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Terrorism's impact on low and middle-income countries' healthcare services: A perspective

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Abstract

Terrorism has emerged as an increasingly pressing global issue, giving rise to escalating casualties and devastating implications for peace and security. The low- and middle-income countries (LMICs), already grappling with inadequate healthcare services and an estimated annual mortality toll ranging from 5.7 to 8.4 million, face further setbacks as terrorism exacerbates their prevailing healthcare deficiencies. Among the aspects of how terrorism affects healthcare in LMICs are high morbidity, mortality, and treatment wait times. The four principal areas of reverberation encompass amplified vulnerabilities in healthcare systems, financial shortfalls in LMIC healthcare systems, worsened personnel shortages in healthcare, and the devastating impact on healthcare facilities. In response to these challenges, international organizations and countries have played a pivotal role in mitigating the impact of terrorism on healthcare systems. Additionally, to improve healthcare in these regions, investing in infrastructure, supporting healthcare workers, and ensuring safety are paramount. Implementing mobile health interventions, traditional medicine, and mobile laboratories may enhance healthcare accessibility. Further, employing blockchain technology for data security and supply chain management may strengthen healthcare systems in these areas.

Keywords

Terrorism, low and middle-income countries, healthcare delivery, healthcare facilities, financial shortages

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Background

Terrorism is defined as the deliberate use of violence or threats to instill fear, often for political, ideological, or religious purposes, targeting civilians or non-combatants.[1] In recent years, terrorism has emerged as a complex and pressing global issue with catastrophic consequences for international peace and security. Despite its historical presence, the frequency of terrorism is on the rise, resulting in escalating casualties worldwide. Political and religious groups have launched violent assaults in a number of locations, of which notable examples comprise Abuja in 2014,[1] Ouagadougou in 2018,[2] Kabul in 2021,[3] and the attacks by heavily armed groups on Mogadishu on October 29, 2022.[4]

Poor healthcare has traditionally existed in low- and middle-income countries (LMICs), which has resulted in an alarming number of yearly deaths estimated to range

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Table 1. Summary of methodology.

Methodology steps	Description
Literature search	- PubMed/MEDLINE, Google Scholar, Scopus.
Inclusion criteria	- Full-text articles published in English. - Studies addressing the impact of terrorism on healthcare systems, public health, and affected communities in LMICs.
Exclusion criteria	- Conference abstracts, opinion pieces, and duplicate records. - Studies lacking sufficient data or relevance to the topic. - Studies in non-English language.
Search terms	- Keywords such as "terrorism and healthcare," "impact," "disruption," and "societal" were used in combination with indicators like "terror attacks," "public health," "services," and "community."
Additional search criteria	- Supplementary sources were identified by manually examining references cited in recent reviews focused on the topic.

from 5.7 to 8.4 million.[5] In LMICs, poor healthcare delivery is responsible for approximately 15% of all fatalities.[5] Due to a plethora of issues, including high disease burden, inadequate healthcare infrastructure, deprivation of the workforce, and poverty,[5–7] low-income countries (LICs) maintain poorer healthcare delivery. Furthermore, poor healthcare quality has a huge financial impact, costing LMICs $1.4 to $1.6 trillion in productivity losses annually.[5] Given that terrorist acts exacerbate already insufficient healthcare services, the situation is highly concerning.

Terrorism has led to fatalities, substantial morbidity, and long-term implications for survivors, families, and communities.[8,9] The influence of said terrorism, however, extends beyond its immediate physical impacts. The sheer number of mortalities and injuries inflicted by these attacks places a significant strain on an already overburdened healthcare system.[8] Reduced healthcare quality, delayed management for affected individuals, and higher morbidity and mortality rates may result from insufficient medical practice.[8,9]

To comprehensively explore the profound effects of terrorist attacks on healthcare delivery in LMICs, this article employs a comprehensive approach involving a review of pertinent literature and empirical evidence. It underscores the heightened vulnerabilities in LMIC healthcare systems, including financial constraints, healthcare personnel shortages, and disruptions in healthcare facilities and services. Furthermore, the paper acknowledges the vital role played by international organizations and countries in addressing these challenges and underscores the critical need to bolster healthcare resilience in LMICs to mitigate the enduring impacts of terrorism on healthcare systems.

Methods

This article takes a comprehensive approach to examine the impact of terrorism on healthcare, drawing from an extensive review of relevant literature and empirical evidence. The timing of terrorist occurrences, the impact on healthcare systems, and the socioeconomic and public health dimensions of terrorism in LMICs are just a few of the topics we reviewed in scholarly articles and reports from international organizations. We conducted this review utilizing search databases comprising PubMed/MEDLINE, Google Scholar, and Scopus, thereby employing qualitative analysis to identify key themes and insights.

Our inclusion criteria focused on studies, reports, and articles in the medium of the English language that addressed the impact of terrorism on healthcare systems, public health, and affected communities in LMICs. We excluded studies lacking data or relevance, as well as conference abstracts, opinion pieces, and duplicate records. Non-English language sources were also excluded.

Our search terms included keywords such as "terrorism and healthcare," "impact," "LMICs," and "disruption." These keywords were used in conjunction with indicators like "terror attacks," "public health," "services," and "community." Additionally, we identified supplementary sources by manually reviewing references cited in recent reviews that specifically focused on the topic. Methodological details are summarized in Table 1.

Terrorism in LMICs

Terrorism in LMICs has resulted in profound human losses, with thousands of mortalities reported annually. As a consequence, novel strategies have been developed in LMICs to counter this threat. For instance, the Economic West African States have developed various approaches to address terrorism in the sub-region.[9] These constitute strengthening healthcare and personal security, addressing root etiologies, promoting cooperation and collaboration with governmental and non-governmental organizations (NGOs), countering extremist propaganda, and implementing rehabilitation and reintegration programs.[9] Furthermore, LMICs are collaborating domestically and internationally with state and non-state actors such as the

United States of America, France, the African and European Unions, and the United Nations (UN) to mitigate terrorism and its underlying causes.[9,10]

Despite efforts to combat terrorism, the average annual mortality over the previous decade remains concerning at 26,000.[11] However, there has been considerable year-to-year variability, with the global death toll ranging from a low of 8200 in 2011 to a high of 44,600 in 2014.[11] From 2011 to 2014, there was a disturbing trend of terrorism-related mortalities and incidents, whereby rates increased by 353% and 190%, respectively.[12] As of 2020, the estimated global mortality attributed to terrorism has reached 22,847.[11] Terrorism is often concentrated in specific countries, with South Asia, the Middle East and North Africa (MENA), and Sub-Saharan Africa (SSA) having high death tolls in 2020. Afghanistan alone accounted for 44% of terrorism mortalities worldwide, followed by Iraq, Syria, Somalia, Nigeria, Ethiopia, and the Democratic Republic of the Congo (DRC).[11] In 2017, Iraq was the most affected country, with 4.3% of all deaths due to terrorism.[11]

Mortality sustained from terrorism remained relatively stable in 2022 as opposed to the year prior, totaling 6701 deaths worldwide.[13] However, casualties have become increasingly debilitating, with an average of 1.7 deaths per terrorist incident compared to 1.3 deaths in 2021.[13] The Sahel region in SSA is now the epicenter of terrorism, accounting for more deaths attributed to terrorist attacks than both South Asia and the MENA combined.[13] Burkina Faso and Mali accounted for 73% of deaths by terrorism-related mortalities in the Sahel in 2022 and 52% of all such deaths in SSA.[13] Furthermore, terrorist groups alone have displaced more than 3.4 million civilians in the SSA.[14] Even worse, the MENA region surmounted 30% of global displacement in 2015, with approximately 2.7 million refugees and almost 14 million internally displaced persons.[15]

In summary, terrorism remains a persistent global threat, leading to substantial loss of life and displacement of civilians. The threat of terrorism persists despite some variations in fatality rates over time, with some regions—such as the Sahel in SSA and the MENA region—experiencing particularly severe repercussions. Vigilant efforts to address this issue and promote peace and stability are imperative to mitigate the devastating impact of terrorism in LMICs.[16–19]

Impact of terrorist attacks on healthcare delivery in LMICs

Worsened healthcare system vulnerabilities

The pre-existing subpar healthcare systems, especially in healthcare delivery in LMICs, have been aggravated by terrorism in these domiciles. Increasing inaccessibility and unavailability of basic logistics, inadequate infrastructure, dilapidated roads, economic challenges, and absence of security have all played socioeconomic sequelae with terrorism.[7,8] This has precipitated a substantial inability to manage casualties, low numbers of trained healthcare personnel available, and even a scarcity of expenditure.[7,8] For instance, in the eastern DRC, terrorism has led to a dearth of capital, facilitating financial difficulty for individuals in need of surgical intervention. The impact was abstruse, resulting in limited healthcare accessibility attributed to the inability to procure drugs and vaccines in the area.[7] This was also observed in Iraq, where individuals faced similar challenges.[20] Overall, the devastating impact of terrorism on healthcare systems in LMICs is profound, exacerbating existing issues and creating new obstacles that hinder access to crucial medical care, medication, and trained healthcare personnel.

Worsening financial shortages in LMIC healthcare systems

Despite the challenges terrorism poses to healthcare systems, some countries have managed to adapt by procuring strategies to provide medical services even in the midst of conflict. For example, in the Central African Republic (CAR), an externally funded free healthcare policy has been implemented to administer services to women, children, and emergency cases.[7] However, in many other regions affected by terrorism (i.e. Iraq, Afghanistan, and Nigeria), healthcare systems face significant setbacks due to reduced tax revenues, increased healthcare costs to provide emergency care coverage, and decreased funding from international aid agencies and other donor organizations due to security concerns and a perceived lack of stability in the affected region.[20–23] Some reports have also demonstrated that healthcare workers are unpaid where services are chronically underfunded, leaving no medico-financial exponentiation to facilitate productivity. [20,22] These issues highlight how it is arduous to procure basic healthcare services for those in need, exacerbating the already dire consequences of terrorism.

Worsening healthcare personnel shortages

In addition, instances where healthcare professionals were unable to conduct their daily duties have been demonstrated, with fleeing being cumbersome due to safety concerns. For example, in Adamawa, the insurgency led to only 37% of functional healthcare facilities instilling working professionals.[7] In Burkina Faso, terrorism led to medical personnel abandoning affected regions, resulting in major disruption to the healthcare system, including surgical staff absenteeism.[23] Similarly, the conflict in Borno resulted in the loss of 35% of doctors to other states.[24] In Syria, 27% of the population resides in areas lacking any present healthcare workers.[25] Furthermore, Jain et al.

observed that the Taliban campaign led to a significant number of healthcare workers leaving their jobs and homes.[22] Given that terrorist-infested LMICs possess a prolonged history of workforce shortages in healthcare, the inclusion of terrorism and dispersal of healthcare personnel from these neglected regions creates an untenable situation for those who become victims.

Devastating impact on healthcare facilities

Healthcare facilities, comprising primary, secondary, and tertiary clinical environments, are commonly targeted by terrorists due to their vulnerability as accessibility to the general public has remained constant. Unfortunately, terrorism often leaves healthcare facilities in a deteriorated state. For example, in 2016, in the CAR, almost half of the infrastructure damage was attributable to terrorism.[7] In the same year, terrorism had either partially or fully destroyed approximately 27% of healthcare facilities, making healthcare delivery detrimental and inaccessible for affected populations.[7] Similarly, in northeastern Nigeria, approximately 788 medical facilities were obliterated, with one-third of the 743 facilities in Borno completely destroyed.[26] In Syria, as of June 2021, there were an estimated 600 terrorism-related incidents in 350 healthcare facilities.[25] These bolstered an increased morbidity and mortality rate, especially for vulnerable populations such as children, pregnant women, and the elderly.

The impact of terrorism on healthcare services is evident in Afghanistan, where only 17% of the healthcare facilities sponsored by the World Bank were fully operational in 2021.[27] Similarly, the Islamic State of Iraq and Syria posed a substantial impact on Iraq's healthcare system, with only 30% of hospital beds in Ninewan healthcare facilities functioning post-terrorism.[20] In Kirkuk, Iraq, 23.9% of healthcare facilities were non-functional, and even those that were operational had limited availability for basic laboratory testing and blood typing services.[20] The impact of terrorism on healthcare institutions is nothing short of catastrophic, causing deteriorating infrastructure, denying the public access to treatment, and raising morbidity and mortality rates, particularly for vulnerable populations.

Disrupting healthcare access and services for citizens

Despite increases in incidents of terrorism, fear of accessing healthcare services is a significant concern. For example, a Syrian study illustrated how terrorism led to a substantial reduction in consultations attributable to conflict avoidance.[25] Pregnant individuals residing in Syria preferred to opt for the cesarean section as opposed to natural labor due to fear of unpredictable insurgencies disrupting their subsequent deliveries.[25] Similarly, a significant reduction in emergency obstetric care was evident in Mexico, where fear of terror on the home level skyrocketed.[28]

Terrorism not only generates insurmountable fear but also poses profound challenges to healthcare services. The termination of healthcare facilities as a result of intensified terrorism significantly limits healthcare service accessibility.[25,29] The reduction in emergency services and increased delays in surgical procedures due to a surge in emergency cases also strain scarcely available medical resources.[30] For example, a retrospective cohort study of trauma patients in a Northwestern Nigerian hospital demonstrated that the said cases exceeded the capacity of their respective intensive care units.[30] Furthermore, policies installed by active terrorist groups, such as the Taliban's ban on female patients seeking medical care at hospitals in Kabul, mediate difficulties in accessing the necessary healthcare services.[22] These barriers to healthcare are worrisome as they result in poorer chronic disease management, an increase in the burden of avoidable illness and comorbidities, and early mortality.

The long-term impact on healthcare systems and survivors

Planning medical responses in the aftermath of a terror act is crucial in the early hours. However, weeks or even months may indeed be the post-traumatic recovery time for healthcare systems and survivors.[31] In conflict zones, such as the Israeli-Palestinian conflict, infants have limited access to adequate healthcare resources, placing strain on affected healthcare systems and exacerbating existing challenges in providing effective care and support for the said populace. Additionally, the severity of pediatric terrorism-related injuries is compounded by inadequate medical care, necessitating modifications in the management of these casualties and their mental health.[32] Furthermore, survivors of terrorism often report unmet healthcare needs, which are often associated with higher levels of post-traumatic stress, psychological distress, somatic symptoms, and inadequate social support.[33]

Terrorism has far-reaching impacts on chronic health-related quality of life. This was demonstrated by a study showing that the majority of survivors suffered from multiple trauma events, resulting in lower scores of 6/8 on the Short Form-36 Health Survey Questionnaire (SF-36) subscales compared to normative population statistics. In addition, post-traumatic stress disorder was reported by 39% of the sample, while 43% were unable to resume their main occupation 2 years following a traumatic injury. Interventions focusing on emotional and occupational status have been suggested to improve the quality of life for this vulnerable cohort.[34]

Special attention must be paid to patients with chronic pain as a vulnerable population during terrorism-related stress. Lerman et al.'s study elucidated how the media's

exposure of terrorist missile attacks predicted an increase in pain intensity alongside the sensory component of pain during the pre-post-war period, highlighting the physical and emotional distress caused by terrorism.[35] Overall, there is a considerable long-term impact of terrorism on healthcare systems and survivors, which results in subpar medical care, unmet healthcare needs, and a poor quality of life.

The efforts of international organizations and countries need to be commended

The World Health Organization (WHO) has played a significant role in improving healthcare in areas affected by terrorism, particularly in north-east Nigeria and the African Region.[26] In 2017, WHO coordinated with health sector partners to provide care for over 3 million individuals in northeast Nigeria. Additionally, through its global health security reforms and the new WHO Health Emergencies Programme, the WHO has deployed over 2500 experts to support the health response and reach over 6 million refugees and internally displaced individuals. The WHO has also trained and certified nearly 100 community response personnel to manage children in over 800 communities.[26]

In places devastated by terrorism, the WHO and UN have assisted in developing health transition plans and directing financing toward national goals. Collaboratively, the WHO, UN, and their partner organizations are working to establish a comprehensive data collection system that tracks the impact of terrorism on healthcare personnel, medical facilities, transportation, and patients during complex emergencies. This data-driven approach aims to provide protection to healthcare workers, facilities, and patients while mobilizing political will to swiftly and peacefully end terrorism.[26,36]

Furthermore, it is essential to recognize the commendable efforts of countries grappling with the impact of terrorism. In 2002, Afghanistan's Ministry of Public Health took a significant step by initiating the Basic Package of Health Services (BPHS).[37] Following suit, Pakistan launched the National Action Plan (NAP) in 2014 and Nigeria introduced the Victims Support Fund (VSF) in 2015.[38] These nations undertook these initiatives with a shared goal: strengthening healthcare infrastructure, providing vital medical aid and support to victims of terrorism, and extending healthcare access to remote conflict-affected areas. Their collective overarching policies have enhanced healthcare services in these challenging environments.

Future prospects

To improve healthcare systems in terrorist-infested regions, the recommendations prioritize investment in healthcare infrastructure, logistics, and trained healthcare professionals. The goal is to enhance healthcare delivery and preparedness for responding to terrorism-related incidents. This includes allocating increased funding to healthcare, especially for emergency care, and procuring financial support for unpaid or displaced healthcare workers. Moreso, adequate protection for healthcare facilities and workers, including security personnel and appropriate safety measures, is essential. Additionally, raising awareness regarding the impact of terrorism on healthcare delivery, supporting community-based healthcare programs, and strengthening emergency healthcare services are arduous but critical stages. Collaboration and coordination among governments and international organizations to address the challenges posed by terrorism may also aid the improvement of healthcare systems based in terrorist-infested regions.

Furthermore, strategies to further enhance healthcare delivery and preparedness in these domiciles are warranted. One such approach is the implementation of mobile health (mHealth) interventions using mobile health technologies, such as text messaging campaigns and mobile apps, to communicate with patients and improve healthcare administration. These interventions may involve appointment reminders, health education, and remote patient monitoring. Implementing traditional medicine is another method that may be utilized to improve healthcare accessibility and substantiate community engagement in the delivery of medicine. Moreover, for centuries, traditional medicine has been implemented in many LMICs and may constitute an essential element of healthcare in terrorist-infested regions.

Deploying mobile laboratories to terrorist-infested regions may assist healthcare providers in the appropriate diagnosis and management of diseases more rapidly and effectively. If equipped with the essentials of diagnostics and specialized staff, these research facilities and working laboratories may become conduits for critical healthcare. In addition, addressing the mental health impact of terrorism is crucial. Providing mental health services to individuals affected by terrorism may help mitigate the long-term effects of trauma and stress, including the provision of counseling, support groups, and psychiatric care.

Another tactic is the use of blockchain technology in healthcare systems. Implementing blockchain technology may help ensure the security and privacy of patient data, which is crucial in terrorist-infested regions where data breaches pose significant risks to patients and healthcare providers. Blockchain can also be utilized to improve the supply chain management of medical supplies, such as vaccines and medications, which may ensure that essential supplies reach those in need on time. Successful implementation of blockchain technology in HICs highlights its potential in LMICs, but better infrastructure is required. Hence, to bolster these proposals, investing in the healthcare system should be prioritized.

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