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Review

Violent conflict and opiate use in low and middle-income countries: A systematic review

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ABSTRACT

Background: Violent conflicts disproportionately affect populations in low and middle-income countries, and exposure to conflict is a known risk factor for mental disorders and substance use, including use of illicit opiates. Opiate use can be particularly problematic in resource-limited settings because few treatment options are available and dependence can impede economic development. In this systematic review, we explore the relationship between violent conflict and opiate use in conflict-affected populations in low and middle-income countries.

Methods: We searched MEDLINE, PsychINFO, SCOPUS, PILOTS, and select grey literature databases using a defined list of key terms related to conflict and opiate use, screened the results for relevant and methodologically rigorous studies, and conducted a forward search of the bibliographies of selected results to identify additional studies.

Results: We screened 707 articles, selecting 6 articles for inclusion: 4 quantitative studies and 2 qualitative studies that examined populations in 9 different countries. All study participants were adults (aged 15–65) living in or displaced from a conflict-affected country. Data sources included death records, hospital records, and interviews with refugees, internally displaced persons, and others affected by conflict. Overall, we found a positive, but ambiguous, association between violent conflict and opiate use, with five of six studies suggesting that opiate use increases with violent conflict. Five key factors mediate the conceptual relationship between opiate use and violent conflict: (1) pre-conflict opiate presence, (2) mental disorders, (3) lack of economic opportunity, (4) changes in social norms or structure, and (5) changes in drug availability.

Conclusions: The strength and direction of the association between opiate use and violent conflict and the proposed mediating factors may differ between contexts, necessitating country and population-specific research and interventions. Prevalence of opiate use prior to the start of conflict was common to all populations in which conflict induced a change in opiate use, suggesting that interventions to reduce opiate use and future research should focus on such populations. Population-based, longitudinal studies that use systematic measures of exposure to conflict and opiate use are needed to further explore this association and its mediating factors.

Introduction

The vast majority of wars in the past twenty years have taken place in low- and middle-income countries (LMICs) (Department of Peace and Conflict Research, 2011; World Bank, 2013a,b). There are 6.2 war-related deaths among populations in LMICs for every one war-related death in a high-income country population (World Health Organization, 2002). While inter- and intrastate conflicts exert a direct toll on LMICs, causing premature mortality, morbidity, and infrastructure destruction (Basu, 2004; World Health Organization, 2002), conflicts also have immeasurable indirect costs, reducing productivity and causing poor health outcomes, including higher infant mortality, increased communicable disease transmission, and a rise in the prevalence of mental disorders (World Health Organization, 2002).

Exposure to conflict may also lead to an increase in population-level prevalence of drug use. Experiencing conflict is a risk factor for alcohol and cannabis use in LMICs (Okulate & Jones, 2006; Weaver & Roberts, 2010). Systematic reviews of studies conducted in LMICs have shown that international and interstate conflict and displacement are associated with poor mental health outcomes (Roberts & Browne, 2010; Steel et al., 2009), and mental disorders are risk factors for substance use (Fazel, Bains, & Doll, 2006; Fazel, Khosla, Doll, & Geddes, 2008; Torrens, Fonseca, Mateu, & Farré, 2005). These results suggest that conflict may, via mental health, increase opiate

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use. The case study of Afghanistan suggests a dangerous association between violent conflict and opiate use. Between 2005 and 2009, a period of intense conflict, the number of regular opium users in Afghanistan jumped from 150,000 to 230,000, and the UN Office on Drugs and Crime (UNODC) reported that 37% of Afghan drug users started using opiates while refugees in Iran or Pakistan (United Nations Office on Drugs and Crime, 2009a). This massive increase in opiate use in Afghanistan raises questions about the role that conflict and its associated factors play in changing drug use behavior (Griffin & Khoshnood, 2010; Todd et al., 2012).

Worldwide, up to 21.9 million people use illicit opiates, and the prevalence of opiate use in low and middle-income countries is rapidly increasing (United Nations Office on Drugs and Crime, 2008). Opiate use may be particularly problematic in low-resource settings because treatment for opiate dependence is largely unavailable (Maguet & Majeed, 2010; United Nations Office on Drugs and Crime, 2008); opiate use impedes economic development because it is associated with increased drug trafficking, drug-related violence, mental disorders, high healthcare costs, and the spread of infectious disease (through needle-sharing and risky sexual behavior) (Hankins, Friedman, Zafar, & Strathdee, 2002); and supply of opiates is more readily available since the majority of the world's opiates are grown in LMICs (United Nations Office on Drugs and Crime, 2008).

Despite the concentration of violent conflicts in LMICs and the evidence suggesting that exposure to conflict can lead to increases in substance use, we are aware of no systematic reviews that have examined associations between violent conflict and opiate use and in LMICs. Accordingly, we sought to explore associations between conflict and substance use by conducting a systematic review of research on conflict and opiate use in LMICs that are affected by an intra- or interstate conflict. Much of this research has been conducted in a single country or region, and a systematic review allows the aggregation of those findings and exploration of trends across countries (Moher, Liberati, Tetzlaff, & Altman, 2009). A better understanding of the association between opiate use and violent conflict can inform decisions about how future research or interventions should approach substance use in conflict-affected populations.

Methods

The review of the existing literature was based on the preferred reporting items for systematic review and meta-analyses (PRISMA) guidelines (Moher et al., 2009).

Search strategy for identification of studies

Searches were conducted of the bibliographic databases MEDLINE (1948–November 2012), PsychINFO (1967–November 2012), SCOPUS (1966–November 2012), and PILOTS (1871–November 2012) for articles containing one or more conflict-related terms ("refugee," "internally displaced," "displaced persons," "conflict affected," "post conflict," or "war") and one or more opiate-related terms ("opiate," "opioid," or "heroin"). Search terms were based on those used in the systematic reviews by Roberts and Browne (Roberts & Browne, 2010) (conflict), Fatséas et al. (Fatséas, Denis, Lavie, & Auriacombe, 2010), and Simoens et al. (Simoens, Matheson, Bond, Inkster, & Ludbrook, 2005) (opiate dependence). Searches were conducted as a combination of text and controlled vocabulary words, translated into syntax appropriate for each database. Using combinations of conflict and opiate-related terms, researchers searched the non-academic literature of select governmental and non-governmental organizations[1] using web-based search engines. Following the database search and initial screening of the search results, two researchers conducted a forward search, a manual search of the bibliographies of the results of the title and abstract screen to identify studies that, based on their titles, fit the review criteria and had not been identified through the database search. Those studies were then included in the full text screen.

Types of studies

Selected studies had opiate use as an outcome variable or characteristic of the participants. If there was data on the use of more than one drug, the study had to specify that a majority of patients used opiates or differentiate opiate use data from data on other drugs. Studies were excluded if they focused only on drug policies, treatment programs, or the history of drug use, or contained no original data. Studies with qualitative or quantitative data and in English or French were included.

Types of participants

Studies were included if their participants were between the ages of fifteen and sixty-five and were living in or recently displaced from a conflict-affected LMIC. If the subjects had been displaced, they had to be living in another LMIC when the study was conducted because the stresses and challenges facing displaced people in high-income countries, such as asylum seeking, and the resources potentially available to them differ from those in LMICs. A country's economic status was determined using the World Bank Gross National Income (GNI) data (World Bank, 2013b) and country classifications (World Bank, 2013a), which specify that LMICs have a GNI per capita of less than $12,275. Although studies were not included unless they mentioned conflict, the researchers also cross-checked using the Uppsala Conflict Database, a listing of all global conflicts since the 1970s, to ensure that the country was conflict-affected before or during the study period (Department of Peace and Conflict Research, 2011; Uppsala Conflict Data Program, 2011).

Results

The database search yielded 690 articles, and 470 articles remained after the researchers removed duplicates (complete selection process displayed in Fig. 1). Two researchers separately screened the titles and abstracts of all results and reconciled differences through discussion, jointly selecting 36 articles. The most common reasons that studies were excluded during the title and abstract screen were that they focused on the "War on Drugs," histories of drug use, drug production or trade, or use of non-opiates; or were conducted in high-income countries or countries that were not conflict-affected. In the forward search, the researchers identified 17 articles that could potentially meet the search criteria. The researchers screened the abstracts of those articles and identified eight articles that appeared relevant. The forward search results were combined with the results of the original screen, and the researchers reviewed their full text and reconciled study selections through discussion. One study was excluded because the full text was not available (Abu Qamar, Thabet, & Vostanis, 2007) and the others were excluded because they did not mention conflict, did

[1] Grey literature databases searched: World Bank e-library, World Health Organization e-library, UN Bibliographic Information System, Médecins Sans Frontiers Field Research, International Organization for Migration, and the International Committee for the Red Cross.

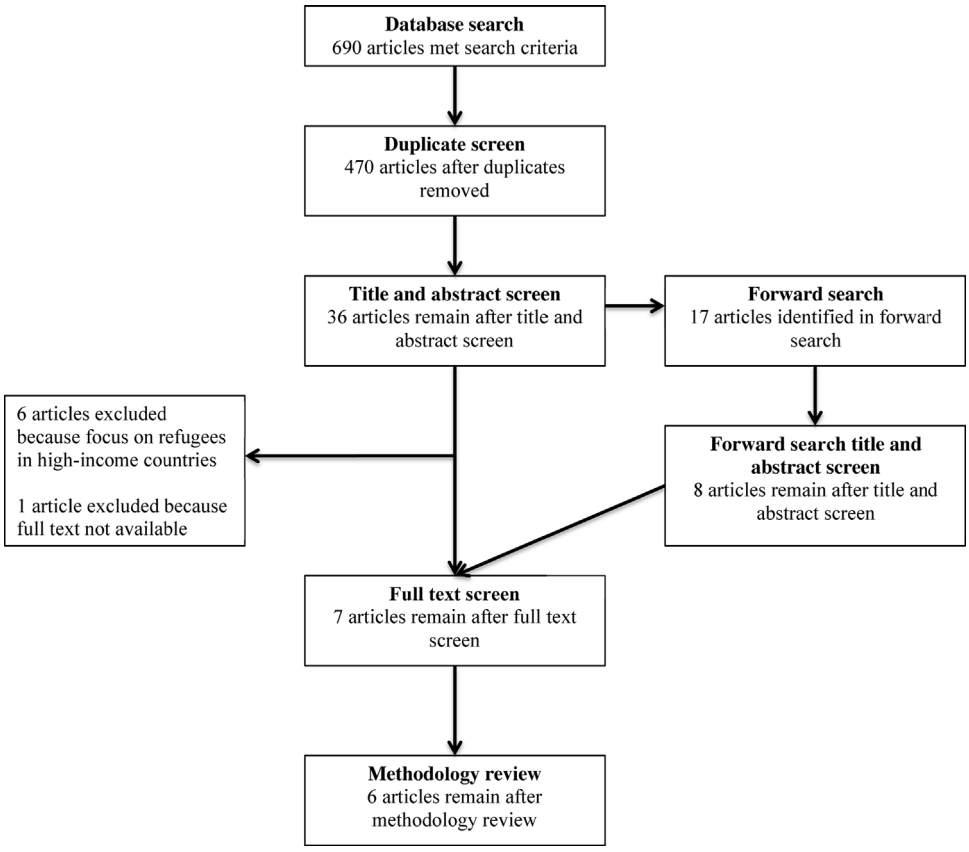

Fig. 1. Study selection flowchart.

not present original data, examined only soldiers from high-income countries, did not include opiate use or differentiate it from use of other drugs, focused only on drug treatment, or included only adolescents.

Seven articles remained after the full text screen. Researchers separately appraised study methodology then assigned an overall quality rating to each study through an iterative process (Table 1). As detailed in Table 1, studies had some sources of bias, but still deemed useful to this review. One study was excluded due to very low overall quality. The search of the grey literature did not yield any results that were both relevant and sufficiently methodologically rigorous for inclusion in the systematic review. Final studies selected for inclusion in the analysis are displayed in Table 2.

Location

Studies took place in Lebanon (Baddoura, 1992; Yabroudi, Karam, & Aea, 2000), Iran (Dalvand, Agahi, & Spencer, 1984; Ezard et al., 2011), Pakistan (Ezard et al., 2011), Croatia (Marasovic Susnjara, Definis Gojanovic, Vodopija, Capkun, & Smoljanovic, 2011), and Laos (Westermeyer, 1978). The Ezard et al. study (Ezard et al., 2011) also reported on data from Kenya, Liberia, Uganda, and Thailand, but did not include meaningful discussion of opiate use in those countries. Consequently, we focused our analysis of the Ezard et al. article on the sections on Iran and Pakistan. The opiate prevalence, when available, and years of conflict in the countries where the selected studies took place are displayed in Fig. 2.

Association between violent conflict and opiate use

All but one of the studies in the systematic review that included a comparison between opiate use before and after the start of conflict showed that opiate use increased with conflict (Baddoura, 1992; Dalvand et al., 1984; Ezard et al., 2011; Marasovic Susnjara et al., 2011).

The number of drug users (80.5% heroin users) admitted to the psychiatric unit of a hospital in Beirut increased from 57 before the Lebanese Civil War to a peak of 235 during conflict, many of whom were being admitted to drug treatment for the first time (Baddoura, 1992). Similarly, there was a nearly five-fold increase in the number of drug-induced deaths (61% heroin users) per year in one county during the Croatian War of Independence, a jump that the authors attribute to an increase in drug use (Marasovic Susnjara et al., 2011). In qualitative interviews, Afghans displaced to Iran and Pakistan by various conflicts in Afghanistan noted that opiate use had increased in their population. Conversely, Westermeyer (Westermeyer, 1978) found that opiate use decreased during the Laotian Civil War because of reduced supply.

Mediating factors

The studies identify factors that may mediate the association between violent conflict and opiate use, explaining or facilitating conflict's effect on opiate use in the context of individual countries and conflicts. Because of the variation in the type of data in the selected studies, the mediating factors presented in this analysis are all those proposed in the studies, not only those that have been shown to have a statistically significant mediating role.

Pre-conflict opiate presence

Conflict was not associated with population-level initiation of opiate use in any of the studies reviewed. The populations that used opiates during or after conflict had notable opiate use prevalence prior to the start of conflict (Baddoura, 1992; Dalvand et al., 1984;

Table 1
Study appraisal.

Study	Internal validity or credibility	Generalizability or transferability	Reliability or dependability	Objectivity or confirmability	Quality rating (high/low)	Comments on potential sources of bias
Aqrawi et al. (2009)	–	–	–	–	Low	Exclude. Study is not systematic evidence, but rather a compilation of personal observations, historical data, media reports, and other grey literature.
Baddoura (1992)	X	–	X	X	High	Study has limited generalizability because it is institution-based. Author acknowledges possible selection bias.
Dalvand et al. (1984)	–	X	–	–	Low	Authors use structured interviews, but fail to discuss how data was analyzed. Authors present original data from after the Iranian revolution and make comparisons between pre- and post-revolution use based on data from other studies; possible inconsistencies in data collection could invalidate comparison.
Ezard et al. (2011)	X	X	X	X	High	This is a qualitative study. As a rapid assessment without audio-recording of interviews, the study lacks some depth, but all methods are clearly stated and generally align with standards for qualitative research.
Marasovic Susnjara et al. (2011)	X	X	–	X	High	Study fails to note limitations and draws data from different death registries, which may have different standards for opiate use or opiate-induced death. Misclassification bias is likely.
Westermeyer (1978)	–	–	–	–	Low	This is a qualitative study. The author offers very little detail on methods of data collection and analysis. Researcher bias is probable.
Yabroudi et al. (2000)	X	–	X	–	Low	The authors provide little breakdown of or specificity on the time period of data collection. Study has limited generalizability because it is institution-based. There is no original data on peacetime conditions.

Note: The method of study appraisal used was adapted from the *Cochrane handbook for systematic reviews of intervention studies* and the supplementary guidance for inclusion of qualitative research in "Cochrane systematic reviews of intervention" (Noyes & Lewin, 2011; Higgins, Green, & Collaboration, 2008).
The symbol 'X' indicates that the above category is acceptable, and the symbol '–' indicates that the above category is lacking.

Ezard et al., 2011; Westermeyer, 1978). Only Ezard et al. (Ezard et al., 2011) compares countries with no history of opiate consumption to those with a history of opiate consumption. Among Afghan refugees in Iran and Pakistan, some of whom used opiates before being displaced, opiate use increased during displacement. In Pakistan, drug use habits of Afghan refugees "were characterized as a continuation or exaggeration of pre-displacement patterns." Conversely, refugees, primarily from civil conflicts in Sudan and Somalia, living in Kenya and internally displaced persons in Uganda did not mention using opiates before or during displacement.

Mental health

The studies in which mental health is examined suggest a mutually reinforcing relationship between mental disorders and opiate use and propose that conflict and related factors may increase prevalence of mental disorders. The majority of this analysis is either descriptive or qualitative, with minimal bivariate analysis and no multivariate analyses.

Based on qualitative analysis, Ezard et al. (Ezard et al., 2011) suggest that a variety of risk factors for mental disorders – including loss, distress, pain and suffering – may cause increases in opiate use among Afghan refugees in Pakistan. Dalvand et al. (Dalvand et al., 1984) find that prevalence of reported opiate use increased after the Iranian Revolution then posit that behaviors related to mental disorders could trigger opiate use (for instance, using opiates to deal with social problems or as a substitute for alcohol).

In the most focused examination of mental disorders and substance use among the reviewed studies, Yabroudi et al. (Yabroudi et al., 2000) investigate associations (using X^2 test) between drug use and diagnosed mental disorders among co-morbid patients in a psychiatric hospital during the Lebanese Civil War. Based on bivariate analysis, ever having used heroin was associated with a diagnosis of depression ($p = 0.012$) or schizophrenia ($p = 0.060$) in men and schizophrenia in women ($p = 0.048$). The authors speculate that conflict may affect the relationship between mental disorders and substance use behavior, highlighting other research (Karam, 2000; Weissman et al., 1992) conducted in Lebanon indicating that psychiatric disorders increased during the civil war. However, the associations between psychiatric diagnosis and drug of abuse during ongoing conflict in Lebanon were similar to those found in other countries during peacetime (Alexander, Craig, MacDonald, & Haugland, 1994; Greenbaum, Prange, Friedman, & Silver, 1991), suggesting that conflict may have no impact on the manifestation of co-morbidities.

Lack of economic opportunity

Afghan refugees in Iran cite boredom, lack of economic opportunity, and working in the drug trade out of economic necessity as reasons for drug use. Afghan refugees in Pakistan explained that

Table 2
Final studies included in analysis.

Author, year	Title	Country of population's origin	Country where study took place	Sample size	Study design	Relevant findings
Baddoura (1992)	Toxicomanie au Liban	Lebanon	Lebanon	$n = 990$	Retrospective cohort study	Number of drug-related admissions to psychiatric hospitals increased during a period of conflict and decreased following conflict.
Dalvand et al. (1984)	Drug addicts seeking treatment after the Iranian revolution: a clinic-based study	Iran	Iran	$n = 200$	Cross-sectional study	Opiate use patterns and motivations shifted during the Iranian Revolution.
Ezard et al. (2011)	Six rapid assessments of alcohol and other substance use in populations displaced by conflict	Sudan, Somalia, Liberia, Uganda, Afghanistan, Myanmar	Kenya, Liberia, Uganda, Iran, Pakistan, Thailand	$n = 178$ key informants, $n = 69$ focus groups	Multi-site qualitative study	Many complex factors change substance use behavior during displacement. Displaced populations in Iran and Pakistan increased their opiate use; opiate use in other displaced populations is not discussed in-depth.
Marasovic Susnjara et al. (2011)	Influence of war on quantitative and qualitative changes in drug-induced mortality in split-Dalmatia County, Croatia	Croatia	Croatia	$n = 146$	Retrospective cohort study	Drug-induced fatalities increased during a period of conflict.
Westermeyer (1978)	Social events and narcotic addiction: the influence of war and law on opium use in Laos	Laos	Laos	$n = 40$	Cross-sectional qualitative study	Opiate use decreases during conflict because of reduced supply.
Yabroudi et al. (2000)	Substance use and abuse: the Lebanese female and the Lebanon wars	Lebanon	Lebanon	$n = 222$	Retrospective cohort study	Mental disorders are associated with opiate use, and both opiate use and mental disorders may be affected by conflict.

people with limited skills, education, and employment were particularly likely to use drugs (Ezard et al., 2011). There was a significant difference in employment status among drug-related fatalities in the city of split by time period: 21.4% who died before the Croatian War of Independence were unemployed, 43.8% who died during the war were unemployed, and 50% of those who died after the war were unemployed ($p = 0.006$). The probability of a drug-related fatality was 90% higher among the unemployed than among the employed ($p = 0.102$) (Marasovic Susnjara et al., 2011). In a sample of drug users in a Lebanese psychiatric hospital, 83.5% were unemployed (Baddoura, 1992). As a result of the Laotian Civil War, displaced opium farmers in Laos had lower incomes, and opiates became more expensive, forcing drug users to decrease their use, enter treatment, switch from smoking to eating opium (which is less pleasurable, but requires less drug), and steal or deny their families of necessities to purchase drugs. These behaviors prompted many families to alienate their drug-using relative (Westermeyer, 1978).

Changes in social norms or structure

When asked about their reasons for starting drug use in a structured interview, 16% of drug users registered at a rehabilitation center in Shiraz, Iran noted that they were using drugs as a result of a social problem, and 57.5% began using drugs for "social or hedonic reasons." Referencing earlier studies of drug users in Iran, Dalvand et al. (Dalvand et al., 1984) conclude that prior to the 1979 Iranian Revolution, more drug users initiated and continued drug use for "problem or symptom-related reasons," rather than social or hedonic reasons. Ezard et al. (Ezard et al., 2011) explain that displacement causes changes in perspectives on acceptable behavior and exposure to new groups, situations, and norms, which influence drug use habits. In both Iran and Pakistan, Afghan refugees used opiates at a lower rate than the native population, but increased opiate use during displacement. In Iran, opiate use rose particularly among women and young people, which respondents attributed to changes in social norms. Baddoura (Baddoura, 1992) implicates social changes from the civil war, including displacement, economic crisis, more permissive social norms, family breakdown, and anxiety, for the increase in drug use in Lebanon

Changes in drug availability

Westermeyer (Westermeyer, 1978) details three factors that reduced availability of opium during the Laotian Civil War: displacement of opium farmers from their farmland, impeded drug transportation due to increased police and military presence on roadways, and the passage and implementation of a new anti-opium law. These changes combined to drastically increase the price of opiates in the country, making it far more difficult for many users to maintain their use. The anti-opium law passed in 1971 led to increased surveillance of drug trafficking countrywide.

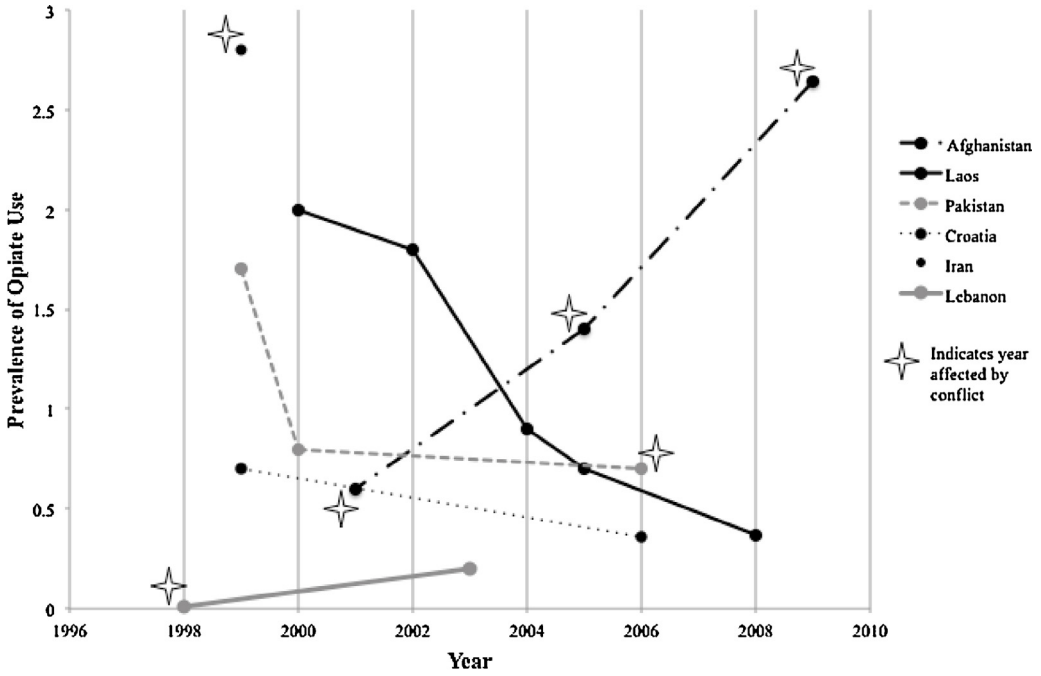

Fig. 2. Prevalence of opiate use and years of conflict in countries included in the review.
These UNODC opiate use prevalence data must be interpreted critically because most were self-reported by national governments, and data collection methods may have varied. The data suggest that there was notable opiate use in the majority of the countries included in this review: all countries except Lebanon had a population-level prevalence of opiate use above the global average (0.3%) during the period shown in the figure (United Nations Office on Drugs and Crime, 2008; Alexander et al., 1994; United Nations Office on Drugs and Crime, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2009b, 2010). The stars indicate the calendar years during which there were at least 25 battle-related deaths, the lower threshold for state-based armed conflict, according to the Uppsala Conflict Data Program (Department of Peace and Conflict Research, 2011). While this is a relatively low threshold for conflict, it allows for conflict-related unrest that may emerge even in instances where there are few fatalities. It is also important to note that the countries may have been affected by conflict prior to the time period displayed, and those instances of conflict may shape their opiate use in the period displayed.

Consequently, opium users switched from opium, which has odor and considerable volume, to heroin, an odorless and less bulky, but more expensive, form of opiate. Additionally, Ezard et al. (Ezard et al., 2011) note that opiates were "readily available" to Afghan refugees in Iran because Iran was a trade route for opium being transited out of Afghanistan, which contributed to the increased opiate use during displacement.

Fig. 3 displays a conceptual model of the mediating factors suggested in the reviewed studies. The factors in the central box are those that authors of the reviewed studies proposed as resulting from conflict and affecting opiate use and, as the arrows within the central box indicate, also affecting each other. The reviewed studies suggest that displacement alone does not change opiate use behavior. Rather, it facilitates other factors (many of those included in the central box), which are more direct mediators of changes in opiate use behavior. As the figure indicates, conflict drives displacement, which, in turn, affects the factors displayed in the central box. Pre-conflict prevalence of drug use is a factor that, independent of the conflict, precedes and precipitates changes in opiate use during times of conflict. This factor is not in the central box because it is not a result of the conflict. Finally, three of the studies suggest a mutually reinforcing relationship between opiate use and mental health

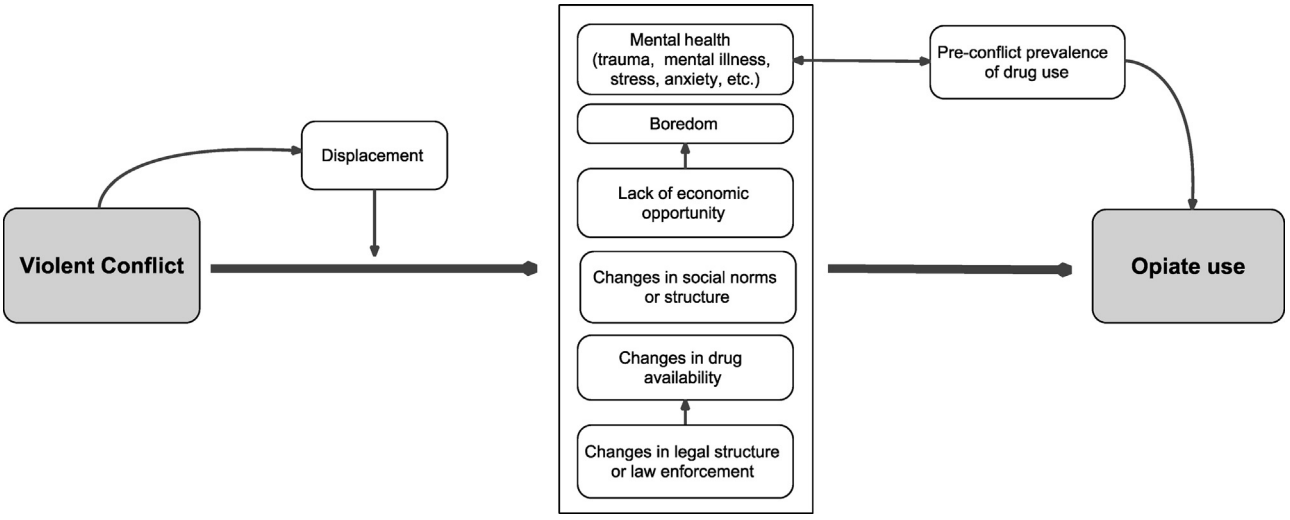

Fig. 3. Hypothesized mediating factors between violent conflict and opiate use.

concerns, before, during, and after conflict, prompting a double-headed arrow between mental health and pre-conflict opiate use.

Discussion and conclusions

This is the first systematic review on the relationship between opiate use and violent conflict in LMICs. The review has allowed us to hypothesize that mental health problems, lack of economic opportunity, changes in social norms, and variations in drug availability within an environment of pre-conflict opiate use and, at times, of displacement, mediate changes in opiate use during and following violent conflict (as demonstrated in the conceptual model: Fig. 3). The association between opiate use and violent conflict appears to be positive, but data are inconclusive. Reviewing the current research has also revealed knowledge gaps: population-based, longitudinal studies that use validated measures for opiate use and conflict are needed to examine the direction of the relationship between conflict and opiate use in LMICs, determine the factors that mediate that relationship, and test the model presented in this review.

The direction and strength of the association and the mediating factors may differ between contexts. While changes in economic opportunities, opiate availability, and the rule of law appear to have been associated with increased opiate use in studies in Lebanon, Iran, Pakistan, and Croatia, the same factors were associated with decreased opiate use in Laos. Even in settings where the direction of the association was the same, the mediating factors varied. Discrepancies between settings highlight that opiate use is context-specific, intertwined with culture, social norms, and socioeconomic circumstances. Additionally, the conceptual model presented in the review suggests that the factors that mediate opiate use are not independent of each other, but connected by complex and not fully understood mechanisms. It is important to note, however, that data collection was not uniform across the studies, and variation in mediating factors between settings could be a product of what the researchers chose to examine.

In the studies reviewed, there was a change in opiate use during or after conflict only when there had been notable prevalence of opiate use in the population prior to conflict. This finding suggests that opiate use must exist in a population prior to the start of conflict for conflict to change opiate use. This supposition requires further investigation because this review primarily captures cases in which opiate use existed before the start of conflict. Although these cases were not directly examined in the review, Ezard et al. (Ezard et al., 2011) describe substance use in populations that did not have significant pre-conflict opiate use (displaced people in Kenya, Liberia, Uganda) and do not remark on opiate use following displacement. Additionally, however, Ezard et al. interview refugees from Myanmar living in Thailand and note that alcohol was the most common substance used, only very briefly mentioning that the refugees also used opiates and not elaborating on that observation. Unlike Kenya, Liberia, and Uganda, Myanmar had considerable prevalence of opiate use (above the global average of 0.3%) prior to the study period. Thailand, the country to which the Myanmar refugees were displaced, had a much lower prevalence (0.1% prevalence, which is below the global average) during the same period. Opiate use in Myanmar refugees in Thailand is not well understood and more research is needed to determine whether that case fits with the patterns observed in the other studies in this review. Overall, this systematic review suggests future research or interventions to reduce opiate use in conflict-affected populations may be able to target areas of greatest need if they focus on countries that had considerable prevalence of opiate use prior to conflict.

While the findings of the systematic review tentatively indicate a positive association between violent conflict and opiate use, the UNODC opiate use prevalence data displayed in Fig. 2 are more ambiguous, with only two countries showing an increase in the prevalence of opiate use during or directly after conflict (Afghanistan, Lebanon). Others had decreasing or constant opiate use prevalence during conflict-affected periods. These prevalence data, however, are primarily intended as background information and cannot be used to draw conclusions about trends in the relationship between conflict and opiate use. A small number of countries are included in the figure, only those discussed in the reviewed studies; there are very few data points, making it difficult to assess change over time; and data collection methodology varied between countries. It is notable, however, that all of the countries studied, except Lebanon, had opiate use prevalence above the global average (0.3%) during and after conflict-affected periods (United Nations Office on Drugs and Crime, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009b, 2010).

This systematic review has allowed us to develop a hypothesis about factors that may mediate the association between opiate use and violent conflict and the direction of the association, but that hypothesis needs to be tested using more rigorous study designs, such as population-based, longitudinal studies that examine opiate use before, after, and during conflict using valid, culturally appropriate measures for both exposure to conflict and opiate use. None of the studies used systematic measures of exposure to conflict, and measures of opiate use varied widely between studies, suggesting a paucity of research tools. Many opiate use scales (Raistrick et al., 1994) have not been translated or validated in a LMIC context. These tools may need to be adjusted to incorporate local forms of opioid product, manifestations of stigma, or attitudes toward drug use. Additionally, none of the studies reviewed use a measure for individual-level exposure to conflict, and few such measures exist. Studies that have attempted to measure individual-level conflict exposure rely on indicators including location, military service, displacement, or self-report of loss or traumatic events (Knapik, Marin, Grier, & Jones, 2009; Roberts & Browne, 2010). Measures that capture individual exposure to trauma or loss (Dubow et al., 2009; Steel, Silove, Bird, McGorry, & Mohan, 1999) may be particularly useful for exploring causal links between conflict and mental disorders or other social changes (Schiff et al., 2012). However, our findings suggest that the ways in which conflict directly impacts individuals extend beyond trauma or exposure to battle and include changes in employment, social norms, and rule of law. Particularly for research in LMICs, where individuals' economic and political situations may be precarious, development of conflict measures that incorporate factors beyond trauma or exposure to battle is critical.

The findings of this review must be interpreted in light of a number of limitations. First, ways of assessing opiate use and the timing of opiate use measurements relative to the time of conflict varied widely between studies, making it difficult to compare results between studies or to conclude that changes in opiate use were due to conflict, rather than other factors. Second, a number of the studies may be subject to selection bias because they include only individuals who sought treatment, which may not give a complete profile of opiate users in the country or region and may miss women and people of lower socioeconomic status. Women are underrepresented in this systematic review, but it is not clear whether that is due to lower opiate use among women, under-reporting of opiate use among women, or lack of researcher attention to women. Finally, this study may be subject to publication bias, as there may be further academic studies or reports from state or non-governmental organizations on this topic that went unpublished due to lack of sufficient data or significant findings or that were unavailable via standard search engines. Publication or

other systematic forms of bias could result in an overall bias in the cumulative results presented here.

This systematic review may inform programs aimed at aiding conflict-affected populations or addressing problematic opiate use in LMICs. The findings serve as a reminder that drug use cannot be ignored when interventions to aid conflict-affected populations are being designed. Because so little is known and there is great variation between settings, more country-specific research is needed before interventions can be designed to specifically target this association. However, this review underscores the importance of investing in initiatives that provide mental health care and meaningful employment opportunities to conflict-affected populations because, on top of their direct benefits, these types of initiatives may also reduce opiate use.

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