



Narrative Review

# The Effect of Sudan's April 2023 War on Medical Education and Prospects for Recovery

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## Abstract

**Background:** Sudan's historical narrative is marked by enduring sociopolitical challenges and deep cultural divisions that have sparked numerous conflicts. A recent escalation in hostilities on 2023, April 15 has dangerously pushed the nation to the brink of a full-scale civil war with potential regional ramifications. The resultant humanitarian crisis involves over 9000 fatalities, 12,000 injuries, and the displacement of six million people, now grappling with dire conditions in their new settlements. The ongoing conflict in Sudan has had a profound impact on the nation's already challenged medical education (ME) sector, resulting in the complete destruction of buildings and infrastructure, widespread looting in conflict zones, and a nationwide disruption of educational activities. This review sheds light on the urgent and still unfolding crisis in ME and explores potential solutions to enhance global understanding of crisis management.

**Methods:** The review utilizes the crisis management framework and draws insights from diverse sources such as literature, student-led webinars, and discussions with Sudanese ME experts. We have examined pre-existing challenges, analyzed the war's impact on ME, and proposed a path forward.

**Results:** Despite the profound devastation, this crisis offers a unique opportunity to revamp Sudan's struggling ME system, introducing a community-centric and socially accountable approach.

**Conclusion:** Through collaborative efforts, Sudan's ME system has the potential to serve as a model for similar nations, effectively addressing the needs of its populace and fostering sustainable development.

**Keywords:** armed conflict, medical education, reform, social accountability, students' involvement

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## 1. Introduction

Sudan, one of Africa's largest countries, shares borders with eight neighbors and has a diverse population of around 48.1 million [1].

Historically, Sudan, celebrated as the cradle of ancient civilizations, boasts a remarkable past with great dynasties. After two colonization, Sudan achieved independence in 1956 through the resilience of its people. However, like many other post-colonial African countries, Sudan fell into a relentless cycle of military coups – dictatorships, perpetuating struggles, injustices, marginalization, and grievances that sparked multiple uprisings/revolutions and civil wars [2].

U.S. sanctions in 1997, triggered by support for terrorism under an extremist regime, initiated economic decline. The 2011 split of Sudan worsened conditions, and discontent peaked, leading to Bashir's overthrow in the 2019 revolution. A turbulent transition followed, marred by a fourth coup in October 2021, intensifying economic, social, and political challenges.

On 2023, April 15<sup>th</sup>, a catastrophic war erupted between former allies, the Sudanese Armed Forces (SAF) and Rapid Support Forces (RSF). Dominique Hyde, Director of External Relations at UNHCR, underscored its severity on 2023, November 7<sup>th</sup>, by stating, "The war that erupted without warning turned previously peaceful Sudanese homes into cemeteries." [3].

According to the latest OCHA situation report in November 2023, Sudan is contending with the most severe humanitarian crisis in recent history. The war has led to approximately 9000 casualties, with thousands enduring atrocities such as injuries, arrest, torture, and rape. Moreover, 4.9 million people have been displaced internally and 1.2 million externally [4].

### 1.1. Importance of this review

Amid Sudan's 2023 war and persistent challenges, this review assesses the impact on medical education (ME), hindering the development of skilled healthcare professionals. With global concerns over armed conflicts and a growing need for healthcare professionals, insights into the challenges and adaptations in current ME contribute to reform initiatives and future requirements [5, 6].

### 1.2. Approach

We gathered insights through the following sources:

1. A thorough review of crisis-related ME literature.
2. Active participation in two students-led webinars:
  - "Medical Education During Armed Conflict in Sudan" (Oct. 23) by SAMER.(The Association for Medical Education and Research at the Faculty of Medicine, the University of Khartoum.)
  - "Accreditation During Wartime" (Oct. 5) by AMSA: The Ahfad University for Women Medical Students Association.
3. Discussions with deans of several medical schools on the Sudanese Association of Medical Schools Deans platform.

## 2. Sudan Medical Education (ME)

Starting in 1924, Sudan ME is considered one of the oldest in the region [7]. It has expanded significantly, reaching 86 schools at the time of

this review. The distinctive and high-quality ME has drawn a significant number of medical students from the region [8].

Quality assurance in ME began in 2000, leading to the National Accreditation Programme, mapped after the global WFME & WHO Basic Standards for undergraduate ME. In the initial round (2010–2012), 97% of medical schools underwent the process, aiming for transformation and reform [9, 10].

After gaining international recognition from WFME in 2018 as the region's first Sudan Medical Council (SMC) began the second round of national accreditation [11]. Only two schools achieved accreditation due to prolonged social and political instability. The disruption started in late 2018 with the December Mighty Revolution, followed by the global COVID-19 pandemic in 2020 and ongoing political turmoil since 2021, hampering the scheduled accreditation process.

Sudan is classified as one of the countries with the highest number of medical schools in the region; it has about 23% of medical schools in sub-Saharan Africa and 10% of those are in the EMRO region [12]. Yet, Sudan's health indicators are among the poorest in the region. This is partially attributed to the brain-drain phenomenon that deprived Sudan of more than 60% of its physicians, as documented in two studies in 2011 and 2017 [13, 14]. This made Sudan one of the leading exporter of physicians [7]. The brain drain has likely intensified amid five years of instability, and the ongoing war is expected to worsen this trend. Similar patterns were evident in conflict zones like Syria and Liberia, where Liberia saw a decline from 500 to 51 physicians (90% departure) during its civil war from 1980 to 2002 [15, 16].

## 2.1. Pre-existing challenges to Sudan ME

- Prior to this war, ME in Sudan was challenged by the following issues:
  - The shortcomings of the basic education system that led many institutions to adopt preparatory programs to bridge the high school-to-university education gap.
  - Admission to medical schools lacks autonomy and is primarily regulated by the Ministry of Higher Education and Scientific Research (MHE&SR) [17].
  - Unregulated privatization in ME raises concerns about quality and community representation.
  - Irrelevant content and ineffective teaching methods.
  - High student-to-faculty ratio, particularly in basic medical sciences.
  - Shortage of clinical training sites and heavy reliance on hospital-based training.
  - Weak collaboration between the health and educational systems.
  - The “feminization of the medical profession,” with women comprising up to 70% of medical students, from a cultural perspective this raises concerns [18].
  - Insufficient emphasis on research and a shortage of empirical data for sustainable development and knowledge preservation [19].
  - Concerns about declining community trust in the quality of ME [20].
  - Apprehensions about student demotivation have arisen from repeated trauma and academic setbacks over the past five years.

## 3. Impact of the Current Conflict on ME

As of the latest available information, Sudan boasts 86 medical schools, with a notable majority being

private institutions predominantly located within Khartoum State, establishing a solid foundation for effective crisis response and recovery. This data is extrapolated from a study conducted in 2019 [9]. Unfortunately, almost all institutions in conflict zones suffered severe damage, including building destruction, looting, and infrastructure loss [21]. During wartime, similar atrocities have been documented, as shown in a scoping review spanning from 1914 to 2018, covering 17 wars in 17 different nations [6]. The Iraq war disrupted ME, and in Liberia, the emigration of university professors created a leadership vacuum [22].

## 4. Feedforward

Global disasters, including armed conflicts, are increasing. Projections indicate that by 2030, about two-thirds of the world's poorest populations will be in countries facing challenges like fragility, conflict, and violence [6]. Disaster management science and literature has evolved significantly. Experts in the field recognized four critical stages in the disaster management life cycle: preparedness, response, recovery, and mitigation. These stages provide a structured framework for managing disasters and guiding strategies to minimize their impact [23]. Dobiesz and associates recognized similar phases with slightly different names, emergency, transition, and development, but omitted the preparation phase. They contended that for ME, each phase has different needs and that these needs are context-sensitive [5].

Sudan was actively involved in robust state-building endeavors during the transitional period (2019–2021), which included comprehensive reforms in the education system. Unfortunately, these promising initiatives were abruptly

terminated, leading to the abandonment of the entire transitional process.

No specific disaster management plan for the education sector, including ME, has been documented. Acknowledging the need for contextualized plans [5], we utilized the disaster management framework [23] to assess the current situation and propose practical recommendations for future implementation across the four phases.

### 4.1. Preparedness phase

#### 4.1.1. Setting the stage for action

In this preparatory phase, internal stakeholders must collaborate with external humanitarian partners to secure essential resources for immediate crisis response. Community and key stakeholders' active involvement is crucial. Despite Sudan's history of armed conflicts, this phase has been overlooked as ME authorities are consistently engaged in addressing challenges to maintain ME quality amidst resource constraints [24].

Preparedness measures must encompass evacuation procedures, training drills, safeguarding vital data off-site, providing psychological assistance to students, and swiftly resuming educational programs focusing on priorities like final-year students. Additionally, these plans should include strategies to prepare medical students for their roles during disasters, for example, adopting war-focused curricula, like in the Syrian experience [5].

Usually, students are willing to assist in disaster management when the healthcare system is strained but often express a lack of readiness [25, 26]. Hence, recommendations were issued to include integrating emergency medicine courses and disaster response training in undergraduate medical curricula in Sudan, Saudi Arabia, Qatar,

Yemen, Pakistan, Germany, Belgium, and the Netherlands [27–35].

The distribution of medical schools in Sudan, with at least one in each state [9], can provide favorable conditions for students' involvement during crises. Prepared medical students can effectively support the healthcare system [36].

This phase is crucial, given the substantial risk, estimated at up to 50% of countries emerging from armed conflict relapsing into another conflict within the first five years of peace, as highlighted by various authorities, including the UN Secretary-General in 2005 [37].

## 4.2. Response phase

The primary aim of this phase is to preserve lives. Success depends on effective planning and anticipation, including the execution of prepared measures like safety maintenance, records security, addressing stakeholders' needs, and swift resumption of education. Although disaster preparation was limited, spontaneous actions and initiatives emerged to support students and institutions.

### 4.2.1. Response of MHE&SR

Several directives were issued: on 2023, August 13<sup>th</sup>, MHE&SR directed a complete halt of higher education in Sudanese institutions. Many institutions objected to the decision. On September 10<sup>th</sup>, a second directive was issued, "Penalties for failure to implement the decision to suspend studies." Finally, on October 7<sup>th</sup>, a third directive instructed institutions to resume education before the end of October.

### 4.2.2. Governors of ME

Sudan ME is governed by a consortium of stakeholders, including MHE&SR, SMC, professional organizations (The Deans' Association), and the broader community. Collectively, they are responsible for establishing and executing a disaster management framework to mitigate crises' impact on ME, ensuring that an adequate quantity and quality of physicians are available for the country's needs.

### 4.2.3. The affected faculties and response

Nearly all universities buildings have been subjected to destruction and looting. The war where it erupted has resulted in widespread displacement of populations, including researchers and medical experts, and a complete disruption of daily life and essential government services [21]. It is estimated that 70% of Khartoum's inhabitants had abandoned their houses and moved to safety either internally (two-thirds) or externally (one-third) [38].

A coordinated and regulated response was lacking at the outset of the crisis. Nevertheless, medical institutions in affected areas initiated contact with their students and faculty to ascertain their well-being and know their whereabouts.

University administrations and faculty actively supported students by seeking options for resuming educational activities, facilitating transfers, and engaging in collaborative efforts with counterparts. Collegiality and solidarity characterize these initiatives, exemplified by one medical school inviting students from other institutions to participate in their classes.

#### 4.2.4. The situation at states medical schools

While this conflict was geographically confined to a limited number of states, its ramifications reverberated across the entire nation. The influx of displaced individuals from Khartoum, Darfur, and Kurdufan into these already resource-scarce states placed immense pressure on their capacities and resources.

Another significant challenge to post-conflict ME arises from conflicting directives from MHE&SR, greatly disrupting institutional planning. A dean from a state faculty criticized these directives, citing program halts, faculty departures, and hindered collaborations. Despite these challenges, the education program resumed for final-year students, with plans for full reinstatement by mid-November. Additional challenges highlighted repurposed dorms as IDP camps and the spread of diseases like dengue fever and cholera in that state.

Significantly, displaced faculty members made valuable contributions to clinical training and took on the roles of SMC, administering exams. State faculties, despite resource limitations, demonstrated robust solidarity and a keen willingness to provide support. This decentralization of resources could potentially mark the beginning of a long-awaited, equitable distribution of resources across the states.

Despite well-intentioned initiatives to address ME challenges, a systematic, coordinated approach is deficient. These efforts, lacking comprehensive planning and higher authority endorsement, risk losing momentum. Financial hardships for faculty members may lead to talent depletion. In this phase, strategies for staff retention and engaging medical students to

support the healthcare system during crises are crucial.

A response worth mentioning is the role of the Sudanese American Physician Association (SAPA). It is a humanitarian non-profit association registered in the United States and Sudan; it actively supported the healthcare system during the war and highlighted the importance of diaspora and civil society. They assisted the SMC in maintaining health professional certifications and supported the Gezira Center for psychological assistance.

#### 4.3. Recovery phase

The focus during this stage is to restore normality. It involves infrastructure reconstruction, returning displaced individuals to their habitats, and the resumption of civil life, including the educational systems. Overall, the goal is to help communities return to their everyday lives.

#### 4.4. Mitigation phase:

Ongoing mitigation efforts in countries like Sudan must address historical issues rooted in colonial legacy, addressing governance deficiencies and incomplete nation-building [2]. Recognizing the fragility of transitions and the likelihood of recurring conflicts [39], community consultations are imperative. These should be integrated into the formulation of Sudan's constitution, involving strategies like peace-building, promoting inclusion, educating militants and the public on human rights, and emphasizing the protection of civilians and healthcare facilities. The aim is to foster a resilient society capable of proactive crisis prevention, endurance, and adaptation.

As we reinstate ME, the case of Syria highlights a unique opportunity for innovation. Despite the

challenges of armed conflict, it spurred contextualized curricula, creative teaching methods, increased flexibility in training sites, and enhanced student involvement. Collaborations with institutions and the diaspora, including international partnerships with universities like Harvard, Utah, and Yale, showcased the transformative potential of adapting ME in crises [5, 40].

In Sudan, the current situation offers an opportunity to reshape ME into a model of excellence through social accountability (SA). Defined by the WHO in 1995 and further elaborated in the Global Consensus for SA in 2010, SA in ME involves adapting education, research, and service priorities to address society's health needs [41]. SA institutions collaborate with stakeholders to ensure quality, equity, relevance, and cost-effectiveness while proactively addressing future challenges [42]. Rooted in human rights and democratic governance [43], SA aligns with the Revolution's ideals of freedom, peace, and justice, complementing efforts for state-building and democratization.

In addressing challenges within ME, SA offers solutions to issues like outdated curriculum content, the gap between health and education systems, shortages of clinical training sites, and community discontent. Ahmed and associates [44] have highlighted these aspects. Adopting a Sudanese competency framework akin to Tomorrow's Doctors, CanMed, or SaudiMed for undergraduate education is recommended as part of this transformation. This initiative, led by the SMC and supported by ME experts, can enhance ME in Sudan [45].

Following Sudan's revolution, the community envisions transformative changes. SA facilitates adaptive curricula catering to each school's community needs in the post-conflict era. This approach fosters healing, addresses cultural

inequality, and promotes solidarity in diversity, aligning with the broader goals of national rebuilding.

## 5. Recommendations for Future Studies

In examining the effects of war on ME and its future, we have identified key gaps requiring further exploration:

1. War and postgraduate ME: Investigate the war's impact on postgraduate ME, addressing specific challenges and avenues for improvement.
2. War's impact on health allied professions: Expand the focus to include other health-allied professions, offering insights into the overall resilience of the healthcare system in conflict.
3. Impact of displaced medical experts on education: Explore the contributions and challenges faced by displaced medical experts in reshaping ME across regions. Assess the potential for decentralization and equitable service distribution post-crisis.
4. Role of volunteering organizations: Scrutinize the contributions of volunteering organizations in supporting and enhancing ME during crises.

These research directions will enhance our understanding of the complex challenges and opportunities at the intersection of conflict and ME.

## 6. Conclusion

This article emphasizes the devastating impact of the April 2023 war in Sudan, which not only results

in immediate harm and loss of life but also hinders development, potentially leading to a full-fledged civil war with grave regional repercussions. The crisis severely affects ME in Sudan, disrupting programs and damaging infrastructure. Despite challenges and confusion, medical educators adopt innovative strategies for program resumption. It also highlights the importance of human solidarity in addressing global crises, emphasizing internal initiatives, diaspora support, and international aid for reconstructing Sudan based on democratic principles. The situation prompts a comprehensive crisis management framework, encompassing preparation, response, recovery, and mitigation, to navigate challenges and prevent future crises.

Despite the trauma, the war is seen as an opportunity to reconstruct ME, focusing on justice and community engagement through SA in ME. Sudan's history of conflicts and resolution efforts positions it as a model for recovery, guided by its social structure, professional wisdom, and revolutionary resilience. We can conclude with a quote by Sydney J. Harris, "The whole purpose of education is to turn mirrors into windows." Let this wisdom inspire the transformation of adversity into opportunities for kindness, justice, peace, prosperity, and a radiant future for Sudan.

## 7. Declarations

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### Ethical Considerations

Not required. We hereby declare that the research conducted for this review does not involve human subjects. As such, it is exempt from the requirement for ethical approval.

### Competing Interests

None declared.

### Availability of Data and Material

All data and materials used in this article are available upon request.

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None.

### Disclaimer

While this article provides a timely overview of the ongoing crisis and its evolving repercussions, it acknowledges the dynamic nature of the situation. The unfolding events may introduce new dimensions to the crisis – like the unfortunate atrocities in Gezira State (not included in this article).. Nevertheless, this article serves as a foundational guide, offering insights into the present scenario and providing a direction for reform that holds relevance for nations facing similar circumstances. We utilized IT (ChatGPT) assistance in certain sections of this article primarily to enhance grammar and refine sentence structure.



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