

The ravages of war: challenges and resilience in medical education in Sudan

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Abstract

The armed conflict between the Sudanese Armed Forces (SAF) and the Rapid Support Forces (RSF) beginning on April 15, 2023, has thrust Sudan into a worsening humanitarian crisis, severely affecting all aspects of Sudanese life, including medical education and healthcare systems. This commentary explores the current state of medical training in Sudan amidst this conflict and discusses potential strategies to address the challenges faced by both students and educators.

Following a comprehensive literature review of articles using keywords, and published from 2015 to the present, 2024, the challenges were categorized into issues related to the curriculum, educational resources, wellbeing of students and educators, human resources, and oversight by governing bodies. The proposed solutions involve the government, humanitarian organizations, medical schools, and innovative curricular strategies.

Partnerships and the involvement of the Sudanese diaspora are crucial for situational assessment and execution of culturally sensitive, contextualized solutions. Alliances with other medical schools can facilitate the relocation of students and faculty. Faculty development programs and student support are paramount during this phase.

Deploying distant learning strategies combined with small group learning, such as e-learning, problem-based learning (PBL), team-based learning (TBL), and ambulatory teaching, can mitigate some adversities in the Sudanese educational experience during war. Implementing collaborative evaluations and solutions can help Sudan's educational system navigate the conflict, enhance resilience, promote healthcare, and facilitate planning for the post-conflict period.

Keywords: Conflict, War, medical education, training, resilience, Sudan

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Introduction:

Sudan is going through a complex humanitarian crisis following the eruption of an armed conflict between the Rapid Support Forces (RSF) and the Sudanese Armed Forces (SAF). At the beginning, the conflict was ignited in Khartoum but eventually it involved other regions of the western and central Sudan (Figure 1).^{1,2} Since the onset of the conflict in mid-April 2023, more than 8.4 million people have been displaced due to widespread violence, with 1.7 million forced to seek refuge externally.³

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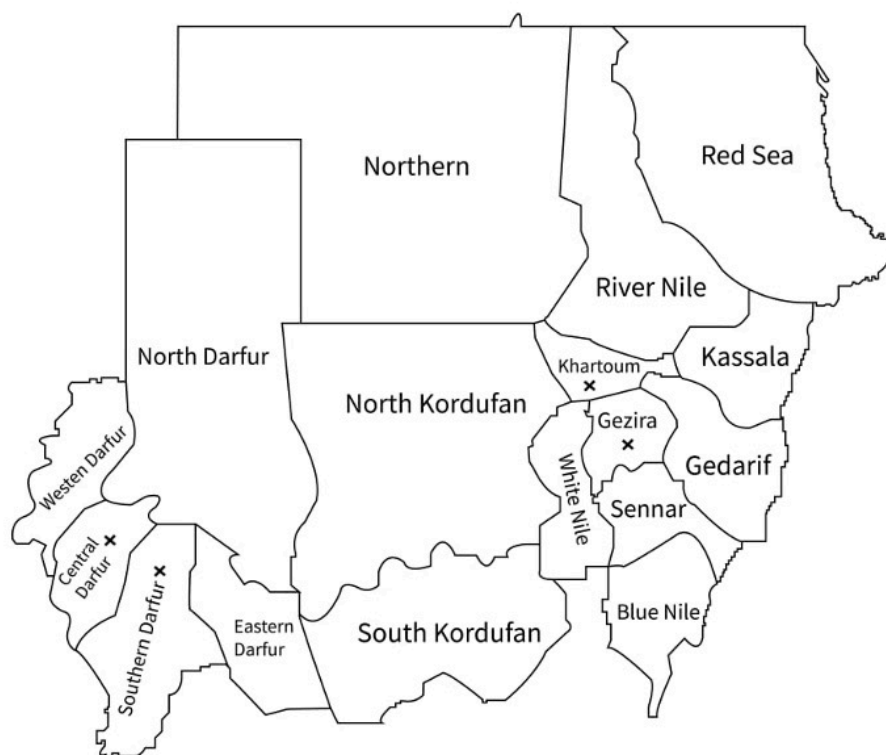
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The conflict has also inflicted extensive damage upon healthcare facilities, leaving only a fraction of hospitals operational in conflict zones.³ Six months into the conflict in Khartoum, 70% of hospitals and medical centers were non-operational, with 20% of medical institutions in remote areas severely affected.³

According to WHO statistics revealed on October 31, 2023, there have been 60 attacks on healthcare facilities in conflict areas, resulting in 34 deaths and 38 injuries. Additionally, at least 222 assaults on the

Figure 1: states marked with (X) represents areas where HEIs has been attacked during ravages of war in Sudan since April 2023.



healthcare system were reported between January 1 and October 31, leading to 38 healthcare worker deaths and health facility damage at least 49 times.^{4,5} On the other hand, the shortage of health professionals who are socially responsive, lack of medical supplies, damaged health care facilities add insult to injury.⁶

To compound the situation, the country experienced a total collapse of all operational networks. Khartoum state and some other regions were entirely without coverage, depriving residents of access to phone calls or internet connections, except for a handful of sites using satellite internet constellations. This made it impossible for families and individuals to check on each other's safety, let alone pursue an academic curriculum.

The negative ramifications of this protracted conflict have reached the entire population of Sudan, not sparing medical students and health professionals. The majority have travelled abroad; others have become internally displaced with cessation of their education and training.^{2,5,6,7} In

addition, the conflict has taken its toll on higher education institutions and healthcare facilities, particularly in terms of damage to the infrastructure and robbery of medical equipment and assets^{1,2,5,7} (Figure 2). This has paralyzed the process of graduations and the provision of new health professionals, who are critically needed at such times. This need was heightened with the emigration of health professionals in search for safety and better academic and professional opportunities.^{1,2,5,7}

Famine is looming for around 14.7 million people, and Sudan is simultaneously facing outbreaks of malaria, measles, cholera, and dengue fever. Compounded with the rainy season, poor sanitation, and poor water supplies.^{3,6,8} Therefore, maintaining quality and contextualized health professional education is imperative for delivering efficient and sustainable healthcare in Sudan in which there are unmet and often escalating health needs.^{6,9}

The weakness of the country's monitoring and information system make it difficult to report on

Figure 2: International University of Africa; showing an example of the destruction to infrastructures to medical schools in Khartoum state. Also in the picture, a member and a bomb shelled vehicle of RSF as they used the campus as a militia base.



actual statistics about the impact of conflict on higher education institutions and medical education. However, anecdotal evidence collected by authors points to bombardment of most of medical schools in Khartoum, Gezira, Kordofan and Darfur states, both private and governmental sectors. The militia (RSF) has used some teaching hospitals as operational sites, after being forcibly evacuated from the patients and health professionals.¹ Trainees have lost their training facilities, been forcibly displaced, and, more disturbingly, targeted by militia. Even worse, some have been forcibly militarized and detained.⁵

This commentary aims to shed light on the challenges faced by trainees and medical students, with the hope of inspiring the development of more reliable, creative, and evidence-based solutions. The goal is to overcome the current situation and create a blueprint for addressing similar challenges in the future.

Methodology:

A comprehensive literature review was conducted to examine the impact of armed conflict on undergraduate and postgraduate medical education in Sudan. Articles published from 2015 to 2024 were extracted using keywords such as: medical education, war, armed conflict, and Sudan, across PubMed, Google Scholar, Scopus, and Eric search engines. Titles, abstracts, and full texts were reviewed in detail. The data were categorized into themes of challenges and solutions. Background information and examples of resilience were gathered from official reports and philanthropic initiatives.

The landscape of medical education in Sudan prior to conflict:

Sudan has over 72 medical schools, split between public and private institutions, with 65% located in Khartoum and Gezira states.¹⁰ The Sudan Medical Council (SMC) and the Ministry of Higher

Education and Scientific Research oversee undergraduate medical education, which has evolved to meet World Federation of Medical Education (WFME) standards.¹⁰ The recent conflict halted the progress of many schools towards WFME accreditation.

Undergraduate programs, typically lasting 5–6 years, use an innovative, integrated, community-based approach pioneered by the University of Gezira. Postgraduate medical education (PGME) began in 1953 and is now overseen by the Sudan Medical Specialization Board (SMSB), established in 1995.¹¹ The SMSB offers 60 specialty degrees and has graduated over 3,000 specialists, with more than 4,000 residents currently enrolled. Training periods range from 4–6 years, concluding with a dissertation.¹¹

Before the crisis, the SMSB's main office and several specialty-training centers were exclusively in Khartoum, complicating the continuation of training during the conflict.

Challenges faced by medical students and educators:

The conflict and war in Sudan have significantly affected medical schools, impeding their ability to deliver continuous education and training.^{2,6} This disruption resulted from limited access to resources, academic calendar disturbances, and a decline in the morale of students and faculty members.^{6,12} Trainees enrolled with the Sudan Medical Specialization Board, particularly in Khartoum, have faced interruptions in their training and qualifying exams for over a year, with no immediate prospects for the resumption of formal training.

The challenges that face medical students/trainees and educators have been categorized by the authors for the purpose of simplicity.

Most challenges facing the **Curriculum** include time constraints and lack of inclusion of peace and wartime topics in the curricular contents; i.e. a curriculum of all times.^{9,13}

Disruption of **Educational Resources**; damage to infrastructures, classrooms, laboratory equipment, loss of textbooks, and destruction of clinical training sites, by unruly civilians or much worse, to

be used as military bases by the RSF.⁵ Damage to the infrastructure hampers the delivery of quality education and training, as facilities become inaccessible or inadequate.^{6,8,9}

The impact of war on staff and students' **Wellbeing** is categorized into; psychological, which includes anxiety and feeling of isolation and depression because of displacement and uncertainties.^{6,9} In addition, post-traumatic stress disorder occurs in response to encountered violence. Physical threats to wellbeing include detention, torture, and even murder. Moreover, health professionals are not spared from the disease outbreaks that occur because of the frail health system.⁹

Personnel. The main issue with human resources during the conflict is the medical “brain drain”; qualified faculty as well as trainees flee the country in search of safety and better opportunities abroad.^{5,9}

Oversight of the stakeholders and government might act as a barrier too, as it can lead to diversion of funding to military institutions away from education and research.⁹

Recommendations and Innovative Approach to Medical Training:

Reports from the USA, Europe, and the Middle East highlight the impact of war on medical education and training. The scale and extent of the conflict influenced medical schools' responses. Some schools continued graduating students with a focus on first aid and emergency medicine, while others closed due to infrastructure damage and staff shortages.

To ensure resilience and context-based responses in medical training, interventions can be stratified into different levels:

1. Government: to ensure safety of higher education institutions and training sites i.e. hospitals, as it is a violation of the Geneva Convention and other calls by the UN and WHO.^{1,5} In addition, fund allocation to pursue educational activities in the nearest safe states.^{2,9} Also through developing plans to reduce risks for educational facilities in conflict zones and restore access to education.

Implementing temporary education delivery mechanisms and consulting with stakeholders for safety and security planning.¹⁴ Consult with faculties, teachers, Higher Education Institutions (HEIs) administrators, and local communities, including community leaders, when determining measures to prevent attack and developing risk analyses, early warning systems, and comprehensive safety and security plans for attacks on education.^{14,15}

2. Humanitarian organizations: it is important to establish partnerships with the government, medical schools and the local community to deliver contextualized, culturally sensitive interventions which are needs-based.⁹ Suggested mechanisms could include:

- Advocating for institutional security and enhancing security measures, including early warning systems and security training in collaboration with the local government.¹⁴

- Supporting efforts to ensure continuous learning by providing safe environments and implementing programs to mitigate the impacts of conflict, including offering psychological support groups and conducting awareness campaigns on-site and through mass media.¹⁴

- Research Centers: Some Higher Education Institutions (HEIs) have existing research centers. These centers can collaborate with NGOs on joint research to achieve common goals, producing and disseminating studies for policy development and evaluation.^{14,15}

- Service Learning: HEIs and Non-Governmental Organizations (NGOs) can provide service-learning opportunities that combine community service with instruction, fostering problem-solving skills and civic engagement.¹⁴

- Projects: Collaborative research projects involving scholars, researchers, faculty members, medical students and trainee doctors that can address community needs, with potential support from NGOs and HEIs through grants.¹⁴

- Supporting Community-Led Schools: Collaborating with governments to rebuild education systems post-conflict, including contingency planning and alternative education delivery mechanisms.¹⁴

3. Medical schools: Establishment of international and national partnerships with multilateral regulating bodies oversight (i.e. SMC and WFME), to facilitate exchange programs and relocation of students and faculty and resource-sharing.^{2,5,9}

Utilizing neighboring safe states can ensure continuity of medical education and exposure to diverse settings within the Sudanese context. This point enforces school's trustworthiness and accountability to its affiliates, might mitigate medical "brain drain", and promotes professionals' retention post-conflict.⁶

Faculty development and student support programs are paramount, and much more needed now than before the war.^{2,9} Placing and prioritizing the psychological wellbeing of students and faculty is highly important. Promotion of evidence-based research, country-wide health, and educational systems need assessment to identify areas for local and international assistance and evaluation of the effectiveness of interventions.^{2,5,16} Engagement of Sudanese health professionals in the diaspora might offer opportunities for mentorship, sharing valuable knowledge and expertise, and aid guiding medical education to navigate the adversities of the conflict.^{2,5}

4. Curriculum: Adoption of innovative teaching and learning methods might help in maintaining education and training in conflict zones and nearby states. Online asynchronous learning (via LMS, seminars, flipped classrooms and social media platforms) allows students and trainees to access educational materials at their own pace, it's crucial in areas of internet and electricity outages.²

5. Online Problem-Based and Team-Based learning, peer-assisted learning as well as the various small group activities might also be of value.² However, teaching clinical and practical skills can be a dilemma in conflict-affected areas.⁸ Fostering ambulatory teaching and simulation-based learning can equip medical students and trainees with necessary practical skills and cultural competency to navigate through the conflict era.²

Moreover, Sudan needs the application of competency-based medical education, inter-professional education, research and collaboration; regular curricular review and reform to respond to various community needs, and to adapt to the ever-changing roles of doctors.^{2,13}

Examples of Resilience in Sudan:

Despite these challenges, some medical schools, like Ahfad University and Alzaiem Alazhari Medical School in Cairo, have managed to graduate

students at external centers.¹⁷ Specialization boards in pediatrics, critical care, and anesthesia have also conducted exams in Port Sudan instead of Khartoum, alleviating uncertainty for trainees.

Students from the University of Medical Sciences and Technology in Khartoum have continued their studies in Rwanda and Tanzania through partnerships. Many global scholarships have also opened opportunities for Sudanese students following the crisis.¹⁸

Innovative approaches to medical education have emerged, led by Sudanese doctors worldwide in collaboration with SMSB and the Sudan Doctors Union (SDU) in the UK and Eire. These initiatives include virtual training sessions and simulation-based learning in safer areas of Sudan, and for doctors abroad in Egypt and South Sudan.¹⁹ These efforts demonstrate resilience and adaptation in the face of adversity.

Conclusion:

The ongoing-armed conflict in Sudan between the SAF and RSF is jeopardizing the future of medical education and health training, severely damaging the fragile healthcare system in the country. Maintaining resilience in medical education amidst war involves navigating multiple challenges: disrupted training, infrastructure damage, physical and psychological tolls on students and faculty, medical “brain drain”, lack of funding, and safety concerns. Key strategies to mitigate these challenges include national and international collaboration, diaspora engagement, student support, faculty development, online asynchronous learning, and needs-based assessments. Collaborative implementation of these strategies can help Sudanese medical education progress during the conflict and facilitate post-war planning.

References

1. Dafallah A, Elmahi OKO, Ibrahim ME, Elsheikh RE, Blanchet K. Destruction, disruption and disaster: Sudan’s health system amidst armed conflict. *Conflict and Health* [Internet]. 2023;17(1):9–12. Available from: <https://doi.org/10.1186/s13031-023-00542-9>
2. Taha MH, Husain NE, Mukhtar WNO, Abdalla ME. Consolidating Medical Education in Sudan During War. *Sudan Journal of Medical Sciences*. 2023;18(3):402–12. <https://doi.org/10.18502/sjms.v18i3.14093>
3. WHO. Sudan - WHO 2024 Health Emergency Appeal [Internet]. 2024. Available from: https://cdn.who.int/media/docs/default-source/documents/emergencies/2024-appeals/sudan---who-2024-health-emergency-appeal.pdf?sfvrsn=19e56635_3&download=true
4. EMRO. Sudan Health Emergency- Situation Report No. 4- 15 December 2023 [Internet]. 2023. Available from: https://www.emro.who.int/images/stories/sudan/WHO-Sudan-conflict-situation-report-15-December_2023.pdf
5. Barnett-Vanes A. Armed conflict, medical training and health systems. *Med Confl Surviv* [Internet]. 2016;32(1):30–9. Available from: <http://dx.doi.org/10.1080/13623699.2016.1180799>
6. Barnett-Vanes A, Hassounah S, Shawki M, Ismail OA, Fung C, Kedia T, et al. Impact of conflict on medical education: A cross-sectional survey of students and institutions in Iraq. *BMJ Open*. 2016;6(2). <https://doi.org/10.1136/bmjopen-2015-010460>
7. Mahgoub EAA, Khairy A, Osman S, Haga MB, Osman SHM, Abbu Hassan AM, et al. War and education: the attacks on medical schools amidst ongoing armed conflict, Sudan 2023. *Conflict and Health*. 2024;18(1):1–9. <https://doi.org/10.1186/s13031-024-00584-7>
8. Bdaiwi Y, Alchalati S, Sabouni A, Al-Khalil M, Abdrabbuh O, Kejah A, et al. Medical education system (re)building in a fragile setting: Northwest Syria as a case study. *PLOS Global Public Health* [Internet]. 2023;3(4):e0001340. Available from: <http://dx.doi.org/10.1371/journal.pgph.0001340>

9. Dobiesz VA, Schwid M, Dias RD, Aiwonodagbon B, Tayeb B, Fricke A, et al. Maintaining health professional education during war: A scoping review. *Medical Education*. 2022;56(8):793–804. <https://doi.org/10.1111/medu.14808>
10. Al Sadig Al Mahdi T. Overview of the Course of Undergraduate Medical Education in the Sudan. *Sudan Journal of Medical Sciences*. 2019;14(4):188–201. <https://doi.org/10.18502/sjms.v14i4.5899>
11. MH Taha, personal communication.
12. Bdaiwi Y, Sabouni A, Patel P, Ekzayez A, Alchalati S, Abdrabbuh O, et al. Impact of armed conflict on health professionals' education and training in Syria: a systematic review. *BMJ Open*. 2023;13(7):1–10. <https://doi.org/10.1136/bmjopen-2022-064851>
13. Amini M, Arya N. Rethinking medical education: introducing peace curricula in medical schools. *Medicine, Conflict and Survival* [Internet]. 2019;35(2):124–32. <https://doi.org/10.1080/13623699.2019.1634862>
14. Seek to ensure the continuation of education during armed conflict [Internet]. Available from: <https://ssd.protectingeducation.org/implementation/seek-to-ensure-the-continuation-of-education-during-armed-conflict/>
15. Aksit N. NGOs and Higher Education: Working together for citizenship education and the development of identities [Internet]. 2008. Available from: https://www.academia.edu/876517/NGOs_and_Higher_Education_Working_together_for_Citizenship_Education_and_the_Development_of_Identities?auto=download
16. Mayer A, Yaremko O, Shchudrova T, Korotun O, Dospil K, Hege I. Medical education in times of war: a mixed-methods needs analysis at Ukrainian medical schools. *BMC Medical Education* [Internet]. 2023;23(1):1–12. <https://doi.org/10.1186/s12909-023-04768-2>
17. Ahfad University for Women [Internet]. 2023. Available from: <https://www.auw-sd.com/>
18. University of Medical Sciences & Technology [Internet]. Available from: <https://www.facebook.com/UMSTofficial?mibextid=ZbWKwL>
19. Abdelgalil S. Sudan crisis outreach and partnership meetings in Cairo, Egypt [Internet]. 2023. Available from: <https://shabaka.org/sudan-crisis-outreach-and-partnership-meetings-in-cairo-egypt/>