

The Silent Casualties: War's Impact on Medical Students and Medical Education

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Medical education has always been a vital aspect of both health and educational systems, largely because of its significant role in enhancing health outcomes and its capacity to transform existing governance structures.^{1, 2} Students pursuing medical education form the cornerstone of these systems globally.³ Their involvement in medical education extends well beyond the improvement of patient care on an individual level. It has far-reaching impacts, influencing various societal aspects ranging from local to international spheres,^{2,4} including policy implementation, leadership roles, and advocacy efforts.⁵⁻⁶ Particularly during critical times, such as pandemics, medical students have played pivotal roles in promoting public health measures, combating misinformation, and enhancing vaccine acceptance.⁷⁻⁹ Moreover, medical education and the medical field in general are fundamental to research and innovation,^{10,11} driving advancements in medical science and technology.¹²

The field of medicine has made significant contributions to the global economy. This contribution is evident in the advancements in medical technology, groundbreaking research, and the development of a highly skilled workforce, including medical students. These advancements have opened up numerous economic opportunities, leading to job creation and, consequently, fostering economic growth.¹³ Beyond economic development, medical students play a pivotal role in promoting social development by addressing health disparities and improving access to equitable healthcare.¹⁴ In addition, initiatives for international medical education—such as those offered by the International Federation of Medical Students—are essential for fostering cross-cultural communication and understanding. Future medical professionals can broaden their viewpoint and acquire varied cultural ideas through these possibilities. This not only makes it easier to promote peace inside and between countries, but it also makes a big difference in helping to create a society that is just and equal.¹⁵

However, medical students face a wide range of challenges during their training. These challenges encompass financial,

academic, physical, and emotional aspects.¹⁶ War and conflicts further exacerbate these challenges, having a profound and often detrimental impact on medical education and the lives of future physicians.¹⁷

Disruption and Challenges in Achieving Career Dreams

The impact of war and conflict on medical education and the aspirations of future healthcare professionals is a matter of grave concern. Conflicts severely disrupt the peace, economy, and sustainability of nations, causing loss of life and adversely affecting medical students and the entire medical education system.^{18,19} Historical instances, starting from World War I in 1914, have shown that conflicts, contribute to traumatic injuries, psychological distress, and infection epidemics.^{17, 20-22} Such unfortunate events have led to the closure of medical schools, destruction of educational resources, and displacement of students and faculty,^{20, 23-25} resulting in disrupted medical learning processes and the potential graduation of underprepared health professionals.²⁶

Medical students training in conflict-ridden areas encounter a complicated and morally challenging environment that extends well beyond the parameters of traditional medical education. These students are frequently placed in situations where they must weigh the need to give the best treatment possible against the backdrop of chaos and shortage while making crucial decisions with limited resources. Prioritizing treatment for a large number of patients, managing possible multiple allegiances to the military and the civilian world, and resolving the moral dilemma of maybe having to provide care under duress are all examples of typical ethical issues. These students also have to consider how their choices may affect longer-term public health outcomes and the dynamics of the larger community in addition to the specific patients. Their ethical framework and decision-making processes are unquestionably shaped by these experiences, which also impart a profound awareness of the complex interactions that exist between medical ethics, conflict, and humanitarian ideals.

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In the 21st century, online learning platforms have become a crucial source of knowledge acquisition.²⁷ However, during war and conflicts, access to technology is often prioritized for military use, limiting medical students' access to these vital digital resources.²⁸ Wars have tragically led to the death and disability of many medical students,^{20, 23-25} negatively impacting their ability to concentrate, learn, and retain information as they constantly fear attacks affecting their peers and families. This leads to decreased academic performance and adds to the mental health burden faced by medical students.²⁹ In times of war, priorities within the medical education system shift,²⁹ with students more concerned about their survival and that of their loved ones, and less on knowledge acquisition.^{20,23-25} Moreover, economic instability caused by conflicts makes it difficult for students to fund their tuition and living expenses,²⁰ and those relying on families, loans, and government grants are equally affected. Consequently, talented medical students may be forced to migrate, internally or externally, from conflict zones, contributing to the brain drain, particularly in low- and middle-income nations.³⁰

Regions affected by war and conflict require healthcare providers and infrastructure adapted to emergency medicine, trauma and acute care surgery, and mental health care.^{31,32} However, these war-torn regions often lack the resources and infrastructure to provide specialized training due to destruction, loss of equipment and supplies, and disrupted supply chains, typically relying on assistance from humanitarian organizations like the International Committee of the Red Cross (<https://www.icrc.org/en>) and Doctors Without Borders (<https://www.msf.org/>). The resulting limited skilled healthcare workforce and infrastructure significantly exacerbate existing health disparities.³³

Psycho-Social Impact of Conflicts on the Social and Professional Lives of Future Medical Doctors

Psychosocial impact on medical students in conflict zones is profound, often leading to a spectrum of mental health disorders, including post-traumatic stress disorder, depression, and anxiety.^{34,35} For instance, Al Saadi et al., estimated high prevalence rates of these conditions among Syrian medical students.³⁵ The firsthand experience of the horrors of war can influence the future practice of medical students, fostering increased empathy and resilience, but also leading to burnout, compassion fatigue, and emotional distress.³⁶⁻³⁹ Training in conflict zones may shift medical students' focus towards specializations in social justice, community health, and policy advocacy,^{20,40} and provide invaluable experience in treating war-related injuries.²⁰ Alternatively, it may direct them into emergency medicine, mental health, or trauma surgery, where their personal knowledge of psychological trauma and war-related ailments is extremely helpful but might eventually restrict access to specialist care. It is important to remember, too, that frequent exposure to trauma in these settings can also lead to social isolation, emotional weariness, and poor communication abilities.⁴¹

Safeguarding the Future of Healthcare

In times of war and conflict, safeguarding the wellbeing of medical students is of paramount importance. They are a crucial component of the healthcare workforce, instrumental in recovery

and rebuilding efforts post-conflict, thus playing a key role in restoring healthcare systems.⁴² Amidst conflicts, advanced medical students often take on critical roles, providing care to both civilians and military personnel affected by the warfare.⁴³ In accordance with the principles of the Geneva Convention and related protocols, it is imperative to ensure the safety of medical students and the broader medical education system during conflicts. This responsibility lies with a collaboration of government bodies, private entities, humanitarian organizations, educational institutions, and the medical community at large.⁴⁴

Support for medical students impacted by war can be facilitated through financial aid and provision of shelter,²⁶ enabling access to education that might otherwise be unattainable and helping maintain the continuity of their professional journey. This contribution is essential in addressing the shortage of healthcare professionals prevalent in conflict-affected areas. Moreover, efforts should focus on rebuilding educational infrastructure and enhancing the availability of online learning resources in regions emerging from conflicts.^{45,46} Incorporating conflict medicine and peace resolution studies into medical curriculums is also a vital consideration for programs globally.²⁰

Recognizing that medical students, like all individuals, are susceptible to emotional and mental health challenges, it is crucial to provide them with mental health support services and trauma-informed care, particularly given the potential long-term impacts on their professional practice.⁴⁷ Medical students have shown initiative in promoting peace by forming associations, engaging in international collaborations, and participating in activities aimed at peace and conflict resolution. These actions are geared towards ensuring the safety of medical education systems, their families, and the global community. Therefore, it is incumbent upon relevant stakeholders to intensify their efforts to create an environment where medical students can pursue their education in a secure and effective manner.

Conclusion

Political conflicts deeply impact medical students, who are vital to the future of healthcare, technology, and research.¹⁷ Recent escalations of conflicts, underscore the need to support medical education systems globally affected by sociopolitical conflicts.⁴⁸ Nevertheless, despite these difficulties, medical students' experiences in war zones embody fortitude, kindness, and an unrelenting dedication to healing in the face of hardship.

The experiences of students in war zones show us that even under the most difficult circumstances, there are no limits to the search for information and recovery. As we ensure the resilience of healthcare systems and pave the path for a more fair, peaceful, and equitable society, it is our common obligation to support and defend the dreams of these future healers. As we honor these medical students' unwavering energy, let us not forget that their goals are inextricably linked to the welfare of all people.

By doing this, we may use a collaborative, multi-sectoral strategy to address the complex issues encountered by medical students in conflict areas. By working together, we can nurture their

dreams and, in the process, heal the wounds of conflict and division that afflict our world.

The Awards for the Editors of the Year

In this 2023 Volume 11, we are proud to spotlight Dr. *Yvan Zolo* as the **IJMS Associate Editor of the Year 2023**, alongside Dr. *Lourdes Adriana Medina Gaona* and Dr. *Ahmed Nahian*, who have been recognized as **IJMS Student Editors of the Year 2023**. Their dedication to the Journal's various initiatives and their readiness to contribute at every opportunity are truly praiseworthy.

Introducing the IJMS December Issue

Apart from our mission to become the voice of medical students worldwide, our journal also assists social and humanitarian values. We are thus simultaneously co-publishing the editorial entitled ***Time to Treat the Climate and Nature Crisis as One Indivisible Global Health Emergency*** with reputed scientific publications in the field of medicine such as The BMJ, JAMA or The Lancet, to call on The United Nations, political leaders and healthcare professionals worldwide to recognize that climate change and loss of biodiversity are another unsolved crisis of the present days which will undoubtedly impact on the health and wellbeing of millions of individuals if immediate action to seek adequate solutions is not taken.⁴⁹

On another note, IJMS's December issue is filled with four original research articles, two narrative reviews, three case reports, one editorial and three experiences.

Despite notable efforts, the COVID-19 pandemic has not come to an end with willingness of the general population to get immunized due to low awareness, fear of side effects or other barriers.^{50,51} Effiong et al. analyze the awareness, coverage, and barriers to COVID-19 vaccination among undergraduate students in Nigeria stressing out that despite the fact that awareness levels are high amongst students, vaccination rates remain low potentially due to misinformation regarding the safety of vaccines against SARS-CoV-2 and inaccessibility of vaccination centers in Nigeria.⁵²

In order to keep up with the latest advances in medicine, medical education must make appeal to newer strategies of teaching and evaluation and evolve from traditional methods to student-centered and patient-centered education, involving students in research and clinical clerkships, encouraging dissemination of knowledge and participation in congresses and conferences, grant writing or organization of scientific events.⁵⁻¹² Spaced repetition has been hypothesized to improve medical students' performances in exams.⁵³ Cooper et al. investigate the impact of spaced repetition on medical students' performance at the medical board exam, revealing that despite the fact that medical students who did not use the Anki platform had higher GPAs those who did use the platform failed Step 1 Exam in a lesser percentage and scored higher on the USMLE Step 1 and COMPLEX exams.⁵⁴

Nikkahmanesh et al. assessed malpractice awareness amongst medical students enrolled in The University of Arizona College of Medicine – Phoenix, United States of America, pointing out an alarming rate of non-awareness regarding medical malpractice in their study cohort. Thus, future physicians need to be schooled and well-informed regarding medical malpractice before they start their careers in the hospital.⁵⁵

Jones et al. studied several factors that influenced prognosis of patients who received veno-arterial (VA) extracorporeal membrane oxygenation (ECMO). Their findings highlight that older subject had elevated odds of survival to hospital discharge, whereas mortality was linked to a history of dialysis or cardiac arrest. Surprisingly, sex, body mass index (BMI) or some of the most common chronic illnesses (atrial fibrillation, diabetes, hypertension, COPD) did not notably impact prognosis in individuals who required VA-ECMO.⁵⁶

Palliation remains a pillar of end-of-life care in the course of cancer management.⁵⁷ In their narrative review, Tseng et al. provide an overview of different models of palliative care delivery and palliative care services in several East and Southeast Asian Countries, focusing on the significance of cancer on the continent, as well as the role of palliative care in ensuring the psychological, spiritual, and physical well-being of patients living with malignancies in order to improve their quality of life.⁵⁸

Career specialty selection after medical school is influenced by one's past experience with the desired discipline, including clinical elective choices and clerkships.⁵⁹ Chen et al. review the literature regarding the status of radiology clerkships for medical students in The United States of America and discuss perceptions of medical students towards clerkships, well-received practices and weaknesses of the available training programs and methods in the field of imaging.⁶⁰

Tuberculosis (TB) remains a health threat worldwide with low levels of TB awareness amongst the general population in many parts of the globe.^{61,62} Moreover, the emergence of multidrug resistant TB (MDR-TB) poses significant challenges to attending physicians. Marwah et al. present a series of MDR-TB cases who developed pulmonary embolism, with a particular emphasis on the management of this complication with anticoagulants.⁶³

Ladner et al. stress out the importance of ethics in clinical medicine and call to action for standardization and prioritization of ethics training during medical school and beyond. The authors present the case of a male subject diagnosed with acute gas gangrene osteomyelitis and schizoaffective psychosis whose autonomy was prioritized when selecting the treatment option despite his lack of decisional capacity.⁶⁴

Cernatescu et al., dive into the fascinating realm of editorial excellence and explore which steps are crucial in maintaining the quality of scientific publications. In an illuminating interview with the distinguished Dr. Russell Van Gelder, MD, Ph.D., the Editor-in-Chief of Ophthalmology, the Journal of the American Academy of

Ophthalmology, they unravel the essential steps that uphold the impeccable quality of scientific publications.⁶⁵

Three experiences close *IJMS's* December issue. Franke presents an autobiographical case report in which the medical student tells the story of how she was diagnosed with beta-thalassemia

minor,⁶⁶ Wright present his experience in building a water system in one of the rural communities of the Dominican Republic,⁶⁷ and Daniel et al. stresses out how better internship experiences can help the ongoing brain drain of Nigeria's healthcare force.⁶⁸

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