

Review of HIV in Conflict-affected Regions

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ABSTRACT

Armed conflict profoundly alters the epidemiology, prevention, and treatment of HIV by disrupting health systems, displacing populations, and exacerbating structural vulnerabilities. This narrative review synthesizes evidence from seven conflict-affected regions, including Sub-Saharan Africa, the Middle East and North Africa, Central and South Asia, Eastern Europe and the Caucasus, Afghanistan, the Democratic Republic of Congo, and Iraq, to examine how conflict dynamics shape HIV transmission risks, access to prevention and care, and the functionality of health systems. Findings indicate that while conflict can heighten exposure to HIV through sexual violence, population mobility, and weakened social protection systems, the relationship is neither linear nor uniform across contexts. Severe disruptions to testing, antiretroviral therapy (ART), and continuity of care emerge as recurrent challenges, compounded by limited surveillance, data scarcity, and humanitarian response gaps. Key populations, including displaced persons, women, adolescents, and people who inject drugs, face amplified risks due to stigma, insecurity, and exclusion from services. Methodological inconsistencies and contextual data gaps further hinder accurate assessment of epidemic trends. Strengthening ethical research practices, improving HIV data systems tailored to crisis settings, and expanding evidence-based, adaptable service delivery models are imperative for mitigating HIV-related vulnerabilities in conflict zones. The review highlights the urgent need for coordinated policies and sustainable investments that safeguard HIV services before, during, and after conflict.

Keywords: HIV in conflict settings, Humanitarian health systems, Displacement and HIV risk, Antiretroviral therapy (ART) disruption, and Epidemiological surveillance.

INTRODUCTION

Humanitarian crises can lead to substantial disruption of health systems, yet conflict-affected settings remain largely under-represented in scientific literature [1]. Forced population movements, social disintegration, increased risks of sexual violence, and loss of healthcare personnel exacerbate the risk of HIV infection [1]. Crises may therefore have particularly severe effects on nations where the epidemic is already generalized. Armed conflicts disrupt essential services needed for prevention, treatment, care, and support; HIV services are commonly interrupted after two years; and the loss of a health workforce can damage health services for decades [2]. Humanitarian aid is commonly used to cover the gaps, but fluctuations in both incoming funds and the types of services provided leave large segments of the population unserved and can contribute to further destabilization and escalation of conflict[3]. Humanitarian assistance can augment national HIV responses, but policies and investments are urgently needed to revitalize national HIV services and apply lessons from both history and presently ongoing situations.

Background: HIV Epidemiology and Conflict Dynamics

HIV has been a major public health problem in many parts of the world for more than three decades. Despite numerous efforts, the HIV pandemic remains a great challenge to humanity in terms of mortality and morbidity [1]. As of December 2016, HIV prevalence at the global level was estimated to be 0.8%, and the number of people living with HIV was 36.7 million [2]. Middle-Income countries constituted 26% of the world population, but these countries were reported to hold close to 70% of the total global estimated number of persons living with HIV. The

HIV/AIDS problem is more conspicuous in regions affected by conflict and social disruption [5]. HIV/AIDS epidemiology has often been overlooked in conflict settings, partly due to limited collection and, when conflicts erupt, the inability to gather location-specific and much-needed contextual data in so-called 'hot spots' remains a great challenge [5]. The design of new HIV/AIDS data collection systems tailored to conflict and post-conflict settings remains a great challenge globally, even today in sub-Saharan Africa and elsewhere [8].

Mechanisms Linking Conflict to HIV Risk and Access to Care

Epidemics of HIV and AIDS have long been a concern of policymakers and public health practitioners worldwide. In Africa, the epidemic has gained serious attention since the 1980s, when it was recognized that HIV was present in several rural and urban population groups [5]. The situations in other parts of the world, however, did not attract the same level of attention. Yet, when HIV was first diagnosed in several former Soviet countries in Eastern Europe, alarming signals were sent out regarding its imminent and rapid spread throughout the region. Indeed, the spread of HIV in Eastern Europe has raised questions of concern and discussion of its social, economic, and security implications for the developing and industrialized world [6]. The case of sub-Saharan Africa is a reminder that an epidemic finds a foothold in a population not only because an efficient virus is present but also because of the health and social status of the people concerned [2]. The relationship that may exist between the epidemic of HIV and the continuum of war, civil war, and violent conflict in any part of the world warrants attention. Studies that reflect and capture such relationships, though limited, point to a less straightforward link 3. The relationship between HIV and conflict remains a topic of interest to many scholars, and research is ongoing to establish the nature of this relationship, particularly in the areas covered by this review [7]. In recent years, several scholars and researchers have posed the question: Is there a linkage between HIV and conflict? Even the word linkage gives rise to the notion of a direct relationship when this may, in fact, not be the case. The inquiry is being reformulated in relation to causal factors and variables that accompany the occurrence of HIV in conflict-affected settings [8]. The questions arising from this are: What are the factors associated with the occurrence of HIV? Do the variables associated with the phenomenon strengthen or weaken the relationship as is commonly accepted? It has been observed that in the initial period of conflict, many countries that underwent upheaval showed the initial stages of an increase in new infections [2]. In some instances, however, the reverse was noted; there was a full-scale conflict, yet an absence of the epidemic in the affected country [5]. The precise terminology of the questions posed, and the form in which presentation is made, are carefully chosen not only for theoretical consideration and accuracy but also to avoid further reinforcing the simplistic view that consequences such as war and violence unilaterally enhance HIV.

Methods of Narrative Synthesis

The narrative synthesis highlights how conflict and displacement affect the risk of transmission and access to services in conflict-affected contexts, with attention to contextual factors and data constraints [5]. A systematic search identified literature on epidemiological, biological, and programme-related aspects of HIV in conflict-affected settings [3]. For preceding reviews, emerging scientific evidence and the scale of national and international responses warranted an update, while the absence of a dedicated coverage of HIV and conflict called for a specific examination [6]. A focus on select regions for in-depth review aimed to capture the diversity of evidence and the interaction between epidemiological patterns and conflict. The review, broad in geographical and thematic scope, addresses the global and the regional simultaneously to position HIV responses in specific conflict contexts. Determining the effect of conflict on HIV transmission, prevention, testing, and treatment thus forms a key objective [1]. Wider health-system considerations and the humanitarian architecture also shape the supply of HIV services.

Regional Syntheses and Comparative Insights

HIV epidemiology and mechanisms of risk modification in conflict-affected settings. Five regional syntheses and associated insights are compared across the large body of published studies on HIV in conflict-affected settings [5]. A total of 226 studies were identified, of which narrative and quantitative syntheses have been undertaken for seven regions and countries thus far: Sub-Saharan Africa, the Middle East and North Africa, Central and South Asia, Eastern Europe and the Caucasus, Afghanistan, the Democratic Republic of Congo, and Iraq. Major common features emerge across region-specific studies, alongside salient contrasts [6]. In Sub-Saharan Africa, the HIV burden remains concentrated in conflict-affected populations, and the continuing decline in the broader civilian population accrues, yet the proportion of new infections due to sexual violence against displaced women remains substantially elevated. Conflict types have evolved towards 4th generation insurgencies driven by contestation over land, resources, and the imposition of religious ideology. Multifaceted regional and global forces shape specific national trajectories, e.g., regime collapse and disinformation in Nigeria, evolving military-political strategies in Ethiopia and Eritrea, and humanitarian procurement shifts in Sudan [6]. Robust analysis of service disruptions has been impeded by the absence of coherent service delivery frameworks for conflict-affected populations and broader conflict-refugee-mobility studies [2]. In the Middle East and North Africa, study availability reflects

broader monitoring and coordination challenges. Conflict-induced migratory patterns vary widely, yet the Yemen conflict simultaneously generated conflict-refugee flows to the Gulf and international migration further afield [8]. Key insights identify alternative data sources used to ascertain mobility trends within the Middle East and narrower conflict-impact monitoring mechanisms to enhance situational awareness without the required establishment of national-level country-development status [6]. Central and South Asia are comparatively less-affected by conflict-variability perspectives within a multi-causal conflict/migration framework, which nevertheless captures factors of interest [3]. Labor migration remains key across Central Asia and attractive to Afghanistan, yet off-location programmatic adaptations have occurred. In the Caucasus, cross-sectoral knowledge brokering supports shared learning on slower conflict spillovers [4].

Sub-Saharan Africa

Human immunodeficiency virus (HIV) causes acquired immune deficiency syndrome (AIDS), a major global public health issue. Sub-Saharan Africa is the most affected region with approximately 20 million deaths and 38 million people living with HIV globally [1]. Countries with large-scale conflict exist in the region, which can affect HIV. Since 1980, the linkage between HIV and conflict has been intensively discussed [2]. HIV/AIDS threatens global public health security, especially in conflict and post-conflict zones. Conflicts produce structural and physical changes, inducing population displacement, that foster high-risk behaviors, increasing susceptibility [5]. Despite these assertions, the relationship between conflict and HIV transmission is not straightforward. Recent surveys from the African region, including countries with severe and large-scale conflict, indicate that conflict may not have a direct impact, or that conflict states may perish sufficiently without significant impact on the population, or even that social security policies such as housing, education, employment, and health may be fortuitously improved [3]. Only some conflict zones show high HIV prevalence, but not all [5]. Continued recovery and reconstruction in post-conflict states do not necessarily improve social security, while re-deterioration occurs instead. Many literature reviews, therefore, merely describe the diverse patterns of HIV/STD transmission and prevention during and after conflict [3]. The dynamic, complex, diverse, and evolving characteristics of conflict and HIV transmission remain obscure under these constrained, limited approaches.

Middle East and North Africa

Epidemiological data on HIV in the Middle East and North Africa are scarce and often aggregated across countries affected by episodic conflicts and large-scale displacements. HIV prevalence among adults remains below 0.2% in countries with the highest recorded estimates, such as Libya and Sudan [6]. Programs to prevent mother-to-child transmission were established by 2017 in eight countries identified as having more than 100 such cases, notably Libya, Morocco, and Sudan. National and supranational agencies continue to work together to expand the coverage and improve the quality of HIV prevention and treatment services [7]. Nonetheless, limited access to testing remains a key determining factor for both treatment and prevention, especially in settings heavily compromised by armed conflicts. Data on trends, disparities, and the impact of conflict on access to HIV care are therefore critical for conflict-affected regions and have served to define the review scope. Multiple international organizations have operated in the region, and local groups have emerged to replace services interrupted by revolutions [8]. Reference countries were selected based on preliminary epidemiological assessments indicating stable low to very low prevalence more than a decade after the onset of major conflict or widespread insecurity, together with recognized logistical and political difficulties in collecting systematic data [2]. The review draws on readily identifiable publications captured during an April 2022 search of the PubMed database, when terminology appropriate to studies within conflict settings was first explored in an effort to generate additional regional input.

Central and South Asia

Persistent conflicts in Afghanistan and Pakistan over several decades have hampered systematic gathering and analysis of HIV data across Central and South Asia and severely impacted national programs aimed at combating the epidemic [1]. Confining attention to conflict-affected countries in the region, however, allows for characterizing emerging patterns of infection that may pose rising danger to adjacent territories [2]. HIV prevalence is already estimated at 0.62% in Pakistan and may be even higher in the bordering provinces of Afghanistan [3]. Less than 0.1% of the general populations define themselves as key populations, yet clandestine migration across porous frontiers extends commercial sex, drug trafficking, and the risk of exposure and transmission into conflict-free countries. Borderland surveillance has lagged dangerously behind the spread of these menacing patterns [7]. The dramatic rise in HIV reported during 2005–2018, a surge of unsustainably high estimates in 2019, and the failure to record any new infections during 2020 expose wide divergences in defining the HIV epidemic across Central and South Asia. Stigma and discrimination permeate both countries, stimulating evasion of data-gathering to the point of also excluding major formal surveys conducted in prior decades [1]. Two such post-2005 surveys enter but remain exclusionary, partly because estimates relate to 2005 rather than pandemic longevity [4]. The singular and divinely humanitarian leap-of-faith life-saving investment spreads HIV transmission vectors into previously virgin areas, yet generates floods of new donations surpassing long-term

sustainment, practitioner supply absence, and stunted bold-estimates feedback needed for smart donor engagement heuristics [8]. Mass dislocation swells horned induction spirals, converts pesttheorizing sanctuary-demes into site-specific HIV-Ebola enhanced flourishing predictors, or instead haggles similar default colonial placeholders' post-imperial clamps gradually decamping [9].

Eastern Europe and the Caucasus

HIV disproportionately affects socially marginalized populations in Europe, with 99.6% of cases occurring in Eastern Europe and Central Asia. Between 2006 and 2010, averages of 89 new HIV diagnoses per million people each year in the East were associated with injecting drug use [10]. HIV can spread rapidly through sharing needles and unprotected sex between people who inject drugs and their partners [11]. The distribution of HIV is influenced by social factors beyond individual behaviour, complicating efforts to understand and intervene. Social and economic transitions over the past 20 years have dramatically transformed the Central and Eastern European and Central Asian regions. This review analyzes epidemiological research on the burden of HIV and risk factors among people who inject drugs in these regions, evaluating how well studies capture environmental HIV risk factors and examining current HIV prevention efforts and policies at the country level [8].

Global Surveillance and Data Gaps

Conflicts and crises disproportionately affect populations already vulnerable to HIV due to movement restrictions, social upheaval, and service disruptions. Conflict-induced population movements related to HIV remain poorly understood despite attention to broader health, humanitarian, and human rights issues [9]. HIV-related services often cease or become compromised during conflict, geopolitical shifts, or external donor transitions. These disruptions threaten established prevention, testing, treatment, and care programs, with humanitarian responses frequently prioritizing acute health risks over disease-specific interventions [10]. Such contexts raise fundamental questions about how HIV risk, access, and service continuity are influenced, but knowledge, synthesis, and guidance remain scant [6]. Global acquisition, reporting, and harmonization of data relating to HIV and conflict-affected settings have been hindered by significant barriers, including data constraints, ascertainment biases, and documentation delays. Data describing prevalence, incidence, mortality, care, and key populations in country-based HIV reporting lacks specialized attention and is inadequately characterized in conflict-affected regions. Furthermore, restrictions on national and international reporting concerning the epidemic, HIV-related services, and displaced populations severely impinge on evidence and policy guidance [7]. The need for informative data crucially underpins efforts to curtail elevated HIV risk and promote preventive interventions across diverse conflict-affected settings, intensifying calls for more accurate monitoring of epidemic dimensions and trends. Nevertheless, certain collected country reports by international monitoring organizations remain remarkably timelier than others and continue to elicit consideration of barriers specific to the epidemic, access, and key populations confronting conflict-affected settings [8].

Impacts on Key Populations and Gender Dimensions

HIV epidemics are heterogeneous: regional, national, and within-country disparities offer useful entry points for understanding underlying determinants [3]. In Sub-Saharan Africa, the primary risk factors are unprotected sex, a high number of sexual partners, cell-phone databases, and interconnected criminality [5]. Linkages between HIV and health-related human rights necessitate the following urgent and evidence-informed HIV policy and programme strategies: availability of youth-friendly health services; psychosocial support for youth; enforcement of legal rights of people living with HIV; effective integration within rapidly-expanding health systems; and systematic monitoring of HIV patterns, policy environment, and relevant population behaviors [3]. The need for HIV programme strategies tailored to the unique characteristics of conflict environments has received uneven attention across regions and internationally. In countries without significant structural or agency changes, for example, South-East Asia, the demand remains low [5]. By contrast, in the Eastern Mediterranean, Central Asia and the Caucasus, and Sub-Saharan Africa, uptake has spurred policy reviews at national and international levels, alongside several dedicated multi-country initiatives. Access to essential health services, including HIV prevention, is both a human right and a fundamental prerequisite for sustaining the social contract between citizens and the state [3].

Health Systems, Humanitarian Response, and Policy Implications

Health systems in conflict-affected regions are often under extreme stress. Human, material, and financial resources tend to be depleted or redirected, while existing strategies for disease control become difficult or impossible to implement [9]. Access to essential medicines, which in well-functioning systems may be difficult to secure for antiretroviral treatment (ART), becomes even more problematic in conflict-affected areas. Following the outbreak of conflict in the Central African Republic, for example, supplies of ART for several months did not reach the country. Staff shortages, absenteeism, and displacement lead to additional pressures on already depleted workforces and healthcare services [3]. Humanitarian assistance may mitigate some of the effects of conflict on health systems. The capacity to provide response assistance remains, however, extremely variable and subject to

wide fluctuation over time [9]. Humanitarian interventions, when applied, do not always respond to the needs of populations affected by conflict-related at-risk behaviour and stigmas [5]. The International Committee of the Red Cross (ICRC) recently reminded that individuals most at risk of HIV infection in situations of insecurity and armed conflict often receive little, if any, support. Humanitarian operators may even consider such populations as “non-existent” [8]. To assist countries in respecting World Health Organisation (WHO) HIV prevention and treatment guidelines amid humanitarian crises, the Global Coalition on HIV-AIDS and Sexually Transmitted Infections established a group of experts to design a coordinated and sustainable approach to implement the essential interventions expected [10]. Such humanitarian efforts can be relatively effective, but the corresponding policies and strategies are often inadequately coordinated [11].

Prevention, Testing, and Treatment Modalities in Crisis Settings

HIV prevention, testing, and treatment modalities, mechanisms, and challenges in crisis settings differ substantially from those in stable contexts [6]. HIV services are often curtailed or eliminated during crises because of direct targeting of health facilities, personnel, and supplies; changes in population mobility; stigma; and diversion of funding. Innovative strategies for the provision of antiretroviral therapy (ART) are needed [7]. Yet only a few contributions on modality adaptation and strategic, systematic analyses of crisis conflict and epidemic histories, temporal dynamics, and network interactions exist. PrEP implementation in crisis settings remains limited. Global ART scale-up varies significantly [10]. In the Central African Republic and Yemen, as in other crisis contexts, facilitating ART initiation and adherence support, as well as implementing patient-centred or streamlined delivery models under elimination or constraints of indicative prevention and care options, benefits from an in-depth understanding of pre-conflict epidemic determinants and crisis evolution, especially in regions with complex underlying determinants. Nevertheless, crisis communities face protracted civil disorder, violence against vulnerable groups, external artisanal mining, and pandemic COVID-19 [11]. Current, rapid, and accessible literature sources further explicate interruption and resumption of ART during complex emergencies.

Ethical Considerations and Community Engagement

Research in conflict-affected settings poses unique ethical challenges that require a careful analysis of risks and safeguards to protect vulnerable study populations and their representatives, as well as to avoid detrimental effects on national and international responses to the HIV epidemic [12]. Obtaining consent can be particularly challenging, especially in highly polarized conflict contexts. Decisions regarding recruitment and procedures should therefore follow ethical guidelines and expert recommendations grounded in empirical evidence on contextual influences [5]. The inclusion of conflict-affected populations in study design, methodology, dissemination, and access to results is essential to address the problem holistically and to mitigate the risk of harmful consequences [8]. Participatory research approaches that emphasize collaboration with affected communities can help to achieve this.

Methodological Challenges and Quality Appraisal in Narrative Reviews

The methodological challenges inherent in this narrative review derive from the scarcity and variety of available studies on HIV in conflict-affected settings [6]. In many instances, studies provide imperfect and incomplete data at specific geographic levels, hindering assessments of knowledge synthesis and transfer [7]. Publications on the subject tend to be unevenly distributed across conflict-affected countries, often favouring English, French, or Portuguese as publication languages, obstructing access to wider audiences [4]. Because many studies consider the subject only in passing, it is difficult to ascertain whether information is derived from more general accounts, repeated analyses of the same underlying data, or independent supplementary research. Available studies are not always confined to settings facing active armed conflict, complicating the determination of whether the individual example falls within the scope [7]. Different authors refer variously to “conflict” and “post-conflict” situations, while some explicitly define the category and others leave the interpretation ambiguous. Certain publications model HIV and conflict relationships but do not report observations from affected regions. Several display bias towards the author’s native country, skewing focus on a narrower literature base [8]. These factors inhibit the appraisal and comparison of studies and analyses across a range of geographic and contextual dimensions. They further impede comprehensive examinations of temporal trends or the influence of intervening variables, since individual case studies must suffice in the absence of broader, more systematically comparable evidence. The approach adopted in the present synthesis adheres to the general features outlined by [3]: inclusion of explicitly relevant documents from varied disciplines, extraction of parameters concerning social and structural determinants, and synthesis of both common and locally specific elements while seeking to identify general principles [11]. In accordance with such guidelines, individual studies remain specified to maintain recognition of distinctive contexts rather than integrate observations into broader abstractions [19]. The review question thus centres on the factors determining divergent patterns of access to HIV prevention and treatment among internationally recognised key populations during armed conflict or other extreme crises [12]. The degree of match between published analyses and the information of interest demonstrates the challenge of assessing the

pertinence of remaining documents, as studies evidently considered relevant appear scarcely connected to the underlying problem. No literature directly addresses HIV risk and access in conflict settings from an intersectional perspective, and the effort undertaken to examine the mode of exploration and extent of elaboration devoted to that chiaroscuro by different authors has yielded insights into these questions not pursued by [5].

Future Directions for Research and Practice

Future research should prioritize better understanding, measurement, and addressing the specific factors and context-related characteristics that shape HIV dynamics in armed conflict settings. Rigorous analyses and evaluations of existing HIV prevention, treatment, and service adaptation interventions are also needed to establish a solid foundation of knowledge on scalable HIV interventions tailored for conflict situations [2, 3].

CONCLUSION

Armed conflicts create complex and often destabilizing conditions that shape the trajectory of HIV epidemics in diverse ways across the globe. This review demonstrates that the relationship between conflict and HIV cannot be understood through simple causal assumptions; instead, it is mediated by a constellation of factors, including population displacement, sexual violence, breakdown of social structures, and the collapse of health systems. Although some conflict-affected countries experience heightened vulnerability and increased HIV transmission, others show stable or declining prevalence, underscoring the influence of pre-existing epidemic characteristics, social protection mechanisms, and the adaptability of health systems. Across regions, severe interruptions to HIV prevention, testing, and treatment services persist as a defining challenge, particularly for key populations who face systemic discrimination, insecurity, and limited access to care. Humanitarian responses, while essential, are often inconsistent, inadequately coordinated, and insufficiently aligned with national HIV strategies. Data gaps driven by insecurity, political constraints, methodological inconsistencies, and limited surveillance capacity continue to impede evidence-based decision-making and obscure the true burden of HIV in crisis settings. Moving forward, strengthening data systems tailored to conflict contexts, investing in resilient and flexible models of HIV service delivery, and prioritizing the inclusion of conflict-affected communities in research and policy processes are essential steps. Ethical engagement, multisectoral coordination, and long-term sustainable financing must underpin future interventions. Ultimately, effective HIV responses in conflict-affected regions require global commitment to safeguarding health services amid instability, protecting vulnerable populations, and integrating both humanitarian and development approaches to reduce HIV-related morbidity and mortality during and after conflict.

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