establishment of an Education Incident Command System (EICS) played a crucial role in mitigating adverse impacts and enhancing system responsiveness. The development of flexible, multilayered educational policies facilitated the continuity of education amid evolving pandemic conditions. Additionally, accelerated digital innovation and an increasing emphasis on mental health represent valuable opportunities for sustainable advancement.

To enhance preparedness and resilience in future health crises, ongoing investment in technological infrastructure, formal institutionalization of crisis management frameworks like the EICS, and comprehensive expansion of mental health

support services are imperative. Collectively, these measures will reinforce the quality, responsiveness, and sustainability of clinical medical education in Iran.

6- AUTHORS' CONTRIBUTIONS

Study conception or design: FS, and MG; Data analyzing and draft manuscript preparation: AK, and MG; Critical revision of the paper: FS; Supervision of the research: MG; Final approval of the version to be published: FS, GK, AK, and MG.

7- CONFLICT OF INTEREST: None.

8- REFERENCES

1. Pangaro L, ten Cate O. Frameworks for learner assessment in medicine: AMEE Guide No. 78. *Med Teach.* 2013 Jun;35(6):e1197-210. doi: 10.3109/0142159X.2013.788789. Epub 2013 May 16. PMID: 23676179.
2. Rezaei H, Haghdoost A, Javar HA, Dehnavieh R, Aramesh S, Dehgani N, Sisakht MT. The effect of coronavirus (COVID-19) pandemic on medical sciences education in Iran. *J Educ Health Promot.* 2021 May 20;10:136. doi: 10.4103/jehp.jehp_817_20. PMID: 34222511; PMCID: PMC8224502.
3. Rezaee R, Peyravi M, Ahmadi Marzaleh M, Khorram-Manesh A. Needs Assessment for Standardized Educational Program for Iranian Medical Students in Crisis and Disaster Management. *J Adv Med Educ Prof.* 2019 Apr;7(2):95-102. doi: 10.30476/JAMP.2019.44713. PMID: 31086801; PMCID: PMC6475032.
4. Beigzadeh, A., Yamani, N., Bahaadinbeigy, K., Adibi, P. Challenges and Problems of Clinical Medical Education in Iran: A Systematic Review of the Literature. *Strides in Development of Medical Education*, 2019; 16(1): -. doi: 10.5812/sdme.89897.
5. Maniati, M. The impact of COVID-19 pandemic on medical education: Iran's experience at the outset of the pandemic. *International Journal of Education and Cognitive Sciences*, 2022; 2(4): 16-22. doi: 10.22034/injoeas.2022.160685.

6. Mosalanejad, L., Sameni, H. Emerging Visions and Orientations in Medical Education: An Overview of Opportunities and Challenges in Corona and Post-Corona Times. *Interdisciplinary Journal of Virtual Learning in Medical Sciences*, 2021; 12(2): 145-48. doi: 10.30476/ijvlms.2021.87834.1050.
7. Gheshlaghi N, Ahmady S. The Impact of Covid-19 Pandemic on Health Higher Education: Challenges, Approaches and Achievements to Post Covid-19. *Res Med Edu* 2022; 14 (1):32-43.
8. Kalavani K, Azami-Aghdash S, Zare Z, Shami E, Heydari M. Challenges and Strategies for Educating Medical Students During the COVID-19 Pandemic: A Systematic Review. *Gazi Med J*. 2025 Apr 15;36(2):226-235. doi: 10.12996/gmj.2024.3797.
9. Rajab Dizavandi F, Heydari A. Challenges to Online Education in Medical Education during the COVID-19 Pandemic. *Med Edu Bull* 2022; 3(1): 397-405. DOI: 10.22034/MEB.2021.322084.1047.
10. Michail Papananou, Eleni Routsis, Konstantinos Tsamakis, Lampros Fotis, Georgios Marinos, Irene Lidoriki, et al. Medical education challenges and innovations during COVID-19 pandemic, *Postgraduate Medical Journal*, Volume 2022;98(1159): 321–27, <https://doi.org/10.1136/postgradmedj-2021-140032>.
11. Karimian, Z., Farrokhi, M.R., Moghadami, M. et al. Medical education and COVID-19 pandemic: a crisis management model towards an evolutionary pathway. *Educ Inf Technol* 2022;27: 3299–20. <https://doi.org/10.1007/s10639-021-10697-8>.
12. Pokhrel S, Chhetri R. A literature review on impact of COVID-19 pandemic on teaching and learning. *High Educ Future*. 2021;8(1):133–41. doi: 10.1177/2347631120983481.
13. Woolliscroft JO. Innovation in Response to the COVID-19 Pandemic Crisis. *Acad Med*. 2020 Aug;95(8):1140-1142. doi: 10.1097/ACM.0000000000003402. PMID: 32282372; PMCID: PMC7188042.
14. Calhoun KE, Yale LA, Whipple ME, Allen SM, Wood DE, Tatum RP. The impact of COVID-19 on medical student surgical education: Implementing extreme pandemic response measures in a widely distributed surgical clerkship experience. *Am J Surg*. 2020;220:44–7. doi: 10.1016/j.amjsurg.2020.04.024.
15. Braun, V., & Clarke, V. Using thematic analysis in psychology. *Qualitative Research in Psychology*, 2006;3(2):77–101. <https://doi.org/10.1191/1478088706qp0630a>.
16. Ferrel MN, Ryan JJ. The Impact of COVID-19 on Medical Education. *Cureus*. 2020 Mar 31;12(3):e7492. doi: 10.7759/cureus.7492. PMID: 32368424; PMCID: PMC7193226.
17. Vatier C, Carrié A, Renaud MC, Simon-Tillaux N, Hertig A, Jéru I. Lessons from the impact of COVID-19 on medical educational continuity and practices. *Adv Physiol Educ*. 2021 Jun 1;45(2):390-398. doi: 10.1152/advan.00243.2020. PMID: 33961515; PMCID: PMC8384569.
18. Al-Balas, M., Al-Balas, H.I., Jaber, H.M. et al. Distance learning in clinical medical education amid COVID-19 pandemic in Jordan: current situation, challenges, and perspectives. *BMC Med Educ* 20, 341 (2020). <https://doi.org/10.1186/s12909-020-02257-4>.
19. Mahdavinoor S M M, Mollaei A, Mahdavinoor S H. Meaning in Life of Medical Sciences Students During COVID-19 Outbreak: A Cross-sectional Study. *Iran J Health Sci* 2022; 10 (4):1-10. URL: <http://jhs.mazums.ac.ir/article-1-815-en.html>.
20. Taghrir MH, Borazjani R, Shiraly R. COVID-19 and Iranian Medical Students; A Survey on Their Related-Knowledge, Preventive Behaviors and Risk Perception. *Arch Iran Med*. 2020 Apr 1;23(4):249-254. doi: 10.34172/aim.2020.06. PMID: 32271598.
21. Haghghat-Manesh E, Alinia-Ahandani E, Dorri-Mashhadhi N, Hajihoseini M. Understanding Mental Health of College Students During the Initial COVID-19 Lockdown in Iran. *jbrms* 2024; 11 (1) :58-67.

URL: <http://jbrms.medilam.ac.ir/article-1-799-en.html>.

22. Son C, Hegde S, Smith A, Wang X, Sasangohar F. Effects of COVID-19 on College Students' Mental Health in the United States: Interview Survey Study. *J Med Internet Res*. 2020 Sep 3;22(9):e21279. doi: 10.2196/21279. PMID: 32805704; PMCID: PMC7473764.
23. Quek TT, Tam WW, Tran BX, Zhang M, Zhang Z, Ho CS, Ho RC. The Global Prevalence of Anxiety Among Medical Students: A Meta-Analysis. *Int J Environ Res Public Health*. 2019 Jul 31;16(15):2735. doi: 10.3390/ijerph16152735. PMID: 31370266; PMCID: PMC6696211.
24. Rohanachandra Y, Seneviratne P, Amarakoon L, Prathapan S. Psychological impact and coping strategies of medical students during university closure due to COVID-19 in a state university in Sri Lanka – an online survey. *Eur Psychiatry*. 2021 Aug 13;64(Suppl 1):S659–60. doi: 10.1192/j.eurpsy.2021.1751. PMCID: PMC9470399.
25. Rose S. Medical Student Education in the Time of COVID-19. *JAMA*. 2020 Jun 2;323(21):2131-2132. doi: 10.1001/jama.2020.5227. PMID: 32232420.
26. Daniel, J. Education and the COVID-19 Pandemic. *PROSPECTS*, 2020;49:91-6. <https://doi.org/10.1007/s11125-020-09464-3>.
27. Arja SB, Wilson L, Fatteh S, Kottathveetil P, Fateh A, Arja SB. Medical Education during COVID-19: Response at one medical school. *J Adv Med Educ Prof*. 2021;9(3):176-82. DOI: 10.30476/ jamp.2020.88744.1351.
28. Yari A, Motlagh ME, Zarezadeh Y. COVID-19: 12 Tips for Crisis Management. *Health in Emergencies and Disasters Quarterly*. 2022; 7(2):59-62. <http://dx.doi.org/10.32598/hdq.7.2.396.1>.
29. Heydari M, Foroughi Z, Ahmadzadeh Ghasab A, Koochpaie A, Hoseini Abardeh M, Nouhi M. Medical Education Quality in the COVID-19 Era: A Policy Brief on Lesson Learned and Recommendations. *EBHPME* 2024; 8(2):84-95. URL: <http://jebhpme.ssu.ac.ir/article-1-501-en.html>.
30. Quek TT, Tam WW, Tran BX, Zhang M, Zhang Z, Ho CS, Ho RC. The Global Prevalence of Anxiety among Medical Students: A Meta-Analysis. *Int J Environ Res Public Health*. 2019 Jul 31;16(15):2735. doi: 10.3390/ijerph16152735. PMID: 31370266; PMCID: PMC6696211.
31. Hossini Rafsanjanipoor SM, Zakeri MA, Dehghan M, Kahnooji M, Zakeri M. Psychological Consequences of the COVID-19 Disease among Physicians and Medical Students: A Survey in Kerman Province, Iran, in 2020. *J Occu Health Epidemiol* 2021; 10(4):274-81.
32. Vafadar Z, Aghaei MH, Ebadi A. Military nurses' Experiences of Interprofessional education in Crisis Management: a Qualitative Content Analysis. *J Adv Med Educ Prof*. 2021 Apr;9(2):85-93. doi: 10.30476/jamp.2021.87653.1317. PMID: 34026908; PMCID: PMC8106742.
33. Bradley-Smith, Karen; Trippett, Vivienne; FitzGerald, Gerald. Improving the Response to Disasters by Enhancing the Incident Command System. *Australian Journal of Emergency Management*, 2024; 39(1): 8-12.
34. Nakhoda K, Ahmady S, Gholami Fesharaki M, Gheshlaghi Azar N. COVID-19 Pandemic and E-Learning Satisfaction in Medical and Non-Medical Student: A Systematic Review and Meta-Analysis. *Iran J Public Health*. 2021;50(12):2509-16.
35. Ali Monfared, Leila Akhondzadeh, Robabeh Soleimani, Saman Maroufizadeh, Somaye Pouy, Fariba Asgari. Psychological Distress and Coping Strategies among Clinicians and Medical Students During the COVID-19 Pandemic: A Cross-sectional Study in Guilan, Iran. *Shiraz E-Med J*. 2021 May; 22(5):e109764.
36. Monfared A, Akhondzadeh L, Soleimani R, Maroufizadeh S, Pouy S, et al. Psychological Distress and Coping Strategies Among Clinicians and Medical Students During the COVID-19 Pandemic: A Cross-sectional Study in Guilan, Iran. *Shiraz E-Med J*. 2021;22(5):e109764. <https://doi.org/10.5812/semj.109764>.
37. Goh PS, Sandars J. A vision of the use of technology in medical education after the

COVID-19 pandemic. *MedEdPublish* (2016). 2020 Mar 26;9:49. doi: 10.15694/mep.2020.000049.1. PMID: 38058893; PMCID: PMC10697445.

38. Suyo-Vega JA, Meneses-La-Riva ME, Fernández-Bedoya VH, Alarcón-Martínez M, Ocupa-Cabrera HG, Alvarado-Suyo SA et al. Educational policies in response to the pandemic caused by the COVID-19 virus in Latin America: An integrative documentary review. *Frontiers in Education*. 2022 Aug 1;7:918220. doi: 10.3389/educ.2022.918220.

39. Frenk J, Chen LC, Chandran L, Groff EOH, King R, Meleis A, Fineberg HV. Challenges and opportunities for educating health professionals after the COVID-19 pandemic. *Lancet*. 2022 Oct 29;400(10362):1539-1556. doi:

10.1016/S0140-6736(22)02092-X. PMID: 36522209; PMCID: PMC9612849.

40. Choi B, Jegatheeswaran L, Minocha A, Alhilani M, Nakhoul M, Mutengesa E. The impact of the COVID-19 pandemic on final year medical students in the United Kingdom: a national survey. *BMC Med Educ*. 2020 Jun 29;20(1):206. doi: 10.1186/s12909-020-02117-1. PMID: 32600460; PMCID: PMC7323883.

41. Dedeilia A, Sotiropoulos MG, Hanrahan JG, Janga D, Dedeilias P, Sideris M. Medical and Surgical Education Challenges and Innovations in the COVID-19 Era: A Systematic Review. *In Vivo*. 2020 Jun;34(3 Suppl):1603-1611. doi: 10.21873/invivo.11950. PMID: 32503818; PMCID: PMC8378024.