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Review

How do extreme weather events contribute to violence against children?

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A B S T R A C T

Background: Only recently have research and policy begun to shine a light on the magnifying effects of EWEs (Extreme Weather Events) on children's exposure to violence. However, the links between EWEs and VAC (Violence against Children) remain under-theorised, poorly understood and often unacknowledged in policy and practice.
Objective: Identify, synthesize and analyse available evidence on the central characteristics and factors influencing the relationship between VAC and EWEs.
Methods: We conducted an extensive scoping review of the literature (academic and grey) to identify existing research and gaps in knowledge. Using flexible and iteratively developed search terms enabled us to identify direct violence – physical, sexual and emotional – and structural violence, rooted in inequitable and unjust systems and institutions.
Results: The relationship between VAC and EWEs is linked to gender; climate-induced mobility or immobility; child labour; and health. We found that VAC can intensify during EWEs, but the nature of this relationship is contextually specific. The relationship between VAC and EWEs is rooted in historical injustices, global systems and structures, and therefore disproportionately affects those living in poverty.
Conclusion: Studies have uncovered how increasing social, economic and emotional pressures following EWEs increase children's violence risk exposure. This may occur in their homes or in relief shelters. The violence may involve peers, or forms of hazardous labour that young people are compelled into because of the sudden need for families to rebuild or help make ends meet. More knowledge is needed to inform integrated, context-specific and culturally sensitive plans to better protect children from the consequences of EWEs.

1. Introduction

In this extensive scoping review of the literature, we explore the interlinkages between two pressing crises: VAC (Violence against Children) and EWEs (Extreme Weather Events). The latter are increasing in frequency, severity, and duration due to unsustainable human activity escalating climate change. It is estimated that children born in 2020 will experience a two- to sevenfold increase in EWEs in their lifetime, particularly heat waves, compared with people born in 1960 (Thiery et al., 2021). Scientists present a grim picture of how human-induced climate change, more frequent EWEs, and environmental degradation, that go beyond natural climate variability, cause widespread adverse impacts and losses and damages to nature and people (IPCC, 2022). In January 2024, the World Meteorological Organization (WMO) reported the eighth month in a row, which was the warmest on record for the respective time of the year and that sea surface temperatures continue to be at record high (WMO, 2024). Around 160 million children currently live in areas experiencing high levels of drought, and about 503 million children are exposed to a high risk of floods due to EWEs such as

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cyclones, hurricanes and storms, as well as rising sea levels (UNICEF, 2021). Research and policy has only recently begun to unravel how this will affect children in the short and long term (e.g.: Cuartas, Bhatia, Carter, Cluver, Coll, Donger, et al., 2023; Cuartas, Bhatia, Carter, Cluver, Coll, Draper, et al., 2023; Office of the Special Representative of the Secretary-General on Violence against Children, 2022). To spur academic and political movement in this area, this review article aims to help identify the magnitude, direction, and pathways of the relationship between EWEs and VAC. We discuss the complexity of that relationship, outline the strengths and weaknesses in existing studies, and argue that more data and research are needed to inform context-specific approaches in practice.

2. Conceptualizing VAC in the context of EWEs

The WHO (World Health Organization) defines violence as: 'the intentional use of physical force or power, threatened or actual, against oneself, another person, or against a group or community, which either results in or has a high likelihood of resulting in injury, death, psychological harm, maldevelopment, or deprivation'.[1] Violence, in this definition, refers to acts leading to physical and psychological harm, and when applied to children under 18 years old, includes maltreatment (including violent punishment), bullying, youth violence, intimate partner violence, sexual violence, and emotional violence (WHO, 2016). Research from disciplines such as political science, sociology, or psychology increasingly takes a broader view, in recognition that violence is embedded in relationships, systems and structures (Nixon, 2011; Parkes et al., 2013; Stewart, 2002; Young, 1990). This scholarship argues that focusing attention only on acts of direct forms of VAC, obscures why violence occurs, and the multiple conditions reinforcing it over time (Wessells & Kostelny, 2021). Violence, in a broader framing, is perpetrated not only by individuals, but can also occur as the product of norms and discourses, as well as inequitable and unjust socio-economic and political systems, structures and institutions (Lee, 2019). Accordingly, Nixon (2011) refers to some of the harmful consequences of climate change as "slow violence". Unlike immediate, spectacular acts of violence that capture public attention, slow violence unfolds over long periods, often decades or even centuries. It is characterized by the delayed, dispersed, and invisible harm caused by environmental degradation, climate change, and other processes that disproportionately affect marginalized communities, particularly in the Global South. From this perspective, the occurrence and consequences of EWEs are understood as strongly intersectional and deeply unequal in its impact, affecting poor, marginalized, geographically disadvantaged and already discriminated societies to a much greater extent, in the short and long-term (see also: Office of the Special Representative of the Secretary-General on Violence against Children, 2022). Our conceptualization of VAC captures these direct and indirect forms of violence. We apply a multi-dimensional framework, developed through our previous research (e.g.: Datzberger, 2022; Datzberger et al., 2023; Parkes, 2015; Parkes et al., 2013), understanding VAC as:

> An act of physical, sexual, emotional force, embedded in structural processes and inequities that are either the result of, or occur alongside past and present economic, social or political conditions, as well as harmful norms and discourses.

This framing allows us to capture both, the visible and invisible aspects inherent in violence (c.f. Nixon, 2011). We view the relationship between VAC and EWEs as a process rather than a standalone event. Instead of focussing on one-dimensional causations, a multi-dimensional framing sheds light on how complex relationships between environmental changes together with social structures, norms, institutions, and interactions influence VAC. Our approach is thus very similar to Cuartas et al. (2023, b), who have applied a social ecological perspective (Bronfenbrenner, 1981) on the direct and indirect pathways linking the climate crisis and VAC. Our multidimensional lens equally allows us to highlight how social, political, and economic structures and institutions create and perpetuate inequities for children, thus structural (or 'slow') forms of violence which can then result in direct forms of violence in the context of EWEs. For example, we perceive depriving children of their human rights to 'health' or 'education' in the context of climate related EWEs, as a structural form of violence, disproportionately affecting children born in LLMICs (Low- Lower-Middle Income Countries) and those from lower socioeconomic backgrounds in HIC (High Income Countries). At the same time, a sudden or gradual lack of access to education related to EWEs poses a risk for children to become easy targets of exploitation or engage in the worst forms of child labour. Children's mental and physical health can also be compromised by sudden or gradual changes in family or community dynamics, such as an increase in domestic violence in homes, after an environmental shock due to parental stress. Nixon (2011) defines this as direct violence of delayed effects. Using this shifted perspective on VAC, we hope to shed light on persisting 'climate injustices', disadvantaging children born in LLMICs the most, fortified by underlying social and geographical disadvantages (Braveman & Gruskin, 2003). It is important to acknowledge how VAC in relation to EWEs is built into and perpetuated by global power asymmetries and unjust political, economic and social structures.

3. Thematic areas

Thematically, we link the relationship between multidimensional VAC and EWEs to gender; climate-induced mobility or immobility; child labour; and health. These thematic areas emerged after a first initial screening of the literature available on the topic and in discussions as a team. We explain at the beginning of each thematic section our scope of enquiry, and how we approach current concepts, theories, debates and trends in the field that informed our literature search and analysis in each theme. We start by first broadly exploring the existing evidence and general ***links between EWEs and VAC***. We then delve into our specific thematic areas by discussing the effects of EWEs on ***gender***-based violence (GBV); the impacts of climate-induced ***im/mobility*** on children; and how

[1] See: https://www.who.int/groups/violence-prevention-alliance/approach, accessed 06.09.2024.

EWEs influence hazardous forms of ***child labour***. Additionally, we examine research on the effects of EWEs on children's mental and physical ***health***. The effects of EWEs on children's health are multiple, ranging from structural (or slow) to direct forms of violence, such as how mental stress among caregivers or peers can contribute to increased direct violence in homes or schools.

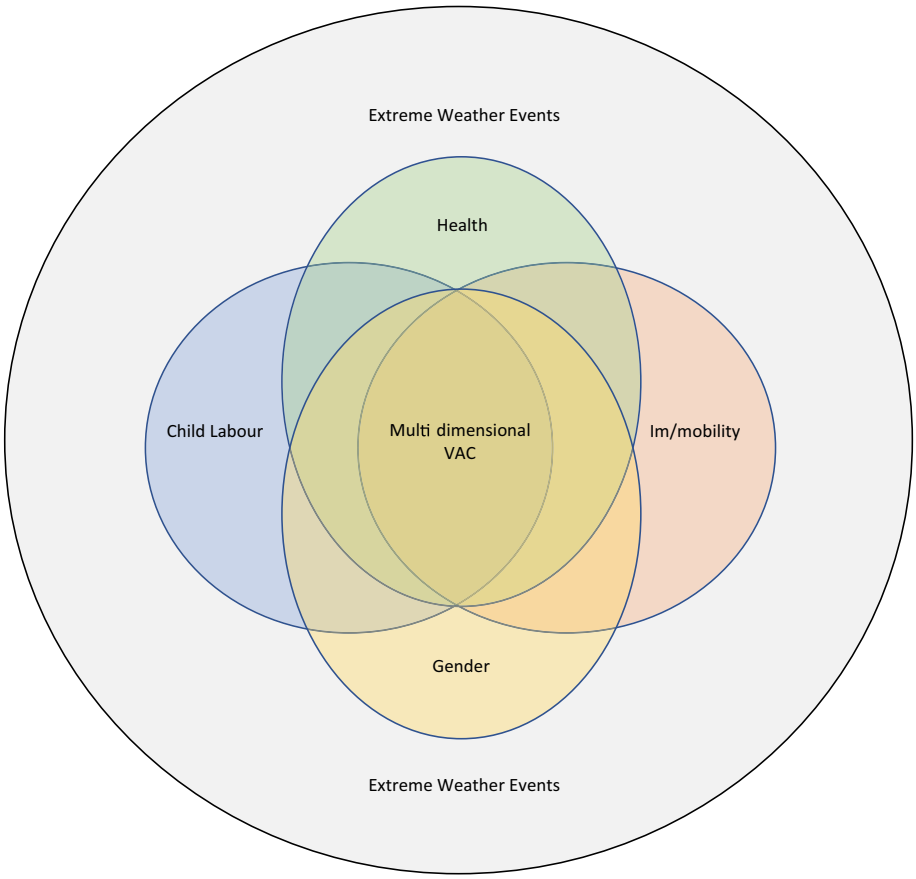
Graph 1 depicts how our analysis of the literature in this review article is organised around these themes, and in our concluding discussion we reflect on how they are related to each other. Structural ('slow') violence against children has emerged as a cross- cutting theme across all the areas, disadvantaging children from poorer backgrounds the most.

4. Methods

This review article synthesizes findings and offers further analysis from a preprint version of an extensive scoping review on the intersections of VAC, climate change and human-induced environmental degradation (Datzberger et al., 2023). To gain a broad and comprehensive view of the existing literature on VAC and EWEs we have adopted a scoping review method. Scoping reviews are a rigorous approach to reviewing the literature in emerging fields of study where a systematic review may not be possible due to the broad scope of the research question and varied nature of research methods used to explore the topic (Munn et al., 2018). Few systematic reviews exist about the relationship between EWEs and VAWG (Violence against Women and Girls), child labour, and children's health (Cerna-Turoff, Fang, et al., 2021; Cerna-Turoff, Fischer, et al., 2021; Hellden et al., 2021; Thurston et al., 2021), whose findings we included to our review. However, the authors of this research encountered a myriad of definitional ambiguities and variations in the quality and type of data collected, making it difficult to draw compelling conclusions from the data. For this reason, we adopted a scoping review method with the aim to (c.f.: Munn et al., 2018):

Identify available evidence about the relationship between EWEs and VAC
Understand what the literature says are the central characteristics, pathways and directions influencing the relationship between VAC and EWEs
Explore knowledge gaps in the literature about VAC and EWEs to highlight areas for new systematic reviews and future research.

Extensive scoping reviews like this one, take an exploratory approach, encompassing a broader range of studies than a systematic



Graph 1. Thematic areas reviewed.

review, including those of varying quality and methodology (Arksey & O'Malley, 2005; Munn et al., 2018). Our aim is to provide an overview of the range of research available on the topic. When reviewing we considered the quality of the evidence, but in particular paid attention to the relevance and significance of the findings. This broad exploration helps us grasp the scope of the literature. Our emphasis was on identifying gaps, themes, and patterns, rather than evaluating the strength or rigor of the evidence. As a result, we are more concerned with *what* has been studied (and what has not) than with how well it has been studied. We initially searched the literature using three databases: Scopus, PubMed and Google Scholar, and reference lists from papers we identified. Following this initial stage, in which we screened titles and abstracts for their suitability before we analysed the full text, we continually revised and refined the search terms (see Annex 1) as we grew to better understand the complexities of pathways between EWEs and VAC, and to acknowledge definitional differences between disciplines, such as exploring both migration and im/mobility. We did establish some exclusion criteria post-hoc, which were specific to the thematic sections often based on nuanced conceptualizations of the different phenomena we were considering (e.g.: we did not investigate literature on earthquakes as there is little evidence on how they are interlinked with climate change). We expanded the search to include policy and grey literature, as well as academic literature that did not have an explicit focus on EWEs and VAC. For example, we reviewed a significant body of literature on child labour which was not explicitly related to the relationship of EWEs. However, findings were still relevant to be included to our analysis when studies were conducted in contexts of high climate variability. The search of the grey literature and policy documents was informed by our existing knowledge, networks, relevant organizations, and outputs from conferences, as well as meetings and webinars we attended about topics related to this review. Annex 1 provides an overview of our search terms we applied for the initial scoping review (Datzberger et al., 2023) and search strategy for each section.

In line with our aim of identifying all relevant literature regardless of the study design or research discipline, we did not place strict limitations on search terms or criteria for selecting research to include in the review (Arksey & O'Malley, 2005). We did establish some exclusion criteria post-hoc, which were specific to the thematic sections often based on nuanced conceptualizations of the different phenomena we were considering. We therefore briefly explain at the beginning of each thematic section our scope of enquiry, and how we approach current concepts in the field that informed our literature search and analysis (Levac et al., 2010). We provide a descriptive – yet critical – account of the data available, commenting on the relevance, rigor and appropriateness of evidence throughout the literature review (Arksey & O'Malley, 2005). In our analysis of the literature, we refrain from offering broad conclusions deriving from specific studies on age groups or gender, as this data is not applicable to all contexts and results vary not only by region but also among scholars.

5. Findings

5.1. Direct links between EWEs and VAC

In the past twenty years, humanitarian disasters triggered by EWEs have increased in frequency, severity and duration worldwide (UNDRR, 2020). Global environmental changes resulting from rapid world population growth and intensified human development over the past centuries have marked the start of a new geological epoch, termed the Anthropocene (Crutzen, 2002). Various EWEs have been directly related to human (in-)activity. While policy actors have increasingly acknowledged that climatic changes and EWEs affect children's vulnerabilities (UNICEF, 2021) and can be a 'threat multiplier' for VAC (UNGA, 2022) research on how specific environmental shocks explicitly intersect with specific forms of VAC is still in its early stages.

We understand EWEs as an abnormal intensity of a natural agent or process such as: heatwaves, wildfires, cyclones/hurricanes, riverine, coastal flooding, or water scarcity. To date, research on how EWEs affect children has predominantly focused on children's physical and mental health (Dyregrov et al., 2018; Kousky, 2016; Martinez Garcia & Sheehan, 2016). While EWEs do increase physical, emotional, and sexual VAC, the exact relationship varies by context and is not fully understood. Literature we reviewed has shown, that in part this is due to heterogeneity of definitions of key terms (such as VAC) and indicators used in research, methodological problems including related to study sample sizes and periods of data collection, and lack of clarity about the generalisability of findings to different geographical and EWE contexts. Consequently, there is a lack of robust data enabling comparisons of VAC prevalence before and after EWEs across multiple contexts. Furthermore, the existing literature does not provide sufficient clarity about the relative importance of different elements of EWEs and how these might lead to increased or specific types of VAC.

Despite these gaps in the literature, (Cerna-Turoff, Fischer, et al., 2021) have mapped potential ***pathways of VAC and EWEs*** in a recent systematic review. They identified the following pathways: i. Environmentally induced changes in supervision, accompaniment, and child separation; ii. Transgression of social norms in post-disaster behaviour (mainly related to sexual violence and GBV); iii. Economic stress; iv. Negative coping with stress; v. Insecure shelter and living conditions. The authors note that these pathways are not generalizable and are context dependent, due to the lack of transnational and comprehensive quantitative and qualitative data. Our scoping review of a wider range of literature confirms this. We rely mostly on peer-reviewed articles and grey literature from studies conducted in isolation from one another, of variable quality, methods, thematic focus and are therefore very difficult to compare across contexts. However, taking these studies (qualitative, quantitative, mixed-methods, academic, and grey) from different contexts together, they start to build an understanding of how some environmental shocks generate stressors that may increase the likelihood of violence affecting children. Hence, we decided to synthesize literature in relation to different types of EWEs and not by region or country.

There is an emerging body of work on the effects of ***floods*** on VAC in LLMICs, with most studies conducted in the context of Bangladesh (Akhter et al., 2015; Azad & Khan, 2015; Biswas et al., 2010) and some emerging evidence from Pakistan (Bellizzi et al., 2023; Pradhan et al., 2022). Biswas et al. (2010) found that in Bangladesh up to 70 % of mothers and 40 % of fathers in flood affected

areas have abused their children, due to extreme mental pressures and inability to control their emotions. Akhter et al. (2015) and Azad and Khan (2015) further highlight molestation and sexual abuse of children in post-cyclone Bangladesh due to cramped living conditions requiring children to share beds with extended relatives. A qualitative study conducted with frontline healthcare providers and district stakeholders to understand the performance of health systems in Pakistan (Pradhan et al., 2022), found that during and following floods there was increased reporting of sexual and domestic violence. This affected women and children the most, in part due to health sector and infrastructure constraints in the flood- prone regions sampled for the study (see also: Bellizzi et al., 2023).

Droughts have also been associated with a higher risk a higher risk of sexual violence and abuse of children in Kenya and Somalia (IDS and Plan Sweden, 2010; Save the Children, 2021). Researchers also found an increase in child marriage and FGM (Female Genital Mutilation) during periods of droughts in the Horn of Africa (Bellizzi et al., 2023). By contrast, in India, droughts led to a decrease in child marriage (see section on Gender). This highlights how nuanced and different the impacts of EWEs on VAC can be, depending on context and region.

Hurricanes and cyclones appear to have severe impacts on children and youth. Most articles focus on the aftermath of hurricane Katrina in the US, pointing to multiple adverse effects for low-income populations, with reported experiences or observations of child abuse (Hawkins, 2009). More evidence and research are needed from other contexts, particularly LLMICs. Currently, a few studies provide us with some insights. In one explorative study conducted post-Hurricane Matthew in Haiti, children reported multiple adverse events, such as witnessing or experiencing interpersonal violence, neglect and abuse in addition to post-disaster stress and limited access to basic needs with a particular high prevalence of depression and PTSD (Post Traumatic Stress Disorder) (Dass-Brailsford et al., 2022). In comparing subgroups, the same study found that children in orphanages following Hurricane Matthew reported significantly fewer adverse childhood experiences than those living with their families, causing the authors to suggest orphanages created a safe and stable environment for children (ibid.). Another qualitative study showed how VAWC (Violence against Women and Children) after Hurricane Matthew was triggered by an accumulation of daily stressors including economic adversity, food insecurity or unemployment (Bermudez et al., 2019). Nearly all adult male and female interviewees ($n = 36$) indicated these structural insecurities were detrimental to the well-being of their family and their community (ibid). Notably, several articles highlight a surge in peer violence and aggressive behaviour among children, attributed to PTSD in the aftermath of a hurricane or cyclone (Lai et al., 2015; Scott et al., 2014; Self-Brown et al., 2013; Terranova et al., 2009) including higher levels of youth violence in general (Madkour et al., 2011).

Academic research on the effects of ***other climate related shocks*** (e.g.: bush/wildfires or heatwaves) on VAC is still limited. We can indirectly make suggestions on the possible impact on children by looking at research on IPV, which has robustly proven severe long-term effects on children's development in various age groups (Guedes et al., 2016). Increased rates of IPV (Intimate Partner Violence) are associated with post-disaster changes to income and with PTSD and depression symptoms among women (Molyneaux et al., 2020). One study from Australia, shows that women residing within high bushfire- affected communities experienced the highest levels of violence compared to women living in medium- and low- affected communities. Scholarship does suggest that earthquakes or tsunamis can lead to a rise in VAC, primarily where the perpetrators of violence are family members who have experienced emotional stress and loss following the disaster (Catani et al., 2008; Sloand et al., 2017; Sriskandarajah et al., 2015; Subedi et al., 2020). Notably, it remains unclear whether these EWEs are related to climatic changes, while at the same time in some contexts (e.g.: Sri Lanka) the effects were also exacerbated by other forms of stress such as war.

Summary: EWEs, combined with large-scale humanitarian crises, pose immediate risks to health, life, property and the environment. Research is gradually uncovering how increasing social, economic and emotional pressures in these situations expose children to higher risks of violence. This may occur in their homes or in relief shelters. It may be perpetrated by their peers, or by caregivers. Studies often point to EWEs causing immediate stress in households or communities, which could be related to economic pressures, or other forms of disruption, which then result in an increase in direct VAC. In addition to the different pathways that can be related to VAC in the context of EWEs (Cerna-Turoff, Fischer, et al., 2021), we argue that these pathways are influenced by gender, whether or not they have to engage in worst forms of child labour, im/mobility and children's and caregivers' health during and after EWEs.

5.2. Gender

The effects of EWEs are not gender neutral. 'Gender' is an identity and role that is socially constructed (from birth) and distinct from biological sex (Butler, 2011). Binary gender roles and identities, influenced by varying degrees of hierarchical and patriarchal structures that produce political, social, economic and cultural inequalities and forms of discrimination, can be viewed as structural forms of violence (Walby, 1989). We reviewed literature on both GBV (Gender-based Violence) and VAWG (Violence against Women and Girls) in relation to EWEs. The terms GBV and VAWG are often used interchangeably, yet they are not the same. We refer to GBV as violence perpetrated on someone because of their gender identity, this includes females, males, sexual minorities, or those with gender-nonconforming identities. We refer to VAWG to specifically emphasize the disproportionate impact of EWEs on women and girls (Osman-Elasha, 2012).

Two recent systematic reviews (Thurston et al., 2021; van Daalen et al., 2022) and a comprehensive study (Castañeda Camey et al., 2020) provide foundational guidance about the interlinkages of climate related ***EWEs, GBV and VAWG***. Six commonalities emerge from this research. First all three studies relate EWEs to increased GBV and VAWG, by exacerbating existing gendered and other inequities and stressors that drive all forms of violence, including VAC. This can be related to stressors such as housing insecurity, economic insecurity, or mental health issues. Second, context matters. The effects of environmental shocks on GBV/ VAWG vary across settings due to differences in local social gender norms, tradition, vulnerability, exposure, adaptive capacity, available reporting mechanisms, and legal responses. Third, studies observe a general increase in IPV during or shortly after EWEs, or due to shortages of resources (related to environmental shocks or resource exploitation). Childhood exposure to IPV in their households can have severe

long-term effects on children's development over the life course. Fourth, specific legal frameworks and prevention mechanisms to protect women and children are weakened or missing during or shortly after EWEs. Fifth, research suggests women and girls face an increased real or perceived risk of violence in shelters or disaster relief centres. At times this conversely has the effect of dissuading women and children from accessing this support, causing them to remain in dangerous contexts emerging from the EWE.

EWEs have also been related to ***child marriage***. A scoping review of academic and grey literature, which included 24 (8 quantitative and 16 qualitative) studies conducted by (Pope et al., 2022), finds that environmental crises worsen known drivers of child marriage in LLMICs, pushing families to marry their daughters early. All the existing data on this topic was collected in South and South-East Asia (in total 12 articles with 8 articles on Bangladesh due to the country's high prevalence of child marriage and frequency of and vulnerability to EWEs (Asadullah et al., 2021), and SSA (Sub-Saharan Africa, in total 13 articles). The most common environmental crises studied were drought (12 articles) and floods (8 articles). Across these contexts, Pope et al. (2022) broadly identify five drivers of child marriage during an environmental crisis, these are: 1) Loss of assets and opportunities for income generation (through dowry or bride price); 2) displacement of people from their homes; 4) Educational disruption; 5) Settings in which sexual violence and the fear of sexual violence increase. The study concludes that the relationship between child marriage and climate and environmental crises is not linear, and reasons can also be overlapping or multifaceted.

The effects of EWEs on child marriage also vary according to context, due to the importance of local norms, tradition, and marriage practices. For example, there is an observed increase in child marriage in SSA during sudden periods of drought, whereas in India droughts led to a decrease in child marriage (Corno et al., 2020). While in India dowry payments (i.e. bride prices) decrease during times of environmental shocks, in SSA receiving a bride price payment may incentivize families to marry off their daughters. Most qualitative and some mixed methods studies, including grey literature, we reviewed provide solid and context-specific evidence on the reasons for marrying children during environmental crises (Ahmed et al., 2019; Human Rights Watch, 2015). It is important to stress that quantitative data of good quality is insufficient to provide conclusive evidence about the association between extreme weather events and forced or early marriage (Carrico et al., 2020; Tsaneva, 2020). Many quantitative studies include a high risk of bias, for example comparing retrospective reporting of marriages from DHS (Demographic and Health Surveys) data with weather records from the same month, making conclusions about causality difficult to interpret.

Unfortunately, much of the literature on GBV and climate related EWEs tends to conflate 'gender' with 'women and girls'. Our knowledge on ***violence against boys*** is therefore still very limited. There is some research emerging on masculinities in the context of climate change more broadly (Enarson & Pease, 2016; Khan et al., 2022; Nagel & Lies, 2022; Temple et al., 2011) revolving around the following three debates:

How hegemonic masculinities (i.e. masculine ideas of dominance and control), in combination with capitalism and individualism, might either contribute to or inhibit action to mitigate the effects of EWEs (Nagel & Lies, 2022).
How being unable to live up to hegemonic masculine ideals in the aftermath of an EWE can increase GBV or IPV, due to increased stressors related to housing and income and the inability to protect and provide for the family (Bermudez et al., 2019; Nguyen & Rydstrom, 2018; Parkinson, 2019).
How intersecting inequalities related to class, race and masculinity render some men more vulnerable to the impacts of CC and ED (Khan et al., 2022).

The above studies implicitly signal that norms about masculinity in some contexts might influence men's perpetration of VAC in a context of EWEs. One study also found an increase in boys physically or sexually assaulting their dating partners after Hurricane Ike in Northern America in 2008 (Temple et al., 2011). Research mostly focuses on young men and male adolescents as perpetrators of violence. Concrete and comprehensive data on boys' specific vulnerabilities and exposure to various forms of violence in the context of EWEs are generally missing in GBV research making it hard to disaggregate their experience in existing studies. Some insights can be found in research and reports on human trafficking and forced labour in relation to EWEs (see section on: Child Labour).

Summary: Based on the literature we analysed, we find that EWE's exacerbate gendered inequalities, in ways that may increase the risk of violence, such as IPV and sexual violence. Risks are further exacerbated by the detrimental impact of EWEs particularly in settings with fragile response mechanisms and due to the absence of protective GBV laws. There is a growing body of work on GBV and VAWG in relation to climate change on which research on VAC can be built. But this work tends to be centred on issues affecting female adults, conflating the term "gender" with "women", without sufficient attention to the gendered effects of climate change on female and male children. Existing research suggests that climate change can potentially exacerbate known drivers of child marriage in LLMICs, but findings vary significantly by region. Similarly, nuanced data about boys' exposure to various forms of violence in the context of climate change is missing because studies tend to focus on males as perpetrators rather than as victims of gendered violence.

5.3. Im/mobility

Despite the rapid growth of literature on climate-related im/mobility, studies on how this affects children are only recently emerging (UNICEF, 2023). Patterns of im/mobility due to climate related EWEs vary widely by context. Broadly climate change and an increase in EWEs have both made an important contribution to migration during the past 30 years (Rikani et al., 2023), and have restricted populations movements including preventing people from escaping EWEs, affecting populations in LLMICs the most (ibid.) Many academic debates remain regarding terminologies, the scale of the issue, response mechanisms and how EWEs might cause or prohibit population movement (Ferris, 2020; Heslin et al., 2018).

Mobility related to EWEs, includes displacement, migration or relocation, and can happen gradually or be sudden. Existing

literature points to three risks of VAC in relation to climate-induced mobility: within families, in camps and shelters, and because of separation from caregivers. Concerning violence within families, evidence suggests domestic violence increases within families displaced following EWEs, due to multiple pressures and psychological stress (Bartlett, 2008; Bermudez et al., 2019; Richards & Bradshaw, 2017). For example, grey literature on SSA shows that children can be placed at higher risk of neglect following displacement due to additional economic pressures on their families (Afifi et al., 2012; Sturridge et al., 2022). Children living in camps and shelters due to environmental shocks also have a higher exposure to various forms of violence (Asad et al., 2013; Huong Thu Nguyen, 2019), but comparable and rigorous data is missing to understand the scale of the issue. Strikingly, emerging research suggests that overall children who are separated from their immediate families, including those living with relatives, are most vulnerable to VAC (Heslin et al., 2018; Richards & Bradshaw, 2017). More comprehensive data collection and analysis is required to gain better insights, understand regional and contextual differences, and to inform context-specific preventative measures.

Immobility occurs when populations end up (in-)voluntarily immobile or 'trapped' (Ayeb-Karlsson, 2020) following EWEs because of various environmental, social, political, economic, or health-related issues. There is little definitive evidence about how environmental- and climate-induced immobility might lead to VAC. Research in the Asia Pacific Region found that fear of violence in shelters leads women and children to stay at home and not evacuate when EWEs occur (Ayeb-Karlsson, 2020; Nguyen & Rydstrom, 2018; Rezwana & Pain, 2021). There is some evidence emerging from Fiji on populations that (in-)voluntarily stay in their communities after an EWE and domestic, or severe forms of, children's abuse and neglect, due to parental stress, precarious living conditions, or being forced into child labour including sex work, among others (UN Women Fiji, 2014). However, more research and data are needed from different contexts. Several studies, mostly conducted in Bangladesh, suggest involuntary immobility following cyclones or flooding leads to child abuse and injuries due to overcrowding in slum areas, parental stress or precarious living and working conditions (Biswas et al., 2010; Hayward & Ayeb-Karlsson, 2021).

Summary: Research points to increased risks of VAC within migrating families and higher exposure to violence in camps and shelters after an EWE. Separation from families or caregivers in the context of an EWE renders children and young people extremely vulnerable to violence as they become easy targets for human trafficking or child labour. Meanwhile, immobility has been associated in some studies with child abuse, injuries and overcrowding in slum areas. Fear of violence in shelters can lead women to remain at home after EWEs, increasing children's risk of harm or other forms of violence. Overall, more comprehensive data collection and analysis is required in this area to gain better insights, understand regional and contextual differences, and inform context-specific preventative measures.

5.4. Child labour

The relationship between child labour and VAC is not always straightforward. What kind of labour is considered violent for children remains subject to debate in the literature (Maconachie & Hilson, 2016). Some forms of child labour (e.g. helping on the family farm or household chores) can contribute to child wellbeing by providing skills, fostering competence and self-esteem, and enabling their transition into adulthood. In many LLMICs, especially in SSA, children are expected to 'work' as part of their upbringing to become respected and valuable members of a community alongside the economic necessity to make ends meet or be able to stay in school. For this reason, conceptualizations of violence in the context of child labour need to be relative, contextual, and relational (Maconachie & Hilson, 2016). In our review we therefore only focused on what the ILO terms the 'worst' forms of child labour that, according to our multi-dimensional framework, constitute a form of VAC. This includes all forms of slavery or practices similar to slavery (such as the sale and trafficking of children, debt bondage and serfdom) and forced or compulsory labour (including forced or compulsory recruitment of children for use in armed conflict; child prostitution and pornography; using children for illicit activities); and work which is likely to harm the health, safety or morals of children.[2]

There is some evidence in the literature that child labour increases after ***EWEs*** and environmental shocks, though studies vary in quality and typology. EWEs can lead to displacement, rendering children, especially those separated from their caregivers, more vulnerable to the worst forms of child labour such as debt bondage and trafficking. Children who remain in post-disaster settings may be drawn into dangerous forms of labour, such as heavy reconstruction work following EWEs with severe consequences for their physical and mental health (FAO, 2017). Another study in Guatemala also found that child labour increased following environmental shocks, but does not clearly differentiate between EWEs and environmental shocks that are not caused by climate change (Vasquez & Bohara, 2010). In some (but not all) contexts, climate variability has also been found to influence child labour. Data from Ethiopia, collected in 2004 and 2009, showed that climate variability meant children spent significantly more time on farming activities, and less time on domestic chores (Colmer, 2013), though it is not clear from the data whether the type of work related to 'light' or 'worst' forms of child labour. By contrast, research from Malawi did not establish a correlation between climate variability and an increase in child labour (Boutin, 2014). All of this suggests that more research is needed in this area, as existing studies are not generalizable, results vary by context, typologies, and indicators.

There is some scholarship associating droughts with an increase in child labour (Moonesinghe, 2018; Nguyen et al., 2020). There is a small body of literature relating cyclones and floods to higher incidences of child labour, with studies conducted in Bangladesh (Islam et al., 2021) and Pakistan (Khan & Hussain, 2023). However, one mixed-methods study conducted by (Delap, 2000) brings to light the many dilemmas and fundamental contradictions that arise about appropriate policy responses to children's work after floods in

[2] See: https://www.ilo.org/ipec/facts/lang–en/index.htm, accessed 28.02.2024.

Bangladesh. Her research highlights both the beneficial and harmful nature of child labour during 'shock' periods such as floods. Families from lower socio-economic backgrounds relied on their children's work and income, and children themselves also felt a responsibility to support their households. On the other hand, children found working in and around the floodwaters problematic and Delap (2000) highlight how work can be harmful to many children, causing physical and mental distress. She calls for policies and interventions that address both dilemmas: families' reliance on child work alongside strategies to eliminate child labour entirely.

Summary: Existing research indicates that child labour increases after EWEs due to families' reliance on child work and the absence of strategies to eliminate child labour entirely. The extent of child labour in this context (light or worst forms), and its link to violence, remains inadequately explored in research due to the hidden nature and contextual specificity of this issue.

5.5. Health

The sheer magnitude of evidence available on the effects of climate related environmental shocks and events on children's health is indicative of the severity of the issue (Hellden et al., 2021; Martinez Garcia & Sheehan, 2016; Sheffield & Landrigan, 2011). This is accompanied by various position statements from experts and institutions around the globe, calling for emergency actions to limit global temperature increases, restore biodiversity and protect health (Atwoli et al., 2021; RCPCH, 2021). The impact of EWEs on children's health is threefold. First, EWEs might directly impact children's health in the form of injuries, diseases, or mental stress. Second, children born in LLMICs have a higher risk exposure to EWEs (UNICEF, 2021) while at the same time facing challenges in accessing health providers and services unable to protect them, which constitutes a structural form of violence. Third, we can also observe violence of delayed effects (Nixon, 2011), such as increased PTSD or mental stress among caregivers and peers after an EWE, which exposes children to a greater risk of experiencing domestic violence or violence in communities and schools.

As far as children's ***physical health*** is concerned, EWEs (such as: droughts, water scarcity, coastal and riverine floods, heatwaves) have been associated with poor health outcomes and death among children, affecting especially children under the age of five (Cooper et al., 2019; Ghirardi et al., 2015; Hellden et al., 2021; Sheffield & Landrigan, 2011). There is widespread consensus among scholars from various fields that children are affected by environmental shocks at all stages of their physical and mental development, starting from in-utero exposure (Sheffield & Landrigan, 2011). Despite the vast number of studies available, there are some crucial gaps in the literature as existing data is not comparable, generalizable, lacks evidence from LLMICs and does not often take intersecting factors (i.e. a systems approach) into account (Hellden et al., 2021).

There is also an emerging body of work on how ***mental health*** problems resulting from EWEs can lead to a rise in perpetration of VAC and domestic violence, with negative implications for children's physical and mental health in the long and short term (Biswas et al., 2010; Cerna-Turoff, Fischer, et al., 2021). Scholarship points to an increase in PTSD after an EWE, affecting disadvantaged children and youth in LLMICs, from poorer socio- economic backgrounds, or ethnic minorities (Kelley et al., 2010; Lai et al., 2015; Self-Brown et al., 2013). Evidence is mounting on 'eco- anxiety' in children and youth because of the awareness and fear of the consequences of climate related EWEs (Hickman et al., 2021).

Summary: Children's physical and mental health is affected by EWEs. They have been linked to poor health outcomes and increased mortality among children, particularly those younger than five. There is emerging evidence that mental health issues, stemming from climate and environmental shocks, can lead to increased perpetration of VAC, including domestic violence. Rising eco-anxiety among children and youth, caused by awareness of climate change and environmental degradation and fears of its consequences, adds to mental health problems.

6. Conclusion

The studies we reviewed build a persuasive picture of specific pathways, patterns and intersections between VAC and EWEs. To understand how EWEs and VAC intersect, we rely on evidence emerging from multiple fields of study and disciplines presented in the scholarly and in grey literature. Although there is no consensus across disciplines about how EWEs precisely relate to specific forms of VAC, the effects of climate related environmental shocks are starting to become visible in varying degrees and pathways depending on the type of the EWE (such as: floods, droughts, hurricanes or cyclones). In addition to delineating various pathways linked to VAC in the context of EWEs (Cerna-Turoff, Fischer, et al., 2021), we showed that these pathways are influenced by factors such as gender, increased exposure to hazardous forms of child labour, mobility patterns, and the health statuses of both children and caregivers. However, it is important to acknowledge that the direct relationship between VAC and environmental shocks is not linear, but context-dependent, with some factors (such as gender or health) and some regions (U.S. or Bangladesh) more researched than others.

Importantly, structural VAC emerged as a cross-cutting theme in most studies we reviewed. When coupled with large-scale humanitarian crises, EWEs present immediate risks to health, life, property, and the environment. Research is just beginning to uncover how the escalating social, economic, and emotional strains in these circumstances expose children to heightened risks of direct violence. This vulnerability may manifest within their homes or in relief shelters, and it can be perpetrated by their peers or caregivers. Studies frequently indicate that EWEs induce immediate stress in households or communities, often stemming from economic pressures or other disruptions such as physical injuries or the death of a family member, which can subsequently lead to an uptick in direct VAC.

Structural and institutional factors can cause many vulnerabilities for children to the damaging effects of increasing EWEs. More attention should be given in policy and practice to those forms of slow violence or violence of delayed effects (Nixon, 2011) grounded in historical and global injustices, which are a threat multiplier of the consequences of climate-related EWEs (c.f.: Office of the Special Representative of the Secretary-General on Violence against Children, 2022). There is a need for a broader understanding of violence

that includes these less visible, but equally devastating, forms of harm. Poverty particularly strips those residing in LLMICs of access to crucial services such as healthcare, education, and adequate nutrition. Consequently, poverty fosters and perpetuates the conditions conducive to various forms of VAC within the context of EWEs, as shown in emerging literature on child marriage or child labour. Children growing up in LLMICs are also disproportionately vulnerable to the impacts of EWEs due to the inadequacy of coping mechanisms in place (such as disaster prevention mechanisms, legal frameworks or post-disaster protection policies and programmes), resulting in heightened health risks and diminished quality of life. VAC, therefore, transcends being merely a phenomenon exacerbated during environmental shocks; it is deeply entrenched in historical legacies, global injustices, systems, and structures, consequently disproportionately affecting those living in LLMICs (Chakraborty, 2017). There is a glaring absence of global and national policies and laws designed to shield the most vulnerable children from the severe ramifications of EWEs in the context of climate change.

This leads us to the following ***limitations in current research, with implications for policy and practice***:

More knowledge is needed to gain a better understanding on the precise magnitude of the issue and inform integrated, context-specific and culturally sensitive plans to protect children better before and after EWEs.

Systematic reviews we reviewed point to a lack of consistent, generalizable, transnational, and comparable data due to different methodologies, indicators, timeframes, and quality standards in research. This, in part, impedes advocacy, policy action and agenda setting.

Literature revolves around westernized ideals of childhood or children's wellbeing, prioritizing individual over communal children's rights, which can be ill-suited for children in non-western contexts, as shown in our section on child labour. This critique and call to decolonize research and work, frequently made by Southern scholars, is hardly reflected in the literature we reviewed.

There is regional bias of available data, with more rigorous data collection in the US or Bangladesh, whereas the evidence from LLMICs is mainly presented in the grey literature, by journalists or non-governmental organizations.

Most studies we reviewed do not explicitly take structural violence into account.

Children and young people's voices continue to be under- represented in existing research, which in part is due to the sensitive nature of researching VAC, with several methodological and ethical implications and barriers to research.

Further research is needed to explore the role that institutions—and their norm-setting practices—play in both preventing and perpetuating structural forms of VAC in the context of EWEs.

CRediT authorship contribution statement

Simone Datzberger: Writing – original draft, Funding acquisition, Formal analysis, Conceptualization. **Lottie Howard-Merrill:** Writing – review & editing. **Jenny Parkes:** Writing – review & editing. **Steven Kator Iorfa:** Writing – review & editing.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.chiabu.2024.107093.

Data availability

No data was used for the research described in the article.

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