



FRAGMENTS

EXPLOSIVE WEAPONS MONITOR QUARTERLY

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Counting the Dead

Explosive weapons' devastating impact on civilians in Sudan

Niamh Gillen, Explosive Violence Researcher, Action on Armed Violence

Children and Blast Injuries

The devastating impact of explosive weapons on children

Narmina Strishenets, Senior Conflict & Humanitarian Policy and Advocacy Adviser, Save the Children

A NOTE FROM THE EXPLOSIVE WEAPONS MONITOR



The disproportionate impact of the use of explosive weapons in populated areas on civilians is well documented, and this pattern of harm continues in conflicts throughout the world today. This issue of *Fragments* shows how this use has helped make Sudan one of the deadliest conflicts for civilians and explores the ways in which explosive weapons have become the leading cause of child casualties in modern conflict.

In Sudan, parties to the conflict have used explosive weapons to strike markets, hospitals, and encampments, devastating infrastructure and killing thousands. Since many of the frontlines are found in cities, civilians are at high risk of being affected by attacks with explosive weapons. The urban nature of the conflict means that any one attack is likely to affect a significant number of civilians, and data shows high numbers of civilian casualties occurring in individual incidents of explosive weapons use. There has been growing international concern over these impacts in Sudan, with increased calls from agencies such as the United Nations Office for the Coordination of Humanitarian Affairs, who have repeatedly called for civilians to be protected.

In Gaza, Ukraine, Syria and elsewhere, explosive weapons have also become a defining threat to children's survival and well-being, with their use now being a leading cause of child casualties. In recent years, the severity of injuries among children has been unprecedented. Between 2020–2025, nearly 50,000 children were killed or injured, with over 60 percent of verified child deaths and injuries caused by explosive weapons. Disproportionate harm to children from the use of explosive weapons in conflict is driven by their developmental stage, dependence on adults, and need for specialised services, making them far less able to withstand the effects of war. While these vulnerabilities are recognised in international humanitarian law, they are rarely reflected in practice, due in part to policy and practice that continues to treat civilians as a homogeneous group, failing to account for children's distinct vulnerabilities.

These impacts on civilians – including children – are predictable and preventable. Central to strengthening the protection of civilians from the foreseeable humanitarian consequences of the use of explosive weapons in populated areas is the Political Declaration and its commitments to move away from the routine use of explosive weapons in towns and cities.

Katherine Young
Research & Monitoring Manager, Explosive Weapons Monitor

FRAGMENTS: EXPLOSIVE WEAPONS MONITOR QUARTERLY SERIES

Fragments is a collection of articles that address topics related to the use of explosive weapons in populated areas and contribute research to or report on developments and news relevant to this issue area. *Fragments* aims to reach a combination of specialised audiences familiar with the issue of explosive weapons in populated areas, including those affected by explosive weapons use, as well as the community of practice working to address the impacts of explosive weapons through the Political Declaration on the Use of Explosive Weapons in Populated Areas.

The Explosive Weapons Monitor is a research initiative of the International Network on Explosive Weapons (INEW). It conducts research and analysis on harms from and practices of explosive weapons use in populated areas and monitors universalisation and implementation of the Political Declaration on the Use of Explosive Weapons in Populated Areas.

WWW.EXPLOSIVEWEAPONSMONITOR.ORG
INFO@EXPLOSIVEWEAPONSMONITOR.ORG
[@WEAPONSMONITOR](https://www.instagram.com/WEAPONSMONITOR)

On the cover:

Palestinians inspect the damage caused by Israeli bombardment in Deir al-Balah, central Gaza Strip, on 12 February 2024.

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Explosive weapons have become a leading cause of child casualties in modern conflict. These weapons cause severe injuries, lifelong disabilities, and profound developmental harm in addition to death. Despite this vulnerability, health systems and humanitarian responses frequently fail to meet their distinct needs. This article argues for stronger protections for children in conflict, child-centred proportionality assessments, as well as sustained investment in victim assistance, research and rehabilitation for children affected by blast injuries.

COUNTING THE DEAD

EXPLOSIVE WEAPONS' DEVASTATING IMPACT ON CIVILIANS IN SUDAN

NIAMH GILLEN, EXPLOSIVE VIOLENCE RESEARCHER,
ACTION ON ARMED VIOLENCE

Sudan has become one of the world's deadliest conflicts for civilians. Across towns and cities, high numbers of civilians have been killed or injured by explosive weapons. This article analyses data from Action on Armed Violence on casualties caused by explosive violence in Sudan, focusing on the sharp escalation in the use of explosive weapons in populated areas since the conflict began, producing high civilian casualty rates per incident of use.

Introduction

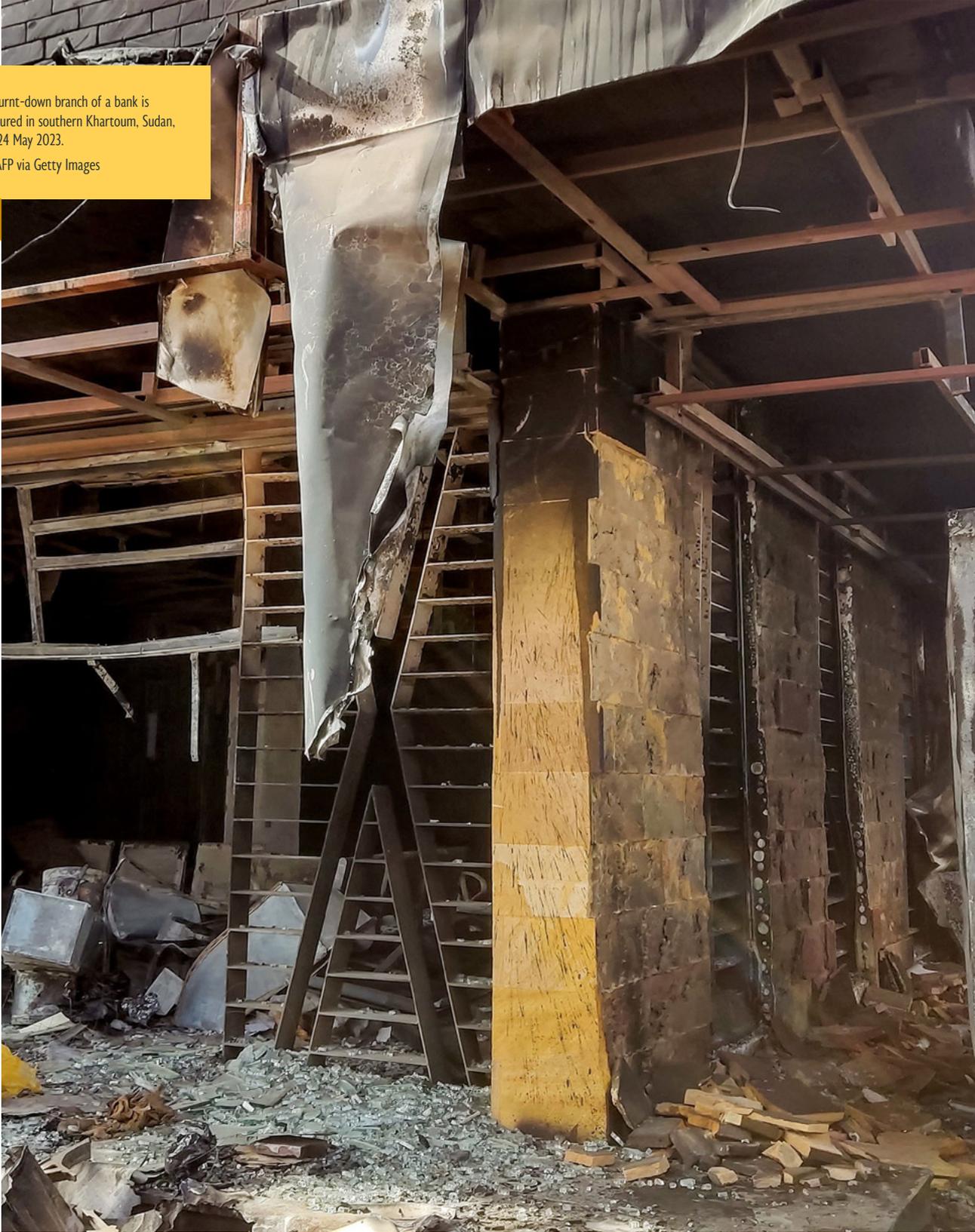
On 1 February 2025, in the crowded Sabreen market of Omdurman, Sudan's second-largest city, shoppers buying fruit and grain were caught in a sudden shelling attack. At least 60 people were killed and more than 250 wounded, according to Doctors Without Borders.¹ The strike came only two months after air raids and barrel bombs hit the same city, killing another 60 and injuring at least 230. Together, they rank among the deadliest incidents of the use of explosive weapons recorded in Sudan since the most recent conflict began in April 2023.

These were not isolated incidents but part of an escalating bombardment campaign that began when Sudan's military, the Sudanese Armed Forces (SAF) and a paramilitary group known as the Rapid Support Forces (RSF), escalated conflict in the country into civil war. This fighting was led by rival military leaders, who had jointly overthrown the transitional government at the end of 2021.² What began as a power struggle in the capital, Khartoum, spread into a nationwide conflict.

Both parties to the conflict have used explosive weapons to strike markets, hospitals, and encampments, devastating infrastructure and killing thousands.³ There has been growing international concern over the use of explosive weapons in populated areas, with increased calls from agencies such as the United Nations Office for the Coordination of Humanitarian Affairs (OCHA), who have repeatedly "called for civilians to be protected and for this ferocious violence to stop."⁴

Sudan has become one of the world's deadliest conflicts for civilians. Across towns and cities, high numbers of civilians have been killed or injured by explosive weapons. This article analyses data from Action on Armed Violence's (AOAV) monitoring of casualties caused by explosive weapons to identify patterns of civilian harm in Sudan. This includes a specific focus on the sharp escalation in the use of explosive weapons in populated areas throughout Sudan since the conflict began that has reportedly produced high civilian casualty rates per incident of use.

A burnt-down branch of a bank is pictured in southern Khartoum, Sudan, on 24 May 2023.
© AFP via Getty Images



Civilian casualties and the use of explosive weapons in Sudan

AOAV has monitored civilian casualties from the use of explosive weapons in Sudan since 2010, documenting how such violence has long affected the population, but with a dramatic intensification since the renewal of conflict in 2023. AOAV collects data on incidents of explosive violence from English-language media reports in which civilians and armed actors were reportedly killed or injured. In the case of Sudan, the majority of incidents are taken from several English-language Sudanese sources. Overall limited reporting on Sudan in media sources means that many incidents are not captured by AOAV, and the true scale of civilian harm is difficult to ascertain.

Before conflict broke out in 2023, there were sporadic reports of civilian harm resulting from explosive weapons use. AOAV recorded at least 797 reports of civilian casualties between 2010 and 2022 from mortars, shelling and IEDs.

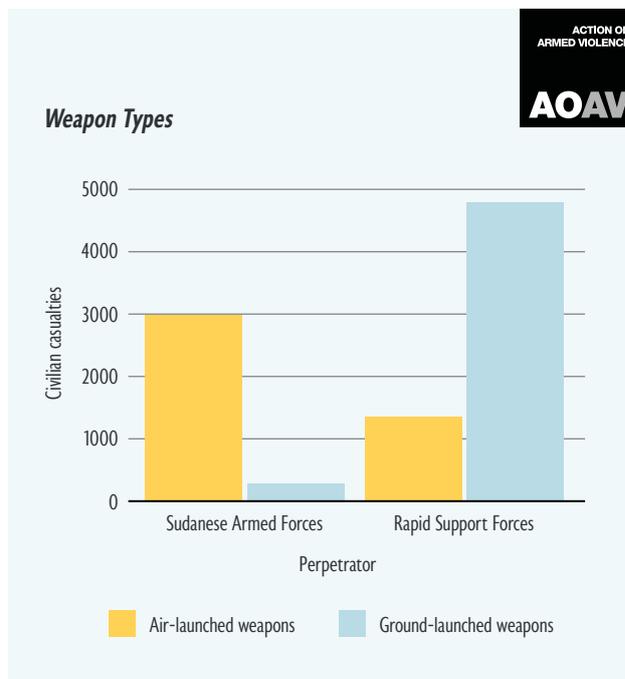
As conflict escalated in 2023, AOAV recorded 2,627 casualties, with a further 4,478 in 2024 and another 5,440 in 2025. Almost all casualties recorded by AOAV occurred in populated areas such as markets, residential districts or encampments, marking a notable shift towards the use of drone and airstrikes and artillery shelling in Sudan's towns and cities.

Since April 2023, the rate of civilians killed per attack more than tripled compared to previous years to 22 civilians per attack. During this time, ground-launched weapons caused 58 percent of civilian casualties, mainly from artillery and non-specific shelling,⁵ while air-launched weapons accounted for 39 percent. Artillery shelling alone killed or injured 3,739 civilians, and airstrikes killed and injured 4,153.

Foreign-manufactured explosive weapons and munitions in Sudan

Amnesty International documented the presence of recently manufactured foreign weapons throughout Sudan, including explosive weapons platforms and their munitions, such as mortars.⁶ Specific weaponry listed as used by the RSF include the Chinese-manufactured Wing Loong II and FeiHong-95 drones⁷. Weaponry listed as in use by the SAF include the Mohajer-6, Zajil-3, Bayraktar TB2 and DJI MAVIC 3 drones.⁸

Figure 1 – Types of explosive weapons that reportedly caused civilian casualties used by the RSF and SAF

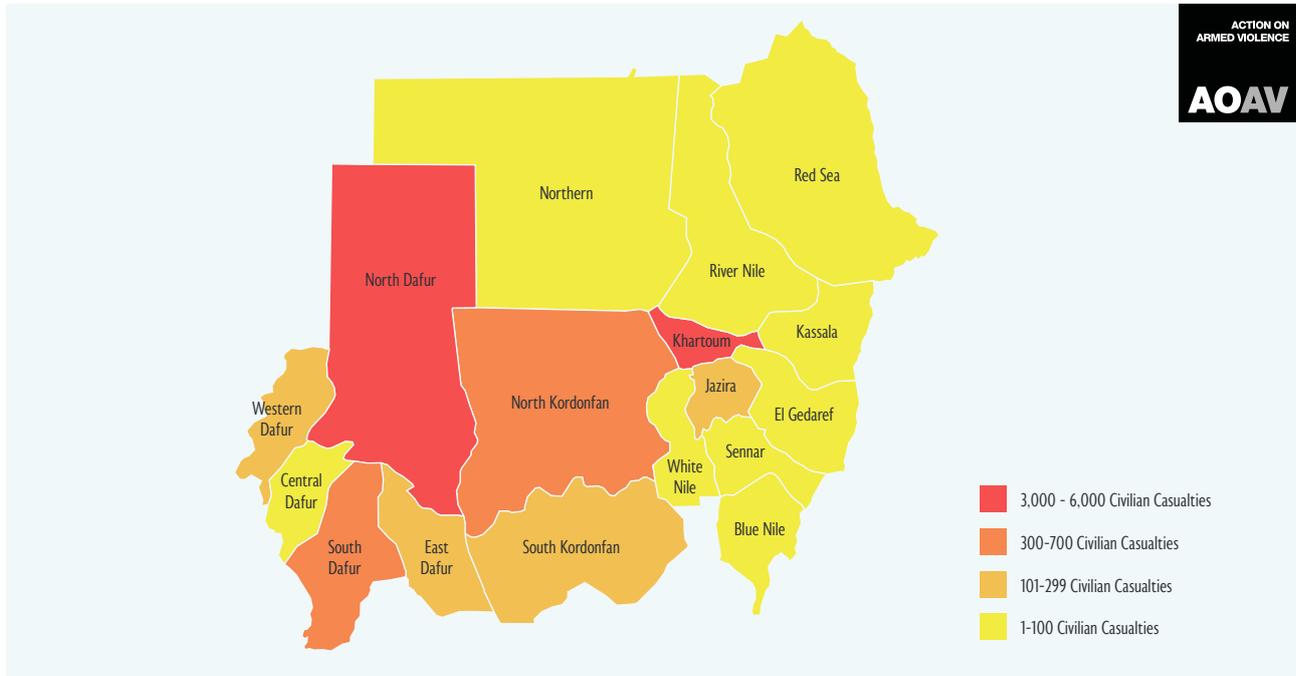


Both the RSF and SAF have used a combination of ground- and air-launched weapons in the current conflict, as illustrated in Figure 1. The RSF's frequent use of ground-launched weapons, such as artillery shelling, reflects the group's lack of air-power capacity and access to air-launched weapons.

In contrast, the SAF has made greater use of air and drone strikes. This difference in weapon deployment highlights the distinct capacities and tactics of the two actors, with the RSF relying on heavy shelling and the SAF deploying air-delivered munitions and drones to conduct strikes, particularly in populated urban areas.

The overwhelming majority of civilian death and injury in Sudan is attributable the use of explosive weapons within populated towns and cities. This pattern shows how urban locations, such as markets, villages, shops and places of worship, have become epicentres of harm. The regions most affected since April 2023 are North Darfur, Khartoum, South Darfur, North Kordofan, and Jazira. Populated areas in North Darfur alone suffered 223 recorded attacks and over 5,400 civilian casualties. Khartoum, the conflict's epicentre, experienced nearly 3,800 attacks (see Figure 2). Cities such as El Fasher in North Darfur, Omdurman in Khartoum, and Nyala in South Darfur were some of the most impacted by explosive weapon use.

Figure 2 - Map illustrating the geographical scale of civilian casualties in Sudan



Specifically, in terms of civilian deaths recorded by AOAV, 38 percent occurred in residential districts, 19 percent in markets, and 11 percent in camps for displaced families. Hospitals, villages, police stations, and places of worship account for the remaining 32 percent.

Why are casualty rates so high?

Sudan has become one of the world's deadliest conflicts for civilians. Since many of the frontlines are found in cities, civilians are at high risk of being affected by attacks with explosive weapons used by parties to the conflict. The urban nature of the conflict means that any one attack is likely to affect a significant number of civilians, and AOAV data shows high numbers of civilian casualties occurring in individual incidents of explosive weapons use.

The SAF and RSF have repeatedly struck densely populated areas using unguided artillery and bombs. In February 2025, Human Rights Watch reported that the SAF dropped unguided munitions on residential and commercial districts in Nyala, South Darfur, in attacks that were inherently indiscriminate.⁹ For example, an air strike carried out by the SAF on 3 February 2025 struck Nyala's Cinema district, killing 25 people, and injuring a further 63.¹⁰

Ninety percent of victims of SAF attacks and 84 percent of those attributed to the RSF died in urban residential districts, markets, or other dense urban areas. The number of civilians harmed per attack has risen from around 19 in 2023 to 26 in 2025, a 37 percent increase in two years. This increase is likely due to the concentration of attacks and use of explosive weapons with wide-area effects on populated areas where civilians are likely to be present, and thus, higher numbers harmed per incident. This escalation reflects increased use of explosive weapons as conflict intensifies, as well as widespread use of explosive weapons with wide-area effects.

The New York Times has estimated the death toll since the civil war erupted in April 2023 to be up to 150,000, with 11 million others being forced from their homes.¹¹ This death toll includes all direct and reverberating effects of the conflict, from death and injury from small-arms, to disease, famine and displacement caused in large part by the reverberating impacts of explosive weapons. The UN and Reporters sans Frontières have stated difficulties in reporting true casualty figures across the country due to communication blackouts and restricted access.¹²

Implications for the Political Declaration

UN Secretary-General António Guterres has warned that Sudan's war could destabilise the wider region and urged all parties to protect civilians.¹³

Central to that effort is the *Political Declaration on Strengthening the Protection of Civilians from the Humanitarian Consequences Arising from the Use of Explosive Weapons in Populated Areas*, a framework endorsed by 89 of states to limit the use of explosive weapons in towns and cities. Sudan has not yet endorsed the Declaration, though many endorsing states maintain some degree of responsibility for mitigating civilian harm in the conflict, including through decisions regarding arms transfers that supply explosive weapons to the RSF and SAF.¹⁴

The use and impact of explosive weapons have deepened every dimension of Sudan's humanitarian disaster. Hospitals lie in ruins, water systems are broken, and cholera and other preventable diseases spread through overcrowded camps. Millions now face famine.

Sudan's tragedy exposes the disconnect between growing international norms on strengthening the protection of civilians from the use of explosive weapons and the continued practice of widespread use with severe humanitarian consequences, as both the SAF and RSF continue to use explosive weapons with wide area effects to the detriment of civilians in its towns and cities.

Closing this gap requires more than signatures. Universalisation of the Declaration must be matched by effective implementation: ensure armed forces implement a range of policies to help avoid civilian harm, as well as ensuring military practice takes the direct and indirect effects on civilians into account when planning operations and attacks in populated areas¹⁵.

The Declaration commits signatories to restrict and refrain from using explosive weapons in populated areas when civilian harm is foreseeable¹⁶. It represents an appeal to restraint and accountability. Yet in Sudan, the use of airstrikes, artillery, and missile attacks on urban areas have become routine, leaving civilians exposed to relentless destruction.



Tamara*, 13, talking to her 13-year-old cousin, Linda*, on 9 March 2023, nearby her house in Taiz, Yemen where she was severely injured after a landmine exploded months earlier.

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CHILDREN AND BLAST INJURIES

THE DEVASTATING IMPACT OF EXPLOSIVE
WEAPONS ON CHILDREN

NARMINA STRISHENETS, SENIOR CONFLICT
& HUMANITARIAN POLICY AND ADVOCACY
ADVISER, SAVE THE CHILDREN

Explosive weapons have become a leading cause of child casualties in modern conflict. These weapons cause severe injuries, lifelong disabilities, and profound developmental harm in addition to death. Despite this vulnerability, health systems and humanitarian responses frequently fail to meet their distinct needs. This article argues for stronger protections for children in conflict, child-centred proportionality assessments, as well as sustained investment in victim assistance, research and rehabilitation for children affected by blast injuries.

Introduction

In modern conflict, explosive weapons have become a defining threat to children's survival and well-being, with their use now being a leading cause of child casualties. In recent years, the severity of injuries among children has been unprecedented. Between 2020–2025, nearly 50,000 children were killed or injured, with over 60 percent of verified child deaths and injuries caused by explosive weapons.¹⁷ These numbers represent only a fraction of the true scale, as many casualties are never officially recorded.

Blast injuries reshape the trajectory of a child's life by interrupting education, isolating children from their communities, and placing enormous strain on families navigating life-altering injuries often in settings where services are limited or non-existent. The psychological toll is profound, with children experiencing nightmares, regression, anxiety, and lasting fear.¹⁸ The nature of contemporary conflict multiplies long-term costs, inflicting irreparable harm on children, infrastructure and social systems.

Across conflicts from Ukraine to Gaza, Sudan to Syria, children are disproportionately harmed by explosive weapons with wide area effects, in ways that current policies, military practices, and humanitarian responses still fail to fully address.

Children's distinct vulnerabilities

Most health responses to the impacts of explosive weapons in conflict remain designed for adults, overlooking children's distinct needs despite the unequivocal evidence that children are not simply smaller civilians. They are physiologically, psychologically and socially distinct, and they are far less able to withstand the effects of explosive violence.

Children have a lower threshold for harm and sustain more severe injuries than adults. Many children arrive at hospitals with shrapnel wounds, traumatic amputations, severe burns, fractures, and complex injuries. Their smaller bodies and developing organs mean the same blast that an adult might survive is far more likely to kill a child or cause catastrophic trauma. It is estimated that 65–70 percent of injured children sustain wounds to multiple parts of their bodies¹⁹ and that children under seven are almost twice as likely to suffer life-threatening head injuries.²⁰

By early 2025, the number of children killed in Gaza since the escalation began in October 2023 had surpassed 20,000 – around 2 percent of Gaza's child population and one third of all fatalities.²¹ On average, one child has been killed every hour over nearly two years of war, the

majority by explosive weapons.²² As of July 2025, over 40,500 children were estimated to be injured.²³ Gaza is now home to the largest cohort of child amputees in modern history,²⁴ with operations often performed without anaesthesia or sterile conditions. Dr. Ghassan Abu-Sittah, a surgeon treating children in Gaza, observed after weeks of operating under siege conditions, that "Gaza is redefining war injuries. I saw many babies who suffered amputations before learning to walk."

The curiosity of young children and their proximity to the ground result in high numbers of eye injuries from mines, many of which are remnants of past conflicts and located in civilian-populated areas. Damage to the eye in infancy, for example, not only causes visual impairment but also prevents normal eye development, leading to additional visual defects over time.²⁵

Burns from explosive weapons are also more severe in children, affecting a much larger proportion of the body than in adults.²⁶ Because children face greater risks from burns and penetrative injuries, they are at higher risk of death and serious injury when caught in the path of an explosion. A study in Kharkiv, Ukraine, found over one-third of injured children sustained severe or critical trauma, with 41 percent discharged with disabilities.²⁷ Younger children, including infants and toddlers, were especially prone to head injuries and burns, likely because of their smaller body size and their closer exposure to heat and blast effects near the ground. This pattern is consistent with evidence from Afghanistan, Syria and Iraq. In many conflicts, health systems are frequently overwhelmed or destroyed. The consequences are stark: injuries that would be survivable and manageable in a functioning health system become life-altering or fatal. Medical blockades and destroyed infrastructure mean many children cannot access surgery. In Sudan, more than 80 percent of hospitals are no longer functioning, and those still open lack basic supplies like blood bags, oxygen and fuel.²⁸

Injuries from explosive blasts often result in amputations, blindness or severe scarring, and very few children have access to prosthetics or rehabilitation. Limb injuries and limb loss further restrict children's daily lives, limiting movement, play and access to school, particularly in rural or conflict-affected settings. Long-term rehabilitation for limb injuries is often unavailable, compounding social exclusion and unmanaged pain.

Children with major physical trauma commonly report long-term, chronic pain, which significantly affects their quality of life. Despite evidence that unmanaged pain in children has devastating consequences, pain is frequently under-assessed and under-treated, including by healthcare professionals and caregivers.²⁹

Prosthetic limbs are therefore vital to children's access to education, healthcare and play, and to their physical, psychological and social development. However, existing paediatric prosthetics are largely scaled-down adult models and lack design features that support a fulfilling childhood, with limited direct input from children themselves.³⁰ Nadin*, 13, from Yemen was forced to drop out of school due to severe injuries from a shelling incident. The attack occurred at a house near the frontlines during a wedding party that she was attending with friends and family, where several people were injured. Nadin says, *"When I woke up from surgery and found out my leg was gone, I cried a lot. I was in shock and kept screaming. 'Give me back my leg, why did you take it?'"*³¹

But the threat does not end when the fighting stops. Children injured by explosive weapons face lifelong medical and psychosocial needs, and over the course of childhood and adolescence may require dozens of assistive devices and years of rehabilitation, making the total cost several times higher than for adults injured later in life.

Explosive remnants of war and their long-term impact on children

Explosive remnants of war, including landmines and unexploded ordnance, continue to kill and injure children long after conflicts subside. Children are particularly vulnerable due to their curiosity, their tendency to play outdoors, and their limited understanding of risk. Globally, they make up 43 percent of all casualties from unexploded ordnance.³²

In Syria, for example, brothers Osama*, 6, and Yousef*, 10, returned to their home near Idlib to start repairs to their destroyed home after the end of 14 years of conflict. After pitching a tent with their father for shelter, a landmine exploded as the boys played outside. The two brothers were seriously wounded, each losing a leg, while their other brother, 8-year-old Khaled*, was killed.³³

Their story is not isolated—it reflects a broader pattern in which the remnants of war continue to maim and kill, undermining recovery and trapping communities in cycles of fear and displacement, and devastating livelihoods. Farmland becomes unusable, infrastructure remains unsafe, and humanitarian access is restricted. Entire communities are prevented from rebuilding, prolonging dependence on aid and delaying economic recovery.

Today, a quarter of Ukraine is contaminated with landmines and unexploded ordnance, making it one of the most heavily mined countries in the world,³⁴ where one in every ten landmine casualties is a child. Children face daily risks simply by walking to school or playing outside.

Mitigating the risks to children of explosive remnants of war in Ukraine

In Ukraine, one innovative response is helping to mitigate the dangers of explosive remnants of war: a demining dog named Chivas.³⁵ Trained to detect explosive materials, Chivas participates in mine safety education sessions for children, using simple, engaging signals - such as crossing his paws to indicate danger - to teach life-saving behaviours.

The presence of the dog transforms what could be a frightening topic into an accessible and memorable learning experience. Children report feeling calmer, more engaged, and better able to retain critical safety messages. Mine awareness programmes have reached tens of thousands of children, equipping them with the knowledge needed to identify a deadly threat that children in Ukraine are exposed to every time they go out and play.

This kind of child-centred approach should not be seen as a luxury, but rather as essential. Yet, such efforts remain underfunded relative to the scale of the threat.

In addition to innovative responses to risk mitigation, equally important is the need in scaling up mine clearance, expanding risk education, and restoring safe access to schools, healthcare, and livelihoods. Without these efforts, the end of active hostilities will not mark the end of danger for children.

Where policy and practice fail children

Disproportionate harm to children from the use of explosive weapons in conflict is driven by their developmental stage, dependence on adults, and need for specialised services, making them far less able to withstand the effects of war. While these vulnerabilities are recognised in international humanitarian law, they are rarely reflected in practice, due in part to policy and practice that continues to treat civilians as a homogeneous group, failing to account for children's distinct vulnerabilities.³⁶

A proportionality assessment that deems a level of civilian harm "acceptable" based on adult thresholds is both legally and morally flawed. If the same blast is significantly more likely to kill or permanently disable a child, or if many children are likely present near the location of an attack, then failing to account for this difference undermines the very purpose of civilian protection.

Addressing this gap means recognising children as a reference point for assessing harm, not the exception. It requires integrating age-differentiated data into military planning, ensuring that weapons use accounts for children's higher vulnerability.

Strengthening the protection of children also demands investment in paediatric medical capacity, from emergency care to long-term rehabilitation. It further necessitates sustained funding for victim assistance, research, and child-focused recovery programmes.

A child who loses a limb loses more than mobility—they lose access to education, independence, and opportunity. A child who grows up

under constant bombardment loses not only a sense of safety, but the foundations of healthy development. A community contaminated by unexploded ordnance loses its ability to rebuild, trapping families in cycles of poverty and risk.

These impacts on children are predictable and preventable, and yet they are increasingly forgotten. Until children are placed at the centre of how wars are fought, regulated, and responded to, explosive weapons will continue to define not only the violence of conflict, but the shape of childhood itself.

*Names marked * in this publication have been changed to protect identities.*

On 27 January 2026, the Ukrainian Deminers Association (UDA) conducted an Explosive Ordnance Risk Education session for children in the Kharkiv region, where children were introduced to a demining dog, Chivas.

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