Children affected by armed conflict: rehabilitation as a global health responsibility

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Today, one in six children lives in a conflict-affected area, with detrimental consequences on their physical and mental health. In conflict, polytraumas of mental and physical origin blend within a disrupted, compromised healthcare system. However, hardly any of the elements required for a professional, evidence-based paediatric rehabilitation response in crises are currently in place, despite urgent global need. This viewpoint presents challenges and knowledge gaps related to paediatric rehabilitation in conflict settings and proposes different research pathways to address some of the evident knowledge gaps. Therefore, this work calls to action humanitarian organisations, experts in the field and researchers to collaborate, collect and share key data, learn from it and develop appropriate paediatric rehabilitation guidelines.

Children are disproportionately affected by conflict injuries, as modern warfare directly targets schools, orphanages and hospitals.[1] Blast from explosive weapons and ordnance results in severe injuries, and children are disproportionately affected due to their distinct physiology and anatomy. The impact of blast is magnified by children's characteristic ways of interacting with hazardous devices, for instance, picking landmines up to play with friends or playing football in contaminated fields.[1 2] Blast exposure can cause a variety of serious and combined injuries. These include brain injuries, vision and hearing impairments and musculoskeletal injuries such as burns, soft tissue damage, fractures and limb amputations. Musculoskeletal injuries are some of the most common blast-related injuries.[2 3] In fact, the Gaza Strip now holds the largest cohort of children with amputation globally. But the impact of war does not stop there: armed conflict degrades health systems over time, with cumulative consequences for child survival and functioning. Beyond direct conflict injury, children experience combined increased mortality from non-violent causes and rising disability prevalence, closely linked to stress exposure and weakened health services.[4] Examples range from paediatric stroke to cerebral palsy and polio sequelae.[5] Indeed, after 25 years with no reported cases, polio has re-emerged in the Gaza Strip, representing another devastating consequence for paediatric health, even though it is not directly caused by conflict. In addition, pre-existing disabilities are often neglected in acute humanitarian responses.[6] In conflict settings, paediatric rehabilitation needs increase in both volume and clinical complexity, requiring sustained, multiprofessional and evidence-based approaches.

A growing body of literature also documents how the consequences of war extend far beyond the cessation of hostilities. For example, studies examining conflicts in Bosnia and Herzegovina, Syria and Rwanda show that key indicators of child well-being, including mortality and nutritional status, may take a decade or more to return to preconflict trajectories.[7] The impact of conflict on children is also highly heterogeneous, reflecting differences in baseline socioeconomic conditions, health system capacity and the nature and duration of the conflict itself.[7] In this context, rehabilitation — defined by the WHO as a set of interventions designed to optimise functioning and reduce disability in individuals with health conditions in interaction with their environment — must be interpreted within the realities of fragile active and post-conflict settings. Where health systems were already weak before the conflict, rehabilitation needs are not limited to restoring pre-war levels of functioning but often require rebuilding services and strengthening long-term support for children with disabilities.[7]

Well-scoped and appropriate research holds the potential to provide the means to address the scale and complexity of these needs. However, research and implementation are lagging behind in many respects,[3] and paediatric rehabilitation in conflict settings remains largely unguided by evidence. Humanitarian practitioners have extensive hands-on experience treating children in conflict,[8] but, to our knowledge, their expertise has not been systematically documented, disseminated or validated in clinical studies. Specifically for conflict-related injuries, longitudinal follow-up studies are required to identify the unique challenges of each injury type and understand how these evolve through childhood and adult life. Research also holds the potential to better capture context-specific constraints that affect the rehabilitation of impairments and injuries either produced or exacerbated by conflict. Tailored research can allow rehabilitation guidelines to be framed accordingly, and frameworks such as the Rehabilitation in Conflict (RiC) framework can help guide this research.[9] Clear research pathways are required and presented in figure 1. Future research could use Delphi studies to gather expert opinion and consensus across the many existing knowledge gaps. Although injury-specific and disability-specific guidelines are likely required, an important challenge is to distil essential and actionable information for use in contexts of extreme constraints. Consolidating existing best practices from high-resource environments into a comprehensive knowledge base would provide a valuable foundation to build on.

Inclusion of children with disabilities and their caregivers in research is also essential, as they should be placed as advocates of their own needs and priorities. Their inclusion can ensure that rehabilitation is meaningful. Such approaches are particularly useful to further build on existing expert knowledge, develop and test new rehabilitation interventions and generate comprehensive rehabilitation protocols. These, in turn, can support workforce training and help address one of the major challenges of rehabilitation in conflict settings: the shortage of trained, specialised staff.

Lack of a trained workforce is not the only challenges in delivering rehabilitation in conflict-affected settings. Additional constraints include resource scarcity, safety concerns, healthcare service disruptions,

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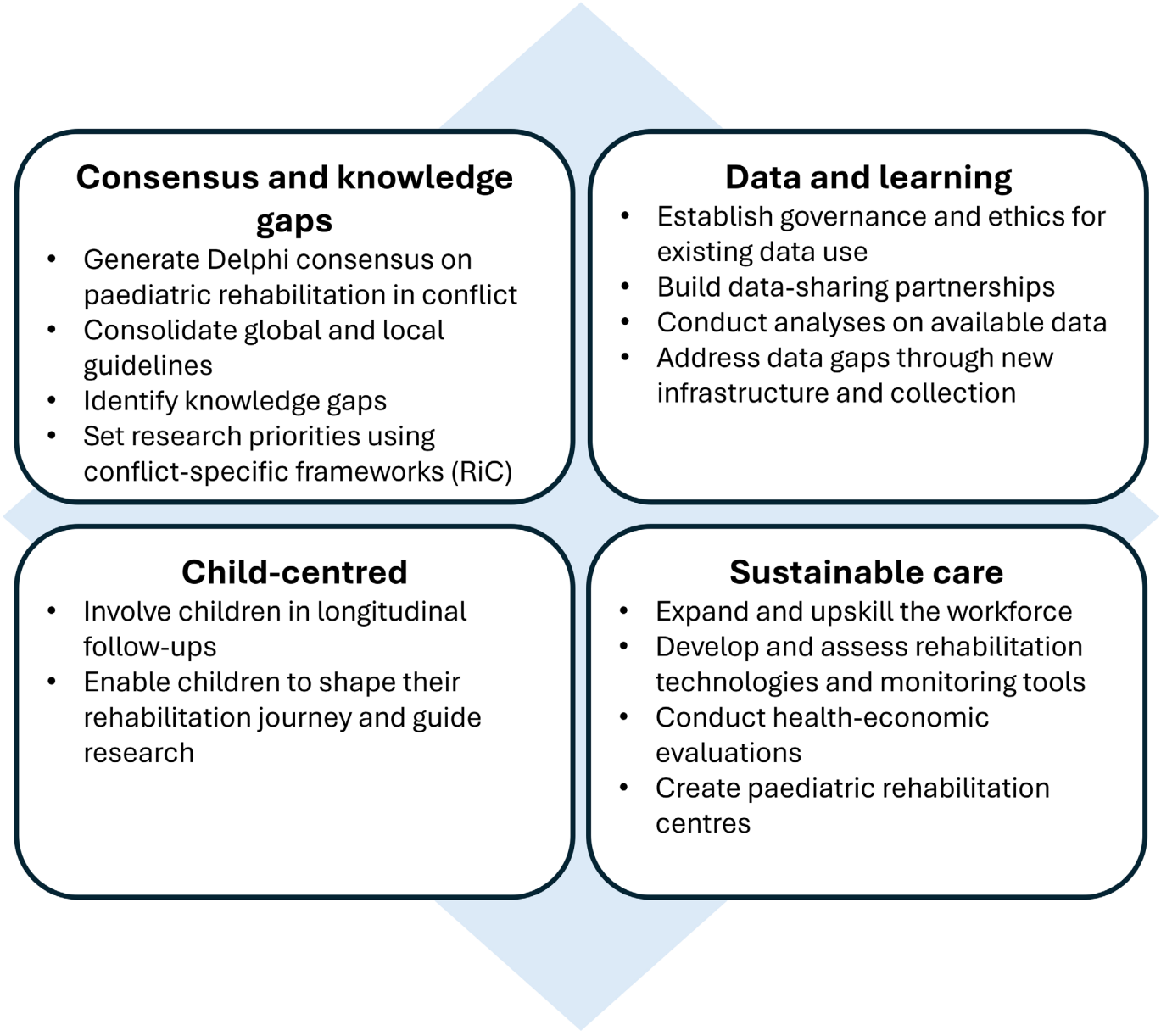

Figure 1 Feasible research pathways to improve the rehabilitation outcomes for children in conflict-affected settings. Frameworks such as the Rehabilitation in Conflict (RiC) framework can help guide this research.[9]

continuous displacement and increased psychological trauma.[4] Supply chain disruptions commonly delay the provision, repair and replacement of assistive technology and essential consumables, while insecurity and repeated displacement interrupt follow-up and long-term rehabilitation, particularly for children requiring ongoing monitoring during growth. Furthermore, psychological support for children who may have experienced displacement, loss of home or the death of loved ones is fundamental.[4] Children who lost caregivers and close family members in conflict face distinct and profound rehabilitation challenges that extend far beyond the acute phase of conflict. Loss of direct carers and bereavement is associated with markedly increased risks of long-term mental health disorders, including depression and post-traumatic stress.[10] Integrating long-term psychosocial support, alternative caregiving arrangements and community-based follow-up into rehabilitation pathways is therefore essential to mitigate these lifelong consequences. Such factors must be addressed alongside physical rehabilitation to ensure its success.

Research must support the updating and reframing of current rehabilitation guidelines for conditions such as cerebral palsy,[11] commonly treated in stable settings, to ensure effective delivery in conflict-affected settings. Although blast is often the defining feature of modern conflict, there are no established rehabilitation guidelines on which context-appropriate protocols can be built, in contrast to many other paediatric disabilities. While acute paediatric blast care has received increased attention lately,[12 13] a systematic review identified that major gaps persist in intervention delivery, outcome data and workforce expertise for children injured by armed conflict.[14] Existing resources for conflict rehabilitation have only small sections with paediatric-specific considerations,[4] despite the acknowledged specialist requirements. This requires urgent addressing. The rehabilitation journey for amputation is presented in box 1 to show how paediatric blast and ballistic injuries create complex

Box 1 Rehabilitation journey: the example of amputation

Traumatic amputation is used here as a case study to illustrate the complexities of rehabilitation and identify the many determinants of its success.

Rehabilitation exercises and effective bandages must begin directly after amputation to avoid contractures and other complications that later affect prosthetic fitting, physical functioning and, therefore, the child's participation in childhood activities. Early prosthetic provision is the next crucial step: the ability to stand and walk again plays a central role in both psychological and physical recovery. Prosthetic provision must be combined with appropriate physiotherapy to enable effective device utilisation and the most normal motor development possible. Rehabilitation approaches must be age-appropriate, activity-based and centred on play.[4] Play-based interventions support motor, cognitive, sensory and social development while reducing anxiety and increasing enjoyment.

Growth creates ongoing challenges in amputation. Children require several prosthesis replacements, and delayed provision may result in prolonged use of poorly fitting prostheses, with potentially severe consequences for the developing musculoskeletal system. Growth-plate injuries, limb-length discrepancies and abnormal bone overgrowth are common and may necessitate repeated surgical revisions and, therefore, a whole new rehabilitation cycle. Rehabilitation goals must also consider age, sex, gender and psychosocial development, particularly during adolescence when body image, social acceptance and cosmesis become increasingly important.

Pain management and psychological support are also fundamental to prevent chronic pain and address trauma related to injury, displacement or loss.[4] Optimal outcomes require a multidisciplinary team, including surgical, rehabilitation, prosthetic, physiotherapy, mental health and pain specialists, with the child and caregiver as central members. Specialised paediatric centres facilitate coordinated care, peer support and improved outcomes,[4] while successful reintegration ultimately depends on sustained community-based rehabilitation, family education and inclusive school and social environments.[4]

and poorly understood rehabilitation needs.

To conclude, rehabilitation is a lifelong journey, and it is key to improve life beyond survival. It requires sustained research to identify care priorities and strengthen its effectiveness. Humanitarian organisations hold substantial, often underutilised datasets, and establishing data-sharing partnerships with academic institutions is essential. Such collaborations can enhance learning and bridge the gap between immediate humanitarian response and long-term rehabilitation needs. They also facilitate the development of clear, accessible, context-appropriate paediatric rehabilitation guidelines, as well as broader dissemination of resources that are too often confined to academic settings. An exemplar set of resources is undergoing development as part of The Explosive Weapons Trauma Care Collective focused on surgical care for a variety of injury types.[13] Similar types of resources are necessary throughout the rehabilitation continuum. They can then be used to upscale and upskill the workforce, addressing one of the core challenges of paediatric rehabilitation in conflict-affected settings. In addition, these partnerships can strengthen field implementation and validation of novel interventions — such as play-based rehabilitation approaches which remain insufficiently leveraged in current practice.

Children represent the future social, academic and economic fabric of our societies. When conflict inflicts trauma in childhood, its consequences extend far beyond the individual, shaping families, communities and generations to come. There is therefore a collective duty to mitigate both the immediate and long-term effects of injury and psychological harm as well as detrimental outcomes due to loss of a functioning healthcare system. Children's ability to function, learn and participate meaningfully in society will ultimately determine a country's capacity for recovery and reconstruction: a capacity fundamentally dependent on timely, effective and sustained rehabilitation.

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