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Effects of armed conflict on maternal and infant health: a mixed-methods study of Armenia and the 2020 Nagorno-Karabakh war

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ABSTRACT

Introduction Armed conflict worldwide and across history has harmed the health of populations directly and indirectly, including generations beyond those immediately exposed to violence. The 2020 war between Armenia and Azerbaijan over Nagorno-Karabakh, inhabited by an ethnically Armenian population, provides an example of how conflict harmed health during COVID-19. We hypothesised that crises exposure would correspond to decreased healthcare utilisation rates and worse health outcomes for the maternal and infant population in Armenia, compounded during the pandemic.

Methods Following a mixed-methods approach, we used ecological data from 1980 to 2020 to evaluate health trends in conflict, measured as battle-related deaths (BRDs), COVID-19 cases, and maternal and infant health indicators during periods of conflict and peace in Armenia. We also interviewed 10 key informants about unmet needs, maternal health-seeking behaviours and priorities during the war, collecting recommendations to mitigate the effects of future crisis on maternal and infant health. We followed a deductive coding approach to analyse transcripts and harvest themes.

Results BRDs totalled more in the 2020 war compared with the previous Nagorno-Karabakh conflicts. Periods of active conflict between 1988–2020 were associated with increased rates of sick newborn mortality, neonatal mortality and pre-eclampsia or eclampsia. Weekly average COVID-19 cases increased sevenfold during the 2020 Nagorno-Karabakh war. Key informants expressed concerns about the effects of stress and grief on maternal health and pregnancy outcomes and recommended investing in healthcare system reform. Participants also stressed the synergistic effects of the war and COVID-19, noting healthcare capacity concerns and the importance of a strong primary care system.

Conclusions Maternal and infant health measures showed adverse trends during the 2020 Nagorno-Karabakh war, potentially amplified by the concurrent COVID-19 pandemic. To mitigate effects of future crises on population health in Armenia, informants recommended investments in healthcare system reform focused on primary care and health promotion.

STRENGTHS AND LIMITATIONS OF THIS STUDY

⇒ Using a mixed-methods approach, this study provides a versatile framework that can be applied to the study of crisis-affected populations in various contexts.

⇒ The study examines the Armenian population, historically underrepresented in research, confronting disproportionate conflict rooted in both the Armenian Genocide and present-day geopolitical complexities within the Southern Caucasus region.

⇒ The study might not fully capture the long-term effects of the 2020 Nagorno-Karabakh war due to difficulties in accurately reporting data during crises and the ecological nature of the information.

⇒ The qualitative nature of the study offers perspectives from key informants that may not entirely represent the lived experiences of Armenian women and displaced mothers in need of healthcare.

INTRODUCTION

Armed conflict is a major contributor to the global burden of disease and has been a major cause of ill health and mortality throughout human history.[1] Population health and the capacity of the healthcare system to respond in times of crises became particularly important during the 44-day, 2020 Nagorno-Karabakh war between Armenia and Azerbaijan, which took place amid the COVID-19 pandemic, increasing the spread of COVID-19 in the region.[2 3] The unique case of war amid a global pandemic allows us an opportunity to examine the synergistic effects of crises on population health. The war in Nagorno-Karabakh (also known as Artsakh) is an active ethnic and territorial conflict dating back to the late 1980s with several eruptions of extreme violence over the past four decades (figure 1, online supplemental file 9), yet international communities and governing bodies have done little to intervene, and effects on population health have insufficiently been studied.[4] As a people who have experienced an abundance of trauma, from the 1915 Armenian Genocide to the decades-long conflict in Nagorno-Karabakh, Armenians are vulnerable to health effects of transgenerational trauma.[5–7]
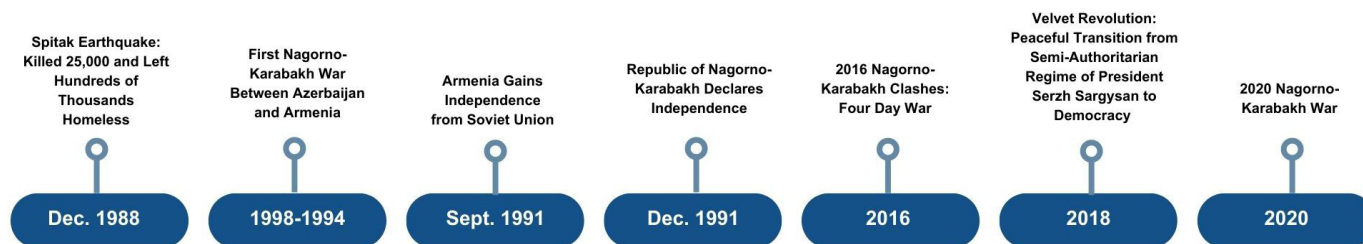
Figure 1 Conflict timeline in Armenia and Nagorno-Karabakh.

The destruction of health infrastructure and health information systems during times of war compromises a healthcare system's capacity to respond to direct and indirect health consequences of conflict, and further compromises its ability to adequately quantify the effect of such conflict on the health of the population.[8 9] Armed conflict causes complications to vulnerable populations, especially women and children whose health is heavily dependent on functioning health systems. Some negative effects of conflict on health outcomes and healthcare include: increases in birth defects, sexual violence, prenatal, maternal, infant and under-5 mortality, and decreases in skilled birth attendance, institutional deliveries, fertility rates, contraceptive use, coverage of antenatal care, preventative services and access to care.[10–16] Some researchers have stressed the importance of prioritising the distribution of resources in a manner that is guided by both evidence and equity, with the aim of effectively addressing the needs of populations affected by conflict.[17] Little research explains the mechanisms responsible for these effects, or how such crises have contributed to the accumulation of harm over time in regions with a disproportionate abundance of crises and historical trauma.

This study aims to describe the health and health-seeking behaviours of the maternal and infant population that coincided with periods of armed conflict in Armenia and Nagorno-Karabakh. The overall objectives are to: (1) conduct a mixed-methods study within the Armenian population to evaluate trends of maternal and infant health indicators during specific periods of crisis; (2) develop a theoretical framework based on stakeholder perspectives that inform on the needs of conflict-affected populations and (3) generate culturally appropriate policy recommendations to mitigate the effects of crises on population health in the context of the 2020 war.

This study provides qualitative and quantitative evidence on an understudied exposure in an underserved population. The results of this study can be used to prioritise resources and make crisis preparedness policy for conflict-affected populations. Additionally, using the period of conflict exposure during COVID-19 as a reference time point uniquely positions this study to elucidate the effects of crisis on the well-being of individuals during a global health pandemic. We hypothesise that exposure to crises will decrease healthcare utilisation rates and worsen health outcomes among the maternal and infant population in Armenia and Nagorno-Karabakh, with the effects being compounded during the pandemic period. This hypothesis is based on The Behavioural Model of Health Services Use developed by Andersen, which emphasises predisposing, enabling and need factors as determinants of healthcare utilisation. We hypothesise that the setting of war and crisis will likely affect the enabling factors (via availability of healthcare providers and facilities) and need factors (via changes in patient's perceived needs, priorities and definitions of urgency) ultimately decreasing healthcare utilisation.[18]

Studying the effects of armed conflict in populations is critical to driving a more diverse and equitable global health delivery system and creating culturally specific humanitarian aid efforts. This study will contribute to efforts by public health researchers globally to record the effects of armed conflict on public health as well as the American Public Health Association's efforts to recognise war as a significant threat to population health and incorporate public health practitioners as agents to end armed conflict and respond to human rights violations.[17 19]

METHODS
Quantitative methods
Data sources
The data analysed for this study are from three open-source data banks. Data regarding conflict measures were obtained from Uppsala University Department of Peace and Conflict Research (UCDP) website.[20] National indicators were obtained from the online *Statistical Yearbooks* published by the National Institute of Health (NIH) of Armenia.[21] COVID-19 data were obtained from the online reporting of national cases by the National Center for Disease Control of Armenia.[22] All conflicts that included Armenia and/or Nagorno-Karabakh as actors were included in the analysis.

Conflict exposure and maternal–child health outcome variables
To assess the degree of conflict, variables of interest from the UCDP website included: best estimate of battle-related deaths (BRDs) per year, conflict intensity per year and geographical distribution of BRDs per year (reported as the best estimate of BRDs per latitude and longitude pair). To describe trends in maternal and infant health indicators over time, we examined the following variables, reported as annual country-level measures: number of

infant deaths per 100 sick newborns (stratified by preterm and term gestational age status), neonatal (<28 days) mortality, low birth weight (<2500 g), preterm births (<37 weeks gestational age), number of births, births resulting in a caesarean delivery, mothers examined by a healthcare provider during pregnancy and cases of pre-eclampsia or eclampsia. To examine how COVID-19 spread during the war, we visualised the 7-day case averages over the weeks leading up to, overlapping with and immediately following the war.

Statistical methods

Our quantitative analysis focused on evaluating and visualising the trends over time across variables of interest with line, scatter and bar plots. We used R (R V.4.0.4 (15 February 2021)) for all analyses. To assess changes in the magnitude and distribution of conflict over the past 30 years, we plotted BRDs over time between 1990 and 2020 and observed changes in absolute BRDs as well as conflict intensity. Conflict intensity is categorised as either 'war' (involving 1000 or more BRDs) or 'minor conflict' (encompassing 25–999 BRDs) by UCDP. We also used latitude and longitude data to map BRDs of the 2020 war to further evaluate the geographical distribution conflict intensity and deaths using Google Maps API. To describe annual changes in our health-related variables of interest, we plotted trajectories and examined changes in these variables over time (including the years 1980–2020, varying based on data availability). We also included annotations of notable events (eg, the start and end of war) to visualise and compare their relative effects on health-related trends over time.

Qualitative methods

We conducted primary qualitative data collection through 10 in-depth key informant interviews, which included two categories of stakeholders: leaders from humanitarian aid non-governmental organisations (NGOs) and healthcare providers, all of whom served Armenian mothers during and following the war (including both displaced persons from Nagorno-Karabakh and locals in Armenia). The qualitative methods followed a descriptive phenomenological approach with purposive and snowball sampling methods shown to effectively engage stakeholders from vulnerable communities.[23] Due to the active conflict and immediate postconflict circumstances during interviews, key informants frequently operated in various locations, offering assistance. The nature of the active conflict and immediate postconflict circumstances prompted key informants to operate in a variety of locations. In deference to the sensitive context and timing of the interviews, we collected no identifiable information, including workplace details, from informants. Consequently, we can report only on their titles (eg, NGO leader or healthcare provider) to provide context for their roles and interactions with the affected population. A semistructured interview guide (online supplemental file 11) was developed, which focused on themes including but not limited to: maternal health-seeking behaviours and priorities, unmet needs of the maternal and child population, synergistic effects of COVID-19 and war, capacity of the healthcare system, and recommendations to mitigate the effects of future crises on maternal and infant health in Armenia and Nagorno-Karabakh. Questions for the qualitative interview guide were developed by the principal investigator (PI), based on the research team's subject matter knowledge and findings from existing literature. Interviews lasted between 30 min and an hour and were conducted by the PI (a native Armenian speaker) over Zoom in both English and Armenian. Interviews were audiorecorded, transcribed and translated to English as needed. We conducted thematic content analysis following a deductive coding approach to analyse the 10 transcripts using DeDoose Software (V.9.0.46.)

Patient and public involvement

This research project was designed and conducted without involvement of the general study population, primarily due to the sensitive nature of the topic and timing of research design efforts. The intention was to prevent any potential retraumatisation of the public by avoiding their direct interaction with study design processes.

RESULTS
Descriptive analysis results

In the last 30 years, a clear spike in BRDs occurred during 1992–1994, coinciding with the first Nagorno-Karabakh war and another upswing was observed in connection with the 2020 war (figure 2). Cumulative BRDs from 1992 to 1994 totalled 4845 deaths, and in 2020, estimated BRDs amounted to 7633. The geographical distribution of BRDs ranged along the border regions between Armenia and Azerbaijan and was most concentrated in Stepanakert, the capital of Nagorno-Karabakh (online supplemental files 1; 3). This was consistent with the historical (1989–2020) geographical distribution of BRDs between Armenia and Azerbaijan (Online supplemental file 2).

We plotted an increase in COVID-19 cases from the start of the pandemic in March to June 2020 (with an average 7-day case average of 23.4 cases in March and 598.25 in June). After increased enforcement of mask-wearing regulations and adherence to public health policy[22] in mid-June 2020, cases declined from July to September of 2020 (with an average 7-day case average of 236.6 over the span of these weeks). However, within the first 4 weeks of the 2020 war in late-September and October 2020, COVID-19 cases increased sevenfold (starting at a 7-day case average of 281 in late September) in Armenia, resulting in a weekly average of 2060 cases during the week of 25 October 2020–31 October 2020 (figure 3). A decrease in cases followed the Ceasefire Agreement signed on 10 November 2020 reaching a 7-day case average of 1270 cases.

Deaths of premature and mature sick newborns increased during the 1988–1994 conflict period and
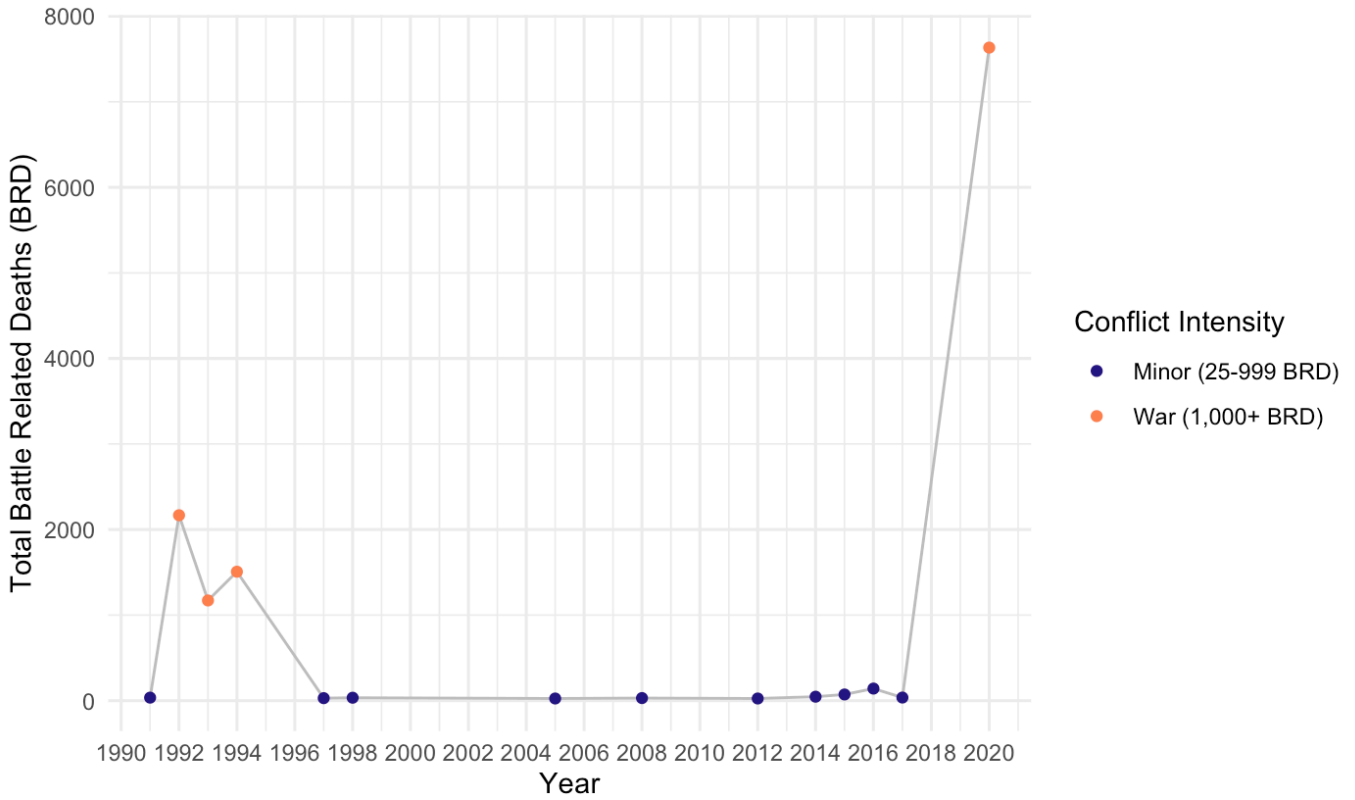
Figure 2 Battle-related deaths in Armenia and Nagorno-Karabakh (1990–2020). Source: Uppsala University Department of Peace and Conflict Research.
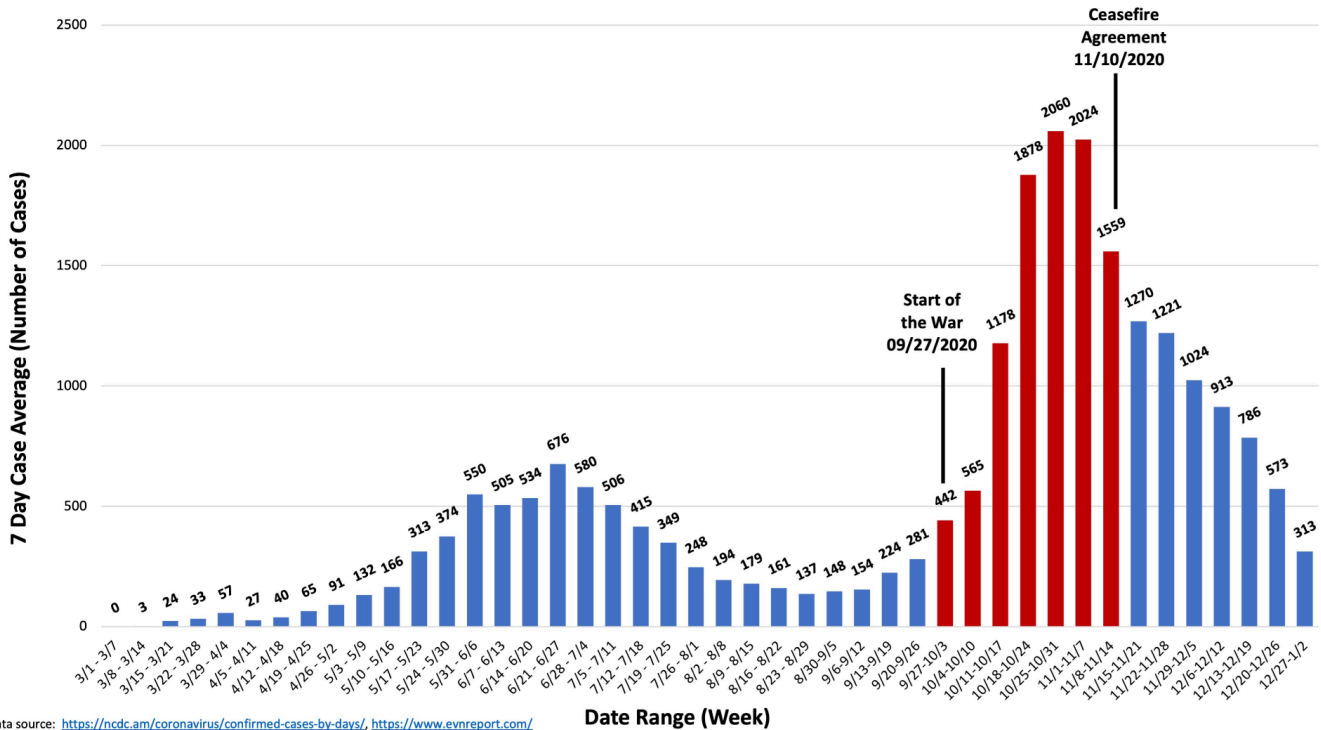
Figure 3 COVID-19 cases in Armenia during the 2020 Nagorno-Karabakh War. Source: National Center for Disease Control Armenia.
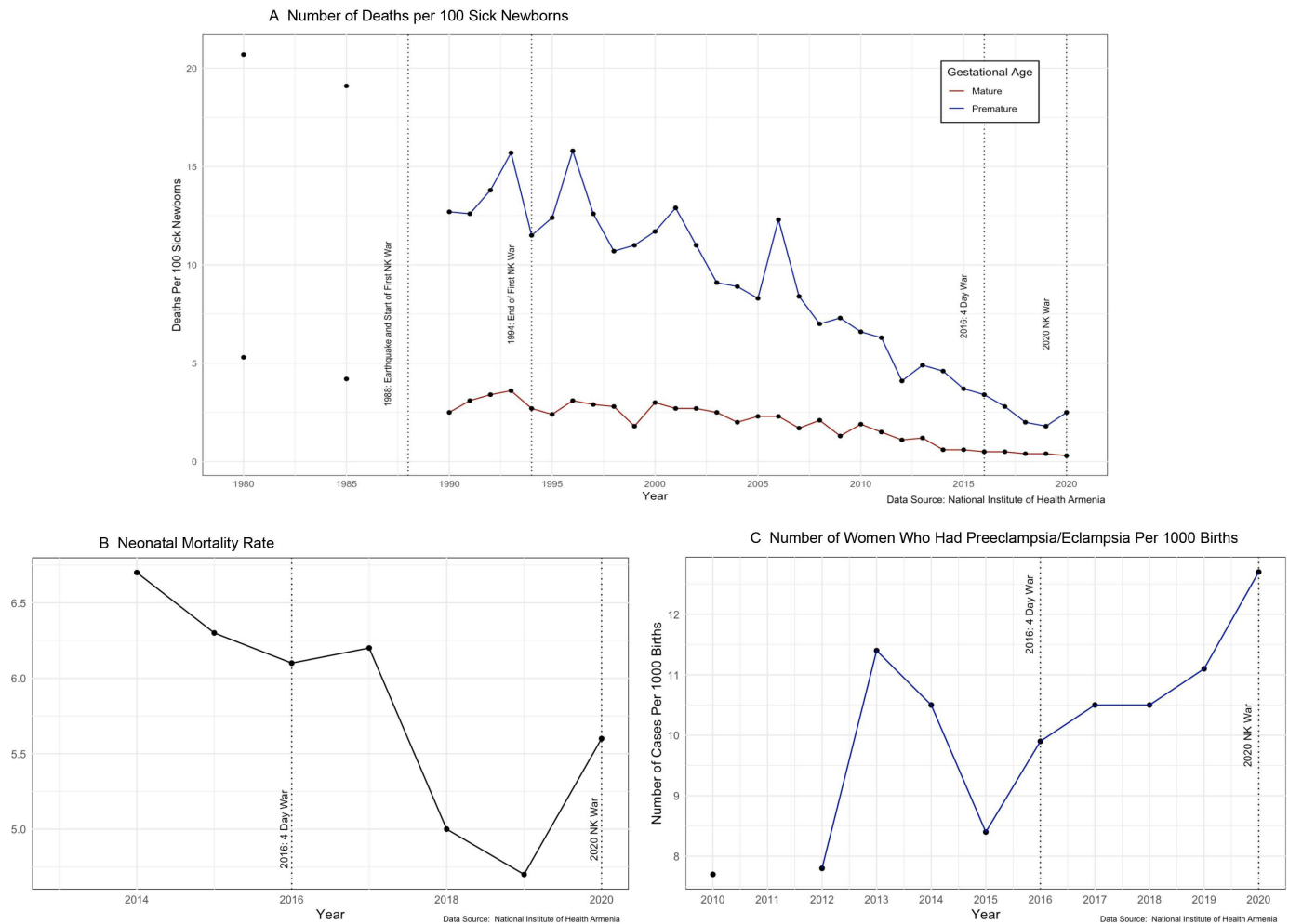
Figure 4 (A) Number of deaths per 100 sick newborns. (A) Source: National Institute of Health of Armenia. (B) Neonatal Mortality Rate. (B) Source: National Institute of Health of Armenia. (C): Number of women who had pre-eclampsia/eclampsia per 1000 Births. (C) Data source: National Institute of Health of Armenia.

premature infant deaths rose again with the 2020 conflict (figure 4A). Similarly, neonatal mortality increased from 4.7 in 2019 to 5.6 in 2020 (figure 4B). These figures represent newborn and neonatal mortality trends over time and are not related to COVID-19 data. In contrast, we see no ecological level changes in measures of low birth weight or preterm birth by conflict period (online supplemental file 4). Births noticeably declined during and after the first war (1988–1994) and began to increase around 2003 (online supplemental file 5). Insufficient data currently hinder a precise assessment of the effects of the 2020 war on a number of births. Overall, births resulting in a caesarean delivery increased exponentially over the past 30 years, remaining steady even in years with fewer births and reached 35.9% in 2020 (online supplemental file 6). The percentage of mothers examined by a healthcare provider during pregnancy shows no discernable pattern over time (online supplemental file 7) but was reported as 97.9% in 2020. The number of women with pre-eclampsia or eclampsia in post-labour and labour period per 1000 births increased steadily from the 2016 four-day war (9.9 cases per 1000 births in 2016) and reached its highest peak within the last decade in 2020 at 12.7 women per

1000 births, resulting in 439 cases in 2020 compared with 387 cases in 2019 (figure 4C).

Qualitative interview results

We interviewed six NGO leaders and volunteers, all of whom are associated with four NGOs and four healthcare professionals from four healthcare institutions. All key informants worked either directly with Armenian women displaced from Nagorno-Karabakh to Armenia, or within the healthcare system that served them. The main themes arising from the 10 key informant interviews are summarised in table 1 and online supplemental file 8 and are further described below. Additional excerpts from key informant interviews can be found in online supplemental file 10.

Key informants' main concerns

The top three concerns interviewees identified regarding the health of the population during the 2020 war were: (1) the consequences of the stress and grief experienced by new or expecting mothers on their mental health, physical health and pregnancy (2) unmet pregnancy related and newborn needs (eg, baby bottles, infant

Table 1 Key informant recommendations

Mental health	▶ Increase access to mental health resources and trauma informed assessments
Organisation of efforts	▶ Better support NGOs and humanitarian aid organisations ▶ Organise and streamline the efforts of various groups and the masses
Crisis preparedness	▶ Create national policy to inform and prepare the public on what to do in cases of national crisis ▶ Basic first aid and crisis training for population
Health system reform	▶ Develop a strong primary care system ▶ Develop a resilient surge capacity in the healthcare system ▶ Better support healthcare providers in times of crisis ▶ Improve quality of care ▶ Incorporate patient centred care and patient communication lessons in medical education ▶ Promote using electronic medical records and data collection infrastructure
Resource allocation	▶ Strengthen the border villages near the Lachin corridor by improving educational, job and living opportunities ▶ Create culturally sensitive and sustainable aid
Diasporan involvement	▶ Better organise and take advantage of the diaspora ▶ Promote diasporan settlement and investment in border villages near Lachin corridor ▶ Involve diaspora in institution building and long-term capacity building resources

NGOs, non-governmental organisations.

feeding formula and diapers) and (3) and humanitarian aid needs (eg, as access to food, housing and clothing).

> We did see a lot of miscarriages and it was very difficult because a lot of the time, if their husbands did pass, then (their unborn child) was what they were holding out hope for because they lost their home, their husbands, maybe their family, and now they lost their child. And then they still have eight other kids to take care of.—NGO Leader

Hesitancy and barriers regarding healthcare service utilisation

Key informants discussed both strengths and weaknesses of the government established healthcare programme, which connected arriving displaced persons to an outpatient clinic (referred to as a polyclinic) near their shelter or housing unit (housing which was also provided in part from the government). Some participants praised the government programme which provided free healthcare to displaced persons by the polyclinics, noting little to no barriers to accessing care. However, others noted that not all types of care were provided free of charge, most noting that in the case of pregnancy, only the delivery and first ultrasound were free of charge, while medications, blood work and additional ultrasounds were not. Additionally, some informants noted that there were many cases of misinformation regarding opportunities available to displaced persons, and hesitation to use these resources. Hesitation was noted to be fuelled by historic distrust in the healthcare system, patriotic perceptions of prioritising soldiers over the general population and uncertainty regarding the safety and conditions of the hospitals.

> I think undoubtedly there was this perception that the priority to health and healthcare delivery should be given to those injured in the war and that consciously or subconsciously resulted in different health seeking behavior.—Healthcare Provider

Deprioritisation of mother's own health due to stress and demands

Key informants repeatedly stated mothers did not prioritise their own health. Instead mothers were prioritising (1) the health and safety of their unborn infant and/or current children and (2) securing humanitarian aid and living in 'survival mode'.

> They had lost their homes, families, and so their health was not a priority for them. We were able to provide gynecological examinations and treatments for women free of charge, and that was very successful because if we had just let those women be, they would never have sought care because that's not what was on their mind, they were in a basic survival mode trying to secure their most basic needs.—NGO Leader

Need for crisis preparedness and mental health resources

Key informants commonly cited two unmet needs (1) crisis preparedness and response policies in Armenia and Nagorno-Karabakh and (2) mental health resources. Many volunteers who worked within NGOs also noted an unmet need for assistance and support among extreme cases, such as families with eight or nine children and large families who were unable to secure safe housing.

> In times of crisis you need to do specific things, we do not have that kind of guide and so Armenia tried to respond quickly and turn for example schools into shelters and that was a good response, but the people inside had no idea how to run these shelters. There was no official leadership within so one of our main

goals was to work with the government to set up this governance and crisis leadership plan.—NGO Leader

Additionally, several key informants mentioned disparities between the situation in the capital city of Yerevan and surrounding rural regions, especially the border regions such as the village of Kornidzor and others in the southern most region of Syunik. Main concerns included access to quality care, safe transportation and resource scarcity in these regions.

> The families of the Syunik village were welcoming the displaced persons with warm hearts and open arms, but after one week, two weeks, three weeks of having seven, eight, nine people in your place, those Tatiks and Papiks [elderly men and women of the village] at some point they didn't have eggs anymore, they didn't have enough food even to feed themselves. You know? They didn't have the means and the resources to sustain all those people. How can you double the population of a village in one week? Of course the village gets exhausted and doesn't have the resources to sustain this.—NGO Leader

COVID-19 pandemic strained health system capacity

Key informants identified several compounded effects of the war and COVID-19 pandemic in Armenia. Many healthcare providers noted that prior to the start of the war, the healthcare system had remained relatively resilient and flexible in the face of the pandemic. However, after the start of the war, all key informants noted major concerns regarding healthcare capacity and disruptions to healthcare delivery. NGO leaders noted the difficulties and complications of providing humanitarian aid to displaced persons during the pandemic. Many healthcare providers and NGO leaders alike also noted a diminished concern for COVID-19 on behalf of the population during the war.

> At that point it was a very stressful situation. No one was thinking about seeking care they were only thinking about getting COVID patients and soldiers into hospitals, it was a crisis situation—even maternity wards were turned into COVID wards and beds for wounded soldiers. […] There was no room in hospitals or clinics, and doctors were overwhelmed with patients. So this turned into a barrier.—NGO Leader

Recommendations from key informants

The overwhelming majority of recommendations offered to mitigate the effects of future crises on the health of mothers and infants in Armenia centred around healthcare system reform. Recommendations included the development of a strong primary care system and resilient surge capacity, better support for healthcare providers, improvements in quality of care, use of electronic medical records and incorporation of patient-centred care and communication practices in medical education. Many key informants emphasised the need for increased

government responsibility, including the development of crisis preparedness policies and protocols as well as better support and coordination for NGOs and aid groups in times of crisis. Other recommendations included ensuring accessible mental health resources for the population, promoting culturally sensitive and sustainable aid opportunities, better organising and leveraging the Armenian diaspora, and investing in and strengthening the border regions near the Lachin Corridor. Key informant recommendations are summarised in table 1.

> Number one recommendation is to develop a strong primary care system. Our system is skewed too heavily towards treating the sick and not at all, or very minimal at keeping patients healthy. I think the biggest determinant of being resilient through crisis like this is minimizing healthcare needs by keeping patients healthy. The strongest way of doing that is to focus on primary care.—Healthcare Provider

> We need to become better doctors, not just our medical skills, but improve in our patient communication … we all live in the same environment, the doctors are experiencing the same trauma and stress as the pregnant women during the war, we need to be supported too and learn how to support them.—Healthcare Provider

> What the diaspora doesn't do enough of is institution building… helping Armenia develop strategies, for example, on emergency response or pandemic response or surge capacity.—Healthcare Provider

DISCUSSION

This was the first study to examine the effects of the decade-long Nagorno-Karabakh conflict on maternal and infant health. The use of ecological data allowed for the evaluation of trends throughout relative peace and conflict periods in Armenia leading up to and focusing on the 2020 war, amid the global COVID-19 pandemic. Studies conducted early in the pandemic revealed that armed conflicts contributed to the increased spread of the virus. These studies also assessed the potential for the COVID-19 pandemic to create conditions conducive to violence by altering the dynamics of various long-standing conflicts.[2]

This, coupled with the existing literature on the disproportionate negative effects of conflict on maternal and infant health, signifies the unique importance of evaluating changes in maternal and infant health in Armenia during the 2020 war.

We found the 2020 war had the highest BRD over the past 30 years between Armenia and Azerbaijan, with effects exacerbated by the COVID-19 pandemic. This finding is in line with Karlinsky and Torrisi's 2023 study, which concluded that the war led to 6500 excess deaths, primarily among young men aged 15–49, with 2800 of these fatalities occurring in Armenia. These findings imply enduring implications for future population, economic and social

dynamics.[24] The 2022 WHO Health Systems in Action Report on Armenia also reported that there was a peak in excess mortality that far exceeded the average of the WHO European Region between October and December 2020, attributable to the synergistic effects of war and pandemic.[25] The mechanisms that led to the synergistic negative effects seen are similar to those being observed in Ukraine during the current conflict.[26] COVID-19 cases began rising in Armenia and Ukraine, during the war as people sought refuge in densely populated areas, such as basements and bomb shelters, to hide from airstrikes.[26] Additionally, our key informant interviews highlighted that the chaos of war and imminent threat of ethnic cleansing have replaced COVID-19 as a concern for the people during the war, a phenomenon that has also been observed in Ukraine and has undermined vaccination programmes and adherence to public health measures such as masking.[26]

Our ecological analysis of infant health outcomes showed an increase in sick newborn deaths during the first war, an increase in sick premature infant deaths in 2020, and a large increase in neonatal mortality rate in 2020. These findings are in line with studies done in the Democratic Republic of Congo[27] and Syria,[11] and other systematic reviews[28] that demonstrate increases in infant and neonatal mortality during conflict periods. The birth rate was drastically lower following the first war. Seemingly unaffected by war, caesarean section rates in Armenia have been increasing exponentially for the past 20 years, a finding that has previously been attributed to higher reimbursement rates, maternal preference and lack of clear regulations.[29] Cases of pre-eclampsia or eclampsia increased since the 2016 four-day war and reached a peak within the last decade in 2020. Given the relationship[30] between stress and high blood pressure, and considering that high blood pressure is a leading cause of pre-eclampsia, the elevated levels of stress experienced by mothers during the 2020 war may have contributed to the increased number of pre-eclampsia or eclampsia cases in 2020.

This is in line with results from the key informant interviews, which identify the main concern to be the effects of stress and grief on the mental and physical health of mothers as well as on their pregnancy outcomes. It is, however, challenging to interpret pre-eclampsia or eclampsia as a variable given the overall incidence remains quite low in the population. Overall, our findings align with previous literature[10–16] that illustrates the adverse effects of conflict on maternal and infant health indicators and healthcare experiences.

Armenia's government must prioritise the promotion of primary healthcare and comprehensive benefit coverage to establish a sustainable healthcare system. By implementing necessary reforms, they can ensure a robust healthcare infrastructure that people will rely on, even in times of crisis. This commitment to accessible and reliable healthcare services is essential for the well-being of the nation's citizens and the resilience of the healthcare system itself.

In addition to healthcare reform and increased government responsibility, there is a clear unmet need for culturally sensitive mental health resources in Armenia. This is especially critical to address the transgenerational trauma experienced by genocide decedents, which puts Armenians at high risk for mental health illnesses.[7]

Our study offers unique perspectives on the decision-making processes of mothers during times of conflict and the factors influencing their health-seeking behaviours. The study is innovative in its mixed-methods and historical case study approach, which provides a framework to study other crisis-affected populations. It is also significant in its examination of the Armenian population, as this population is both underrepresented in literature, and has experienced a disproportionate amount of conflict stemming from the Armenian Genocide and the present-day geopolitical climate in the Southern Caucuses. Despite these strengths, due to the ecological nature of the data, the challenges with reporting accurate data during times of war, and the recency of the 2020 war, the descriptive analysis of maternal and child health indicators is limited in its ability to illustrate the long-term effects of the recent conflict and is unable to assess causal relationships. Additionally, the variable of maternal mortality was not included in the analysis due to inconsistencies and gaps regarding the reporting of this variable in the NIH Statistical Yearbook data. It is also important to note that the qualitative nature of the study offers perspectives from key informants that may not entirely represent the lived experience experiences of the Armenian women and displaced mothers in need of healthcare.

We conclude the decades-long Nagorno-Karabakh conflict has significantly harmed the health of the maternal and infant population in Armenia, resulting in a nearly 19% increase in neonatal mortality and 14% increase in pre-eclampsia or eclampsia cases in 2020 compared with 2019. The conflict between Armenia and Azerbaijan took a critical turn in September 2023, when Azerbaijan launched a large-scale attack on Nagorno-Karabakh. This resulted in the forceful displacement and ethnic cleansing of the Armenian population in Nagorno-Karabakh. Since 24 September, over 100 000 forcibly displaced individuals have sought refuge in Armenia.[31] The American Public Health Association's recent policy statement deemed the situation in Nagorno-Karabakh a public health emergency. It urged international action towards securing and protecting the rights of ethnic Armenians, ensuring humanitarian access and the right of expelled Armenians to return, monitoring human rights, providing aid and support, financing medical and psychosocial help, supporting reconstruction, and seeking accountability for human rights abuses and blockades in the region.[32]

This conflict, alongside numerous other geopolitical conflicts worldwide, poses a significant threat to the health and overall well-being of families residing in these conflict-affected regions. It is crucial to underscore the urgency of resolving conflicts as a paramount public health priority, involving upstream prevention strategies

that engage international organisations. While there is a clear recommendation for prioritising health system reform in these countries, there is also an undeniable need for action on the part of public health practitioners and international health agencies to support sustainable health systems that will strengthen capacity-building efforts in conflict-affected regions. These groups can use their power to advocate for populations who are otherwise forgotten when setting the global health agenda.

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Patient consent for publication Not applicable.

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