Transmission and prevention of HIV and sexually transmitted infections in war settings: implications for current and future armed conflicts

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Introduction

Armed conflicts often constitute 'complex emergencies', defined as situations affecting large civilian populations which combine war or civil strife with food shortages and population displacement [1,2]. Wars can increase the spread of sexually transmitted infections (STI) and facilitate HIV transmission through sexual routes, injection drug use (IDU), contaminated blood transfusions and occupational injuries; furthermore, they can create synergistic conditions for interacting epidemics. Armed conflicts can influence HIV epidemic dynamics in surrounding countries and beyond, both directly by affecting HIV transmission itself and indirectly through reallocation of health-related public funds toward security and defense measures.

Poverty, powerlessness and social instability, all of which facilitate HIV transmission, are extremely heightened in complex emergencies, but HIV is rarely seen as a priority [3]. We review the effects of war on HIV and STI transmission and critically appraise short- and medium-term approaches to prevention. Our intent is to stimulate thinking about the potential for increased HIV/STI transmission in current and future armed conflicts, with particular reference to Afghanistan, and to encourage timely interventions to prevent a worsening HIV epidemic in Central and South Asia.

Direct effects of war on sexual transmission of HIV and STI

In World War I, high reported STI rates among soldiers reflected both high syphilis and gonorrhea prevalence in civilian populations and conditions conducive to acquisition and transmission in the military. In 1917, 23 000 British soldiers were hospitalized with STI while, from 1914–1917, over a million syphilis and gonorrhea cases were recorded among civilians in France [4]. In World War II, more than 750 000 United States of America (USA) military draftees had positive syphilis serologic tests and/or clinical symp-

toms [4]. Deploying troops without actual combat in the early 1970s in Korea is thought to have contributed to high STI rates, exceeding those of the war in Vietnam [5].

More recently, wars have been important mechanisms for disseminating HIV infection. By 1987, HIV had spread from northern areas of Angola to central and southern regions, accompanying war-induced population displacement [6]. High HIV infection rates in El Salvador soldiers were attributed to high levels of sexual risk behavior associated with the 12 year civil war and numerous prostitution centers surrounding military posts [7]. Ethnic patterns of recruitment into Uganda's National Liberation Army after the overthrow of Idi Amin in 1979 correlated positively with geospatial distributions of Ugandan AIDS cases in 1990, supporting the hypothesis of military involvement in HIV spread [8]. By 1998, a decade of ethnic war, upheaval and mass movements of refugees from violence in Rwanda had fanned an escalating HIV epidemic that spread from cities such as Kigali to the countryside [9]. In Sierra Leone, sexual contacts with foreign soldiers from countries with high HIV seroprevalence preceded rapid increases in rates of STI and HIV [10].

War can severely disrupt access to food and other necessities, generating significant population movements as refugees flee violence and starvation. Refugees are highly vulnerable to sexual predation by those with food or money and to rape by those with weapons. For example, in Mozambique, social disruption, war and compromised health infrastructure likely provoked higher syphilis rates in 1992−1993 among displaced pregnant women, some of whom had experienced sexual abuse and repeated rape while being held captive by insurgents [11]. The extent of sexual abuse in situations of armed conflict and civil unrest is not well described and may be under-reported due to associated stigma, emotional disturbance and fear of recrimination [12]. Unaccompanied minors are at particular risk of sexual violence during wars. Rape, whether by 'homeland' or foreign soldiers, may be used to systematically terrorize and displace populations [13,14]. HIV risk increases if there are multiple perpetrators or if women are held in captivity for long periods [10]. In the context of an emerging HIV epidemic, widespread sexual violence can have devastating health effects.

Women in complex emergencies may use transactional or 'survival sex' with men who have food or money to avoid starvation for themselves and their children [15−17]. In Sierra Leone, war altered sexual networks through massive displacement of populations, psychological trauma, and progressive impoverishment of women [10]. Deaths or loss of contact with spouses −

frequent concomitants of war − may lead men and women to seek new partners in situations where normal social controls of sexuality by relatives and neighbors are disrupted [18]. In Sudanese refugee camps in northern Uganda in 1996, beer brewing and selling were common activities for young refugee women, most of whom were separated or widowed due to war. Unprotected sex with multiple partners while under the influence of alcohol was common [19].

In conflict situations, psychological contexts may also increase risk behaviors and risk networks. Changing patterns of sexual behavior, drug use, and increased HIV/STI risk were found in 1998 among young people displaced by war in Bosnia−Herzegovina [20]. Sexual relationships during war are likely to be short-term, increasing rates of partner change which in turn affect the reproductive rate of the HIV epidemic [21,22]. Frequent partner change can increase STI risk, further increasing HIV transmission [23]. Poor knowledge of risk [24] and restricted access to condoms compound these economic and psychological factors, with resultant low levels of preventive sexual behavior.

Soldiers and other men separated from their regular partners are more likely to frequent sex workers during war or migration [7,25]. Large-scale prostitution creates core groups for epidemic spread of HIV [26] and STI [27]. When significant disparities in hard-currency purchasing power exist between local populations and occupying soldiers, widespread concubinage and prostitution near military bases and in 'rest and recreation' areas in surrounding countries are likely. Refugee women and children may be forced into brothel-based or other forms of sex trade, increasing their risk of acquiring HIV/STI from 'protectors' or customers who became infected before leaving home or while abroad in the military [28]. Lack of adequate social programs and recreational facilities for soldiers can lead to boredom, apathy and frustration which may favor types of sexual expression that facilitate STI transmission [5].

Far less is known about the impact of war on men's sexual behavior with male partners. Men who have sex with men (MSM) may be found in war zones, prison camps and rest and recreation settings. Homosexual encounters are reported by men who are preferentially heterosexual in orientation, when they are placed in closed environments such as prisons. These settings create conditions of 'obligate homosexuality', in which partner choice is limited to same sex partners, for those engaging in consensual sexual activity. Closed environments are also potentially conducive to male/male rape or other non-consensual sexual penetration. The extent to which consensual male-male sex occurs among soldiers on various sides of current conflicts is undocumented.

Direct effects of war on transmission of HIV and other blood-borne infectious agents through injecting drug use

The effects of war on the extent of drug use have not been widely studied. Many USA soldiers in Vietnam initiated drug use and even drug injection on patrol, in base areas, and in rest and recreation areas. Narcotic use was 43% in a representative sample of 943 soldiers of whom half (21% of the whole sample) met criteria for opiate addiction based on length and frequency of use and history of withdrawal symptoms [29]. Dependent opiate use was facilitated by demoralization and boredom, widespread presence of opiates and significant economic disparities between local holders of drugs and USA troops. An explosion in heroin use in the late 1960s in Sydney, Australia was largely attributed to the presence of USA troops on leave from Vietnam [30].

Wars can increase injecting drug use (IDU)-related transmission of blood-borne viruses through other mechanisms. Conflicts can disrupt supply routes, facilitate introduction of new drugs with higher injection frequencies, and create shortages of sterile injecting equipment. Drug consumption through injecting is facilitated by reduced availability or quality of non-injectable-grade opiates and by increased access to injectable drugs due to law enforcement and interdiction initiatives [31,32].

Afghanistan, which provided 75% of the world's heroin supply in 1999 [33], is a case in point. Despite a 30% fall in production resulting largely from drought in 2000 [34], opium markets and heroin production facilities flourished due to expansion of opium poppy cultivation in areas not under Taliban control [35] until early 2001 when the Taliban strictly enforced a short-lived ban on cultivation [36]. After the Afghanistan war began, important fluctuations in opiate supplies and prices occurred in response to market factors or the conquest of local areas [37]. For example, in late October, 2001 opium prices increased ten-fold in Taliban-controlled areas but dropped from 1200 US$/kilogram to 176 US$/kilogram elsewhere in Afghanistan [35].

Increasing prices can encourage people who are dependent on opiates to seek the most cost-efficient means of administration, i.e. injection [38]. Preliminary findings indicate that military pressure on the Afghan−Pakistan border, combined with increased police pressure, interrupted heroin supplies, resulting in decreased heroin quality in Quetta and Lahore [39,40]. Many heroin users who had traditionally 'chased the dragon' (inhaled heroin fumes) switched to injecting synthetic opiates, particularly buprenorphine, which was cheaply and widely available from chemists [39,40]. As observed in India, some opiate users who begin injecting will continue injecting even if supply conditions become more favorable for less risky modes of drug consumption [41].

War-induced drug supply fluctuations, locally and world-wide, can lead to widespread HIV transmission in areas of drug transit, as some local residents start taking drugs because of increased drug availability or payment in kind for services rendered. HIV molecular epidemiology has demonstrated close associations between drug trafficking routes in south and south-east Asia and diffusion of various HIV subtypes and recombinants [42]. Despite the Afghanistan government's pledge to ban poppy cultivation, many Afghans depend on it for their livelihood. Consequently, future HIV genotype mapping is likely to demonstrate that continued opium production, political instability and military conflict in Asia have created new international drug export routes.

In situations of poor HIV awareness and minimal access to means of preventing transmission, explosive IDU-related epidemics occurred in Western cities (e.g. New York, Edinburgh, and Milan), Asian cities (e.g. Bangkok, Manipur, and several Vietnamese cities) and cities in the Newly Independent States (e.g. Kaliningrad, Odessa, and Svetlogorsk), with HIV prevalence sometimes rising rapidly to over 50% [32,43−45]. Other potentially fatal diseases, including hepatitis B and C, malaria, and bacterial infections such as endocarditis, can also be spread by injecting, particularly under complex emergency conditions which do not lend themselves to safer injection behaviors. Furthermore, in situations of armed conflict and civil instability, sterile injecting equipment is less likely to be available to IDU than during peacetime.

Direct effects of war on interacting sub-epidemics of HIV

Sex workers in virtually all developing countries currently experiencing complex emergencies generally do not inject illicit drugs. However, since many IDU, particularly men, form sexual partnerships with non-users [46,47], the IDU-associated and the sexual HIV epidemics − among both heterosexuals and MSM − can reinforce each other synergistically. Wherever social and cultural barriers to discussing sexual issues exist, the proportion of MSM during conflicts may be underestimated. In peacetime Pakistan, for example, adolescent male−male contact, younger male−older male sexual relationships, and married men having male sexual companions are all reported [48]. Whether such

behavior is more prevalent under conditions of increased military involvement is unknown.

No information is available concerning HIV prevalence among MSM or other populations in Afghanistan [49]. Of the six surrounding countries [50–55], only Pakistan has reported AIDS cases among MSM [52]. If 6% of the estimated 73 000 HIV-infected adults in Pakistan are MSM, reflecting a similar proportion of known AIDS cases, 4000 men have already acquired HIV through male–male sexual contact. The overlap between populations of IDU, MSM and sex workers in Afghanistan and Pakistan is not known. Heightened tensions due to the war in Afghanistan and the India–Pakistan conflict may see recently established harm-reduction programs in Pakistan [39] become casualties of social disruption, heightened authoritarianism, or budgetary difficulties. Given potentially sharp rises in drug use in the region, substantial increases in HIV incidence among IDU and their sexual partners can be anticipated if effective responses are not mounted [39,40,56].

Indirect effects of war on the HIV epidemic

The social disruption and economic impact of war can affect domestic spending priorities, reducing health care investments. Conflict-induced migration and social disruption often interact with pre-existing structural and environmental factors [57]. In the Afghanistan case, these include economic underdevelopment, poverty exacerbated by years of drought, systematic subordination of women, and health care infrastructure already severely weakened by 23 years of conflict. Two-thirds of Afghans lack access to health services [58]. Health indicators are abysmal: disability adjusted life expectancy of 37.7 years [59], infant mortality rate of 165 per 1000 live births [60], under-five mortality rate near 25% [58] and the world's second highest maternal mortality rate (1700 deaths per 100 ,000 live births) [61,62]. Within this context, low awareness of HIV/STI, lack of access to HIV/STI prevention supplies, fluctuating prices and increasing availability of opiates, and non-existent or weakened prevention programming combine to create conditions ripe for HIV spread. Possible mitigating cultural factors should not be assumed *a priori* to protect populations experiencing conditions of increased vulnerability due to armed conflict, particularly following years of poor health care and virtually non-existent surveillance of HIV and other STI.

Global responses to the HIV/AIDS epidemic may be affected negatively by wars around the world. Countries in the throes of complex emergencies are unlikely to prepare successful funding proposals to bilateral, multilateral, private sector donors or the new Global Fund on AIDS, Tuberculosis and Malaria (GFATM). This latter fund depends on increasing commitment and mobilization of contributions from public and private sources [63] at a time when funding the fight against terrorism has predominance. Consistent with other estimates [64,65], the Commission on Macroeconomics and Health recommended that the GFATM should fund around US $8 billion per year by 2007, and US $12 billion per year by 2015 for AIDS alone, with the balance of needs met by other bilateral and multilateral donor programs and by domestic resources of the recipient countries [66]. It is optimistic to assume in the climate created by the events of September 11, the war in Afghanistan and the war on terrorism that international funding targets will be met by target dates. In the first round of proposals to the GFATM, countries asked for US $1.2 billion, but only US $700 million was available [67]. This waning attention, if sustained, will reduce HIV prevention budgets, weaken the impetus to establish and fund AIDS treatment and care for infected individuals and thus, overall, increase economic and social disruption in developing countries, with important security ramifications for the industrialized world [68].

After-effects of war on HIV epidemics

HIV transmission dynamics after armed conflicts end are specific to local contexts. On return, both internally- and externally-displaced refugees may bring HIV/STI with them. The speed of subsequent spread depends on HIV/STI prevalence and amounts of sexual and injecting partner mixing in areas of refuge and of return. These are shaped by the traumatic effects of wartime physical violence, sexual violence, and socio-economic disruption. Risk is reduced if host countries conduct effective awareness raising and behavior change prevention programming among refugees during their stay. However, in Central Asia, for example, displacement of 3.5 million Afghan refugees into neighboring countries over the last two decades [69] likely reduced countries' ability to provide socio-economic supports and HIV prevention programs to both their own citizens and refugees.

Depending on the duration of armed conflicts and post-war disruption, the degree of demoralization of troops, and absent or ineffective HIV/STI prevention efforts during and after cessation of hostilities, significant numbers of returning soldiers may be infected with HIV or another STI. Some may have acquired blood-borne diseases through IDU and some will continue to inject when they return home [70,71].

Returnee-to-homeland-partner transmission depends

on the numbers of infected soldiers and the social relations and responses of their countries when they return. Historically, soldiers have been granted considerable latitude to form new partnerships while away from home. To a lesser degree, this has extended to their spouses, particularly if the soldier is killed or goes missing in action. This dynamic facilitates HIV spread if subcultures of rapid partner change create core groups fuelling wider transmission of HIV/STI. The speed of transmission depends on the baseline level and distribution of the infectious agent, the rate of influx of infected and uninfected returnees and the extent to which overlapping sexual networks form [72].

Blood-borne viral transmission after hostilities cease may also be significant. If borders remain tightened, fluctuations in drug supplies involving producing or transit countries may continue to affect drug availability, quality and price in different parts of the world. Large proportions of heroin users in Europe and the USA have smoked or snorted the drug [38] since the mid-1980s. Drug market fluctuations may lead significant numbers of them to begin injecting. If drug substitution involves cocaine, a drug with a short half-life driving injection frequency, HIV infection risk among IDU will rise further [73,74].

Implications for action

Resolution of complex emergencies around the world and initiation of processes of building and rebuilding allow steps to be taken to reduce HIV transmission, provide support to those already infected, and mobilize a sustained response against conditions leading to further spread [75,76]. The Declaration of Commitment on HIV/AIDS signed by all 189 member countries of the United Nations in June 2001 recognized that 'populations destabilized by armed conflict. . . . . . including refugees, internally displaced persons, and in particular women and children, are at increased risk of exposure to HIV infection' and called on 'all United Nations agencies, regional and international organisations, as well as non-governmental organisations involved with the provision and delivery of international assistance to countries and regions affected by conflicts. . . . . .to incorporate as a matter of emergency HIV/AIDS prevention, care and awareness elements into their plans and programmes'. By 2003, national strategies are to be 'in place to address the spread of HIV among national uniformed services, including armed forces and civil defense forces' and to provide defense and other personnel involved in international peacekeeping with 'HIV/AIDS awareness and training, including a gender component', as well as pre-deployment orientation [63].

During a complex emergency, more immediate actions are required. The minimal initial services package (MISP) developed by the Joint United Nations Programme on HIV/AIDS (UNAIDS) and the UN High Commission for Refugees (UNHCR) should be implemented with dispatch. The MISP includes essential programs for preventing HIV transmission such as basic information on HIV and AIDS, condom access, safe blood transfusion, and materials to implement universal precautions in camps of refugees and internally displaced persons [77,78].

Casualties and landmine injuries increase demand for blood, necessitating adequate, uninterrupted supplies of HIV, hepatitis B and hepatitis C test kits [79]. Sufficient supplies of sterile needles and infusion kits, and strict adherence to safe sterilization practices, are required to prevent infection of patients through reuse of contaminated equipment. Health care workers treating injured soldiers or civilians risk acquiring blood-borne infections through needlestick injuries or mucous membrane exposures to infected blood and body fluids. Such incidents are more likely to occur under the stressful conditions existing in conflict zones but also can occur when over-stretched health care services cannot meet demand at a safe pace. Adequate supplies of gloves, gowns, eye protection and other materials are essential for maintaining universal precaution measures.

Sexual transmission of HIV is less likely if affordable, easy access to condoms is ensured and basic HIV information is communicated in culturally acceptable language, preferably by members of the local population. Among 143 Afghan drug users in Quetta, Pakistan, none had ever used condoms [56], indicating the challenges that prevention efforts face. Consideration should be given to establishing HIV voluntary counselling and testing services for refugees and other displaced persons [80] returning from countries within and outside regions in which complex emergencies have been underway [81]. These services must be accompanied by programs providing social support and ensuring protection from retribution for those diagnosed as infected. It is important to prioritize STI diagnosis and treatment, given the synergistic role of STI in HIV transmission. Rapid assessments of STI prevalence in refugee camps can provide quick baseline information [82]; training health care workers in STI case detection and management using the syndromic approach can reduce STI transmission. Strengthening HIV surveillance to provide an accurate understanding of the magnitude and determinants of HIV transmission can inform HIV prevention programming [83–85]. Beyond these measures, the potential for rape or other coercive sexual activity should be reduced. This includes studying temporary living environments and modifying layouts of refugee camps to ensure adequate

protection for women and unaccompanied minors. Women's shelters that have been set up at the edge of camps have been more vulnerable to violence from soldiers, police and male refugees [86].

Structural changes are required to counteract economically-driven risk situations and behaviors. Both internally displaced people and refugees need ways to earn money through productive activities, both for financial reasons and for their general well-being. This reduces the probability of 'survival sex' within camps and enhances post-war re-integration for those who develop new skills and abilities. Sex workers may also want alternative employment and social integration support. For those who remain active in sex work, a 100% condom campaign, as was introduced in non-war settings in Thailand [87] and Cambodia [88], and the empowerment of sex workers to successfully demand condom use, are critical in preventing highly efficient HIV and STI transmission.

In the complex emergency occurring in Central Asia, IDU in Afghanistan and surrounding countries are at particular risk of acquiring HIV [39,40,56]. Existing needle exchange programs should be expanded to address the shortages of sterile equipment and increased drug use predicted for India, Pakistan, Bangladesh, China, Iran, Tajikistan, Uzbekistan, Turkmenistan and other countries in the region. Alongside HIV and drug awareness programmes, new needle exchange programs are required wherever significant IDU begins to occur. Decision makers and program planners should be informed that providing sterile needles and syringes has not been shown to increase drug use or provoke initiation of drug injecting [89–92]. Shifting patterns of drug use in response to supply-side interventions during complex emergencies should be monitored, and prevention programming modifications anticipated, both in immediate regions and industrialized countries. In bordering countries and around the world, opiate substitution programs using methadone, sublingual buprenorphine and other medications should be implemented and/or dramatically scaled up to meet fluctuating demand [93] stimulated by complex emergencies.

Conclusion

Complex emergencies create environmental and interpersonal conditions that are fertile for HIV transmission. The overall extent to which the relatively new HIV pandemic thrives on armed conflicts which displace civilian populations, cause food shortages and create the conditions for transactional sex has only begun to be elucidated in recent years. It is highly probable that wars around the world are increasing

HIV/STI incidence, resulting in major setbacks for the world-wide campaign to slow HIV transmission and provide care and treatment for those already infected. To address immediate risks, steps must be taken to institute the MISP recommended by the UN, rapidly increase the number of harm reduction programs, and rectify critical structural factors that increase the vulnerability of displaced persons and refugees, such as risky environments for sexual violence, lack of resources and systemic unemployment.

In industrialized countries, concerted efforts are required to ensure that HIV research efforts and development assistance to prevent HIV transmission, to support STI control programs and to mitigate the impact of the AIDS epidemic in the least developed countries receive high priority and increased funding. The more rapidly global peace and stability can be attained by the cessation of all hostilities, the less likely it is that ongoing conflicts will fuel HIV transmission with disastrous medium- and long-term consequences. Finally, the extension of the war on terrorism may be accompanied by new HIV/STI risks requiring urgent action to prevent further undermining of progress toward sustainable human development.

Acknowledgements

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