MAKING CITIES SAFER FOR CHILDREN: ADDRESSING UNINTENTIONAL INJURIES

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SUMMARY

Every year, almost a million children and adolescents globally are killed by unintentional injuries – and urban children in informal settlements and slums are at especially high risk. In this brief, we explore the extent of the problem for poor urban children and why the scarcity of reliable data means that the incidence of injury is under recognised. We discuss the types and patterns of injury and the hazards and risk factors for girls and boys of different ages in different settings. We consider implications for action, including the need for greater awareness that most injuries are preventable, and why effective responses must be locally relevant, using local situation analyses and risk assessments involving local residents. Finally, we explore the valuable role of child-focused NGOs in raising awareness of the issue at all levels and encouraging processes to address it.

CONTENTS

ACRONYMS

GBD	Global Burden of Disease study
LMICs	Low-and-middle-income countries
NGOs	Non-governmental organisations

1. INTRODUCTION: ADDRESSING CHALLENGES AND MISCONCEPTIONS

Every year, almost a million children and adolescents globally are killed by unintentional injuries. A far greater number – somewhere between 10 and 30 million – suffer from non-fatal injuries, many of them resulting in long-term disability.[1] Precise estimates are difficult to come by. Yet we can confidently assert that unintentional injuries, including road traffic injuries, falls, burns, drownings, bites and poisoning, are the major global cause of mortality and long-term disability for children over the age of five.[2] This is a public health concern that receives astonishingly little attention in much of the world.

Among younger children in low-and-middle-income countries (LMICs), infectious diseases and malnutrition still take a much higher toll than injury does. Yet the number of young children who are affected by injury in these countries is many times higher than in high-income countries. Of the 95% of children's injuries estimated to occur in LMICs, the great majority are among children in poverty.[3]

Urban children in informal settlements and slums are at especially high risk. This is a reflection of their challenging living conditions and the limited availability of healthcare and emergency response services. Overcrowded housing, unsafe electrical connections, rapidly growing and poorly managed traffic, the growing risk of flooding and an absence of safe play spaces are just a few of the many factors that take their toll, adding to the burden of preventable deaths among the urban poor each year and resulting in millions of non-fatal injuries, most of them unreported.

According to the World Health Organization, about half of all injured children seen in hospitals are left with some form of disability, often consigning children to deeper poverty over their lifetimes.[4] Even when death or long-term disability do not result, the costs can be prohibitive in terms of out-of-pocket expenses, lost school days and, for parents, missed days at work. As the urban population surges in low-income countries, the number of children threatened by injury continues to rise. The increasingly challenging conditions related to climate change contribute to the injury burden, especially drowning.

This brief considers the nature of the problem for children in low-income urban settlements, drawing attention to the scarcity of reliable data. It discusses the types and patterns of injury, and the hazards and risk factors for girls and boys of different ages in different settings. It also considers the implications for action, pointing to the need for greater awareness of the preventable nature of most injuries, stressing the importance of local hazard assessments, and exploring some productive responses.

Children in informal settlements and slums are at especially high risk due to the challenging living conditions and the limited availability of healthcare and emergency response services.

2. WHY THE PROBLEM OF INJURY IS UNDER RECOGNISED

Between 1990 and 2013, unintentional injury rates declined globally by almost a third.[5] This is an impressive achievement and an indication that evidence-based public health interventions stressing injury prevention can have a significant effect. This decline in rates, according to an assessment of the Global Burden of Disease study (GBD) 'warrants a general statement that the world is becoming a safer place to live in'.[6]

This optimism must be accompanied by a reality check, however. Progress on this front has been very uneven and in some countries, rates have gone up not down.[7] In most LMICs where communicable diseases remain a primary concern, injury is still a seriously under-recognised public health problem. In fact, the term 'urban safety' most often refers to concerns related to violence, not the problem of injury. And in both high- and low-income countries, improvements in injury rates have lagged far behind improvements in communicable diseases.

Injury has been compared in this respect to mental illness: another neglected public health domain, especially in the global South.[8] Many otherwise fine assessments of health burdens do not even include attention to injuries. There are several reasons for this. One is the common perception that injuries are 'accidents' or 'acts of God' – random unavoidable events that are hence not a target for public health measures. A recent study from urban Uganda, for instance, notes this belief among parents: 'It is not a matter of whether a child will get injured, but rather when the child will get injured'.[9] Another reason is the medical world's bias in favour of curative services, rather than the preventive measures that are essential in responding to the risk of injury. And in places where communicable diseases are still a major public health threat, injuries understandably have a lower profile. The laissez faire attitude towards injuries is further expressed (and perpetuated) by the critical lack of reliable data.

For instance, the otherwise detailed and informative Demographic and Health Surveys Program run by USAID – which collects, analyses and disseminates data on populations, health, HIV and nutrition in over 90 countries –has only recently added an optional module on injury, and many countries still do not make use of it.

The most systematic assessment is the GBD study mentioned above. It includes injury as a major public health category. But in most LMICs, these GBD figures depend on national estimates and on extrapolations from hospital and clinical records. Yet most injuries, especially for low-income households and underserved communities, are never treated in formal health systems and can remain unrecorded.[10] If an injury is not recorded, then officially it did not happen. Hospital records, moreover, are not always reliable, as will be further discussed. Many injury fatalities also occur too quickly to make it into hospital records. Vital registration systems should record all deaths and their causes, but these systems are often incomplete, especially for informal settlements.[11]

Despite the growing numbers residing in informal settlements globally, there are no systematic figures on the burden of injury for urban populations, let alone the targeted figures that would clarify the situation for children living in the most hazardous settings.

Figure 1. An injury pyramid of unintentional childhood injuries

Meanwhile, community-based studies, which are relatively scarce, point to a considerable hidden injury burden, and indicate that rates of both death and disability are far higher than formal figures suggest.

The lack of data is a particular problem when the objective – as with this brief – is to assess the urban situation. The GBD study offers no urban/rural breakdown, and this is true also of many population-based studies. Studies that provide urban figures seldom break them down by income or location, although there are massive disparities within urban areas, and urban averages are no indication of the burdens in the poorest communities. Without these basic figures, it is impossible to identify causes and risk factors, and to develop evidence-based strategies for effective prevention programmes. Also, documentation varies by region. Sub-Saharan Africa is generally considered to have higher injury rates, although far more research is available from South Asia, as is evident from the sources cited in this brief.

Injury rates, both fatal and non-fatal, are generally considered to be higher in rural areas.[12] This may be true when only averages are considered. But when low-income and informal urban settlements are the unit of observation that is being compared with rural areas, the picture changes. In Uganda, for instance, a study comparing a rural village and an urban slum found that the urban child injury rates were 2.4 times higher for deaths and 4 times higher for non-fatal injuries than in the rural setting.[13] A South African comparison of informal settlements and low-income formal neighbourhoods also showed sharply elevated injury rates in the informal settlements, related to the more challenging environmental conditions and poor services.[14]

The bottom line is this: despite the growing numbers residing in informal settlements globally, there are no systematic figures on the burden of injury for urban populations, let alone the targeted figures that would clarify the situation for children living in the most hazardous settings. Global and national figures provide some sense of the scale of the burden. But injuries are tied to very local conditions, and prevention must be based on local assessments.

3. CHILDREN'S EXPOSURE AND VULNERABILITY: WHAT ARE THE RISK FACTORS?

Risk factors for injury are multifaceted and contribute synergistically to an event. But it is helpful to look separately at the contribution of different dimensions. Children's likely exposure and vulnerability to hazards vary by age and gender, and are associated with a range of social and environmental factors. There are distinct trends, but also exceptions based on local conditions.

3.1 Social risk factors

3.1.1 Social risk factors related to age

Young children are disproportionately likely to be the victims of injury for reasons related to their stage of development. Their curiosity and drive to play, their small stature, their limited experience and their physical and cognitive immaturity all contribute to their exposure and vulnerability. As they move through childhood, injury begins to outweigh infectious disease as a threat to their health and survival. Infants are far more likely to succumb to infection. But as they begin to explore and experiment with their surroundings, the risk of injury rises. Older children are better able to evaluate risky situations, although adolescents may also be more drawn to taking risks. But caregivers often overestimate children's ability to manage, especially when these caregivers are overtaxed, a common situation in underserved settlements.[15]

Studies generally find the risk is highest for children between one and four years of age.[16] [17] [18] For instance, a South African study found children under four accounted for almost half of all under-14 injury fatalities.[19] A study of a Dhaka slum also found almost half of the injury victims were children under five.[20] The type of injury also varies by age, as will be discussed further below.

3.1.2 Social risk factors related to gender

Boys almost without exception have higher rates of injury than girls. This is generally related to their greater inclination (and freedom) to engage in behaviour that exposes them to risks.[21] The South African study just cited, for instance, found boys outnumbered girls by over 50 per cent in traffic-related deaths, and by 250 percent in drownings.[19] The exception can be burns, which girls in many places may experience in higher numbers, generally because they are more restricted to the home, helping in the kitchen and often lifting pots of scalding liquids too heavy to manage properly. The gender gap increases with age: for 5 to 9-year-olds, the global death rate for boys from unintentional injury is about 30% higher than for girls and for 10–14 year olds about 60% higher.[7]

Boys almost without exception have higher rates of injury than girls. A South African study found boys outnumbered girls by over 50% in traffic- related deaths, and by 250% in drownings.

3.1.3 Social risk factors related to emotional problems

Many studies document the association among school-aged children of injury and emotional stress. Among grade children aged between five and nine in urban China, about 38% had experienced injuries in the previous year; the higher rates among migrant children were associated with their more stressful lives.[22]

In Thailand and Indonesia, injuries among older school children were also associated with psychological distress.[23] Other studies relate higher injury rates to the experience of fighting or being bullied at school, finding that emotionally stressed children are more vulnerable to other causes of injury.[24] [25] In part this added vulnerability is undoubtedly related to the lower level of attention that can result from stress; but generally speaking, children under stress are more vulnerable across the board.

3.1.4 Social risk factors at home

Several family factors have been related to a higher risk of injury for children. In Dar es Salaam in Tanzania for instance, inadequate supervision, lower socioeconomic status and low maternal age were all found to be significant risk factors.[26] Studies from low-income neighbourhoods in Bangalore in India and Maputo in Mozambique also point to inadequate supervision from caregivers.[27] [28] In Egypt, second- and third-born children were at significantly higher risk of injuries – pointing to the caregiver's more strained capacity to provide supervision.[17] Household tensions are also considered a risk: in urban Sri Lanka, significantly higher injury rates were found among children whose parents quarrelled, and whose fathers were drinkers.[29]

There can be conflicting results, however, relating to these social factors. While some studies show higher injury rates for children of younger parents and those with less education, the Egyptian study found most injuries occurred among children whose mothers were over 30 and had ten or more years of schooling.[17] There can also be some very questionable correlations. Many studies, for instance, relate higher injury rates to lower household incomes. But 'low income' may well be a proxy for the more hazardous environmental conditions in low-income settlements. And while adequate supervision is clearly important with young children, even close supervision can be insufficient where environmental hazards abound.
A Gambian study on children's burns noted that 86% of burn victims under five were being supervised at the time of the injury.[30] There is only so much a caregiver can do when living in a tight space.

The recorded death rate from burns is eleven times higher in LMICs, with the highest rates for young children.

3.2 Environmental risk factors

Environmental risk factors on the whole are more conclusively demonstrated, and often remain significant even when socioeconomic factors are controlled for.

3.2.1 Environmental risk factors at home

Overcrowding is frequently identified as a significant risk factor.[27] [31] In eight slums in Vellore in India, for instance, children from more crowded households had significantly higher odds of sustaining injuries, and a greater risk of repeated injuries over time. By contrast, socioeconomic factors had no significant impact.[32] In Kathmandu in Nepal, overcrowded kitchens were identified as an especially risky site.[33] Kitchens pose particular risks for young urban children, who are less easily and safely able to play outdoors than rural children.[34]

A semi-urban study from Kumasi in Ghana, where many families live in compounds around a central courtyard, is revealing in this regard. Children whose households cooked in the courtyard were 60% less likely to be burnt than those whose households cooked indoors.[35] A Pakistani study relates child injuries to a variety of challenging home living conditions, including poor housing infrastructure, lack of barriers to cooking or washing areas, the use of paraffin stoves, and a lack of safe storage for harmful substances – all features of many homes in low-income informal settlements.[36]

3.2.2 Environmental risk factors within the neighbourhood

While home is generally found to be the most common site for urban injuries,[37] there are exceptions. In low-income neighbourhoods in Bangalore, for example, most injuries occurred in the street while children were out playing.[38] The Pakistani study just cited also mentions inadequate local space for recreation. For children who are permitted to play outdoors – not always the case in overcrowded urban slums[39] – there are many risks, including heavy traffic with no sidewalks or safe crossing places, uncovered sewers and drainage ditches, uncollected waste, slippery and uneven walking surfaces, and a lack of safe play space.[28] Nor is it just a matter of play. Many children walk to school or have to reach toilets at a distance, coping with uneven terrain and an absence of street lights.

Social factors can combine with environmental hazards. Refugee populations, for instance, which increasingly end up in some of the most challenging and overcrowded settlements, can be especially vulnerable to injury. In Lebanon for example, refugee children were found to be at double the risk of dying from road traffic injuries as local children.[40] Climate change is another exacerbating factor. The growing prevalence of flooding, for instance, amplifies the hazards in many places, increasing the risk not only of falling, but also of drowning, snakebites and electrocution from downed power lines.[41] Tidal surges can wreak havoc in unprotected neighbourhoods, and torrential rains can also generate damaging landslides, particularly in peri-urban settlements built on steep slopes.[42]

Young children playing outdoors in risk laden environments in an informal settlement in Mumbai, India
CREDIT WHO / Diego Rodriguez 2015

Box 1. Patterns of child injuries in an urban slum in Dhaka

In Dhaka in Bangladesh, a house-to-house survey in Korail – the city's largest slum settlement – found that 43% of 486 children and adolescents in surveyed households had been injured in the previous year, a rate far exceeding that in Bangladesh's formal records. In part, this is due to the underestimation that is typical of formal injury figures. But it also relates to the far higher presence of environmental hazards in slum settlements.

For the 201 children who had been injured in Korail, the highest number had been burned (33%). Most studies show that younger children experience the highest burn rates, but here 90% were aged 5–15 years old and were mosly girls (87%). This points to the heavy reliance on young girls' help with cooking.

Road traffic injuries (the second most common cause) affected 29% of children, with a shocking 37% rate among those aged 5–10. Of these, the great majority were boys. In crowded slum settlements, streets can be the only unbuilt spaces where children can play – but to do so, they take their chances with traffic. Overall, 44% of the boys had been injured by vehicles in the past year.

Occupational injuries were the third leading cause, affecting over a quarter of 10–15-year-olds, 80% of whom were over 15. Even among the 5–10-year-olds, almost 10% had been injured while at work. Falls (on the street and from trees) were most common among children aged under 5 (mostly boys) and three children had fallen from a roof.[43]

3.2.3 Environmental risk factors at work

As is clear from Box 1, working children face a particularly high risk of injury, a reality that remains poorly documented. The International Labour Organization indicates that there are almost no statistics on occupational injuries for children or adolescents in the global South, but estimates that globally 79 million 5 to 17-year-olds work in hazardous conditions.[44] There are no specific urban figures, yet many millions of young urbanites work in taxing service jobs, waste recycling, construction and small industries, often doing unprotected work unsuitable for their size and strength. The risk of injury, furthermore, has been noted to increase along with the increased temperatures that are common in so many cities, especially with urban heat island effects.[45] Again, also at especially high risk are refugee children, whose families may be especially dependent on their children's contributions, and whose work may be particularly hazardous.[46]

A rare study from Cusco in Peru on occupational injuries for children and adolescents focused on 375 young workers aged 10 to 17 attending night school after work, a factor that the authors point out might result in underrepresenting those with more demanding and hazardous jobs. Of this sample, 97% reported occupational injuries, although only 3% had experienced severe injuries such as amputation. Injuries were primarily from falls and road traffic. The latter is especially common for young people who work on the street washing cars, transporting goods, collecting recyclables or serving as bus attendants. Most of them (82%) reported working under ergonomically difficult conditions, doing repetitive chores or handling overly heavy loads or devices, potentially causing damage to their growing bodies that could result in lifelong handicaps and deformities.[47]

4. INJURY TYPES

In most urban locations, falls, burns and road traffic injuries are the most common causes of child injury, with falls most often exceeding 50% of injuries.[48] There are anomalies, however, that highlight the very local nature of the distribution. Most studies also collect these statistics from emergency rooms or health centre records, and so are likely to overlook the less severe injuries. Table 1, which draws exclusively on studies from informal or slum settlements in two South Asian countries, demonstrates how much the situation can vary even where one might expect more similarity.

Table 1. Child injury prevalence and top three injury causes i low-income urban settlements in Bangladesh and India[49]

City	Injury prevalence	Male to female ratio	Highest prevalence	Falls	Burns	RTIs	Cuts	Dog bites	Location
Dhaka, Bangladesh	43%	1:1	< 5 years	13%	33%	29%			Home
Bangalore, India	28%	1:1	5–9 years	55%	9%			16%	Street
Delhi, India	7%	6:4	< 5 years	37%		19%		25%	Home
Burdwan, India	20%	9:10	1–4 years	73%	1.2%		15%		Home

4.1 Injuries caused by falls

Falls – whether from unprotected heights or because of slippery or rough surfaces under foot – are generally the most common source of injury for urban children. This can be especially prevalent in the challenging surroundings of many informal settlements. In Dar es Salaam, falls needing treatment were most common among children under five, with 42% higher odds among boys. Most falls here occurred outside (62%),[26] although in Maputo in Mozambique (62%) and in Burdwan in India (84%),[50] the majority happened indoors. While young children are the primary victims, a global school-based health survey found falls were the most common cause of injury even among adolescents.[51] According to a Bangladeshi study, falls are also the most common cause of permanent disability.[37]

4.2 Road traffic injuries

Road traffic injuries are the leading cause of death globally for young people aged 15 to 29, and the second leading cause among children aged 5 to 14.[52] Almost two out of three of these deaths occur while children are out walking,[40] with boys about twice as likely to be victims. Non-fatal injuries can result in lifelong disability. Some studies show higher rates in rural areas, where traffic can move far more rapidly.[53] But conditions in many low-income urban areas also present extremely high levels of danger. In the Dhaka slum described in Box 1, for instance, where the prevalence of child injury had been over 43% in the previous year, road traffic injuries were the second most common cause after burns, affecting 28% of children in the last year, the great majority of whom were boys.[20]

4.3 Burn injuries

Globally, the recorded death rate from burns is eleven times higher in LMICs, with the highest rates for young children.[4] [54] There is an especially high risk of burns in kitchen settings. In a Dhaka slum, girls aged between 10 and 15 who are expected to help with cooking, were found most likely to be the victims. Another Bangladeshi study found the highest prevalence among one- to four-year-olds, almost always in the kitchen. [37] Some studies find paediatric burns more common among rural children,[55] but this is not the case when overcrowded urban slums are considered. A rural-urban comparison in South Africa, for instance, found burns three times as common for the urban sample, with the highest risk attributed to overcrowded conditions.[51] In Kibera, an informal settlement in Nairobi, children under five were almost four times as likely to be burnt as those over five, especially toddlers aged between one and two, most likely because they are underfoot when cooking is happening.[56] Fires also have to be considered, especially in the overcrowded environs of slum settlements, where shacks may be built from highly combustible materials, and fires can spread rapidly from shack to shack.[54] In Maputo, where a data breakdown was available, 83% of children's burns were from scalding liquid and 17% from fires.

4.4 Drowning

Children under five are most often found to be at highest risk of drowning, and incidents mostly involve boys. In some countries, drowning is especially prevalent. In Bangladesh, for example, it accounts for 43% of all deaths in children aged one to four years; and in China, it is the leading cause of injury death in children aged between one and 14 years.[57] Drowning is generally found to be more prevalent in rural areas, but this is entirely a function of accessible local waterbodies. An Indian comparison of rural villages and urban slums found drowning was seven times more common in the urban sample settings, where large open runnels passed through settlements.[21] Given that young children can drown in a few inches of water, even poorly drained lanes can be a hazard in underserved settlements. Climate change is exacerbating the risks, with typhoon-related tidal surges in areas that have not been evacuated. Typhoon Haiyan in the Philippines, for instance, was associated with over 10,000 deaths.[58] There is also an increased prevalence of flash flooding in settlements without adequate storm drainage. The location of many slum settlements on steep slopes that are prone to landslides is also a factor here.[59]

4.5 Poisoning

Poisoning is generally considered more common in rural areas because of the prevalence of pesticide-related poisonings.[17] Yet in small overcrowded urban homes with limited storage space, access to pharmaceuticals can be a serious risk and also kerosene (paraffin), especially when it is purchased and stored in repurposed bottles. In an urban resettlement area in Johannesburg, for instance, it was tragically common for thirsty children to mistake a bottle of kerosene for water.[60] Although lead poisoning is not generally included in the injury category, it is worth mentioning how often children in slum areas may be exposed to this toxic substance. In eight Vellore slums, over 46% of 24-month-old children had elevated blood lead levels, a function of lead water pipes and clay floors.[61] Also in this general category is the rising risk of poisoning via the toxic chemicals contained in e-waste, a hazard which especially pertains to children working in dump sites to recover these harmful materials.[62]

4.6 Animal bites

A Cape Town study investigating the prevalence of animal bites found that the majority were caused by rats (65%), almost all (90%) inside the house, and the victims' median age was 2.9 years. Over 40% of bites occurred within just three informal settlements, where rodent infestation was high as a result of poor sanitation and waste removal. A follow-up investigation found most of the child victims lived in poor-quality housing with dilapidated floors.[63] Dogs and other animals can also be a serious hazard. In low-income areas in both Bangalore and Delhi, for instance, dog bites were the second most prevalent cause of injury for children (see Table 1).[27 64]

5. ASSESSING THE COSTS OF INJURY TO URBAN HOUSEHOLDS

Few studies from the global South assess the costs of injury to urban households and communities, and those that do tend to focus on hospital-treated events and hence underestimate the burdens. For many families, these costs can end up being catastrophic.[65 66]

Most such studies focus on adult injuries. An exception is research from a Ugandan slum, which found the average out-of-pocket cost for each child injury to be US$24, a large amount for already burdened households living on a few dollars a day and especially when considering there may be many such events.[67] A Nepal study found a third of affected households had to take out loans.[68] Added to this is the loss of school days for an injured child, averaging 25 days per injury in the Ugandan study, as well as the very serious long-term opportunity cost of disability. A World Health Organization study of Bangladesh, Colombia, Egypt and Pakistan found that nearly half of all children with an injury requiring emergency-room treatment were left with a permanent disability. This study also concludes that child injuries can be the precursor to family breakdowns and poverty.[69]

6. RESEARCH TO ACTION

A 2018 editorial on the global challenge of child injury prevention notes that injuries are increasingly recognised as 'predictable, preventable, and controllable' but also that in much of the world, the medical and public health professions have been 'slow to recognise opportunities for prevention'.[70]

There are many such opportunities, but responding to children's injuries, especially in environments of urban poverty, is not easy or straightforward. The proven measures employed in many high-income countries are simply not applicable in low-income contexts. Legislation regulating the temperature of hot-water taps makes little difference where running water is still a work in progress; and requiring infant car seats does not help families without cars. In many low-income settlements, restricting the sale of paraffin in recycled bottles without poison warnings might make more sense. As emphasised throughout this brief, patterns of injury vary considerably by locality, and can be especially intense – and difficult to address – in the challenging settings of underserved urban informal settlements.

Injury in these settings is a problem with many dimensions and contributing factors, including perceptions and the lack of data, along with a wide range of environmental conditions and the many social factors that complicate lives in poverty. Along with all this, there is often limited access to childcare and to health and emergency services. Ideally, interventions should be multi-pronged, addressing the constellation of factors that come into play. In Ghana, for instance, multiple simultaneous strategies were recommended, including injury surveillance systems, home hazard reduction, provision of safety equipment, establishing community crèches and traffic-calming interventions.[71]

There are numerous potential actors at all levels of government and civil society that need to be engaged to support the uptake of evidence-based interventions. Here we focus specifically on a potential role for non-governmental organisations (NGOs), and especially child-focused NGOs. The emphasis here is less on the creation of stand-alone programmes and projects than on support to both formal and community-driven systems. That said, some stand-alone injury prevention programmes have been extremely powerful. In Bangladesh, for instance, where drowning is the leading cause of death among children, an intervention that included swimming lessons, water safety and water-rescue skills along with improved supervision, decreased the risk of drowning among children aged four to 12 by 90%.[72]

Despite such dramatic results, however, the potential for well-targeted, sustainable efforts tends in general to be stronger where there is good integration with local systems. Child-focused NGOs can play a critical role on this front in responding effectively to the many overlapping needs. This includes raising awareness, supporting local recordkeeping, and situation analysis as a basis for determining locally appropriate responses and helping to ensure that these are effectively implemented in communities that most need this support. This certainly does not negate the need for a conducive policy environment, or for high-level attention to injury as an essential component of public health, for which NGOs can also be valuable advocates.

A shanty area built on top of breakwater and prone to flooding in Manila, Philippines
CREDIT WHO/Anna Kari, 2009

6.1 Raising awareness of the problem

An acceptance of the preventable nature of most unintentional injuries is fundamental to addressing the problem. As long as injuries are widely seen as unavoidable 'accidents', little progress can be made. The health sector has a key role here, particularly in convening other sectors where policies have impacts on health and injury outcomes, such as the transport and housing sectors. Parental/caregiver awareness is also critical. Research in Uganda indicates that while mothers assume injuries are unavoidable, they are also painfully aware of the toll they can take and are very open to considering the measures they might take in avoiding them.[9] A training programme for mothers in inner-city Turkey on risk assessment and safety precautions resulted in a highly significant change in knowledge and awareness among mothers of children aged zero to six years.[73]

Awareness at the community level is also essential to galvanise the types of changes that go beyond individual households. Child-focused NGOs have been extremely effective over the years in carrying out awareness campaigns on many fronts, whether for mosquito nets, immunisation, birth registration or the eradication of child labour. They are well-placed to stimulate local actors and to support their efforts. Their own recognition of the significance of the problem is a starting point.

6.2 Keeping better records of the nature and scale of the problem

Many injuries, as discussed above, never make it into formal records. Even when they do, these records can be unreliable. Even hospital and clinical records in some places are still handwritten or available only in summary form. This can mean, for instance, that the important distinction between the **nature** and **cause** of an injury remains unclear.[5] This has practical implications. For example, even if we know how many children in a city have been treated for burns, unless we know whether burns resulted from house fires or scalding pots of water, there is no basis for developing prevention strategies. The situation can be especially difficult in informal settlements, where children may never be seen in formal health facilities. NGOs can offer valuable technical support in this regard, supporting the efforts of both formal facilities and such local providers as pharmacists to keep systematic records, and spearheading the establishment of coordinated databases.

6.3 Identifying risks and hazards at community level

Good, detailed and disaggregated records identifying the most serious injury problems, along with their causes and impacts, are essential underpinnings for identifying risks. The GBD study, a fine example of the capacity to build on these data to identify trends at scale, is relevant to informing public policy and investments at a national level. But this is too blunt an instrument to be useful to the prevention efforts of city governments and local civil society, which need information down to the ward or neighbourhood level. This is especially the case for informal settlements, which are often subject to higher rates of injury. Yet they are seldom the recipients of environmental improvements or of preventive and curative health services.

As long as injuries are widely seen as unavoidable 'accidents', little progress can be made.

In several papers of the research series of the Global Alliance – Cities 4 Chidlren, we have highlighted the capacity of grassroots organisations to carry out this kind of local data collection, focusing specifically on the community enumerations carried out by members of local slum/shack federations.[74]

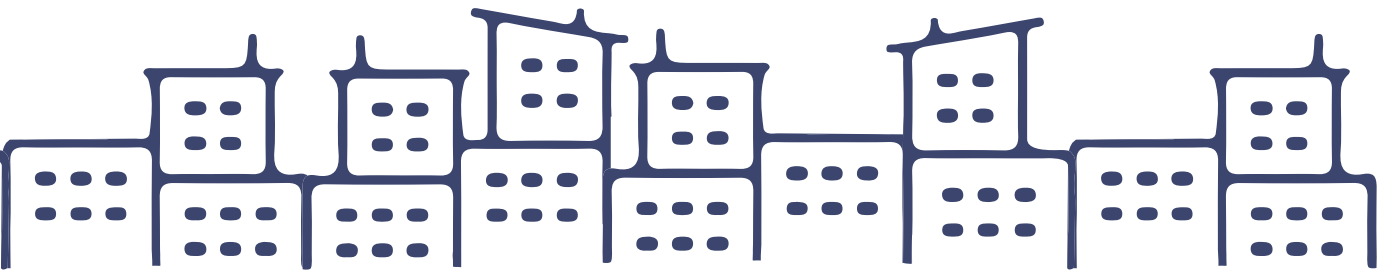
These enumerations do not focus on injury prevention, but they demonstrate the capacity of such community groups to make use of shared tools that can assemble data critical to their capacity to represent themselves and their concerns to local government, and to negotiate for solutions. Box 2 provides an example of the kind of data such local groups could collect to raise awareness about local risks and hazards. Child-focused NGOs could provide invaluable support on this front, either collaborating with existing community data-collection efforts or initiating such efforts where they do not already exist.

Box 2. A local assessment of injury patterns in Mehrauli, South Delhi

In Mehrauli in South Delhi, an assessment of 400 households determined the pattern of injuries over a year among 622 children under 14, and the conditions underlying these injuries. Nearly 40% of the 622 children had suffered an injury in the previous year, most of them children aged 1 to 3 years old. Falls were the most common injury (60%) followed by cuts (15%), burns and scalds (13%), and animal bites (7%). Girls were more likely than boys to be injured by burns or cuts, and boys were more likely to fall.

Based on evaluations of the household environment, almost half the sampled homes were considered overcrowded. All stairways were found to be unsafe (too steep, too narrow, unprotected). There were unsafe electrical points in 95% and unsafe balconies (without adequate parapets) in 90% of homes. Most homes (86%) had unsafe methods for heating water (open fires, electric rods) and 29% had access to sharp objects. Some factors were riskier than others. For instance, while injuries due to slippery floors were less common than those caused by unsafe stairways, slippery floors were more likely to have caused injury. Kitchens posed particular risks, especially when they also functioned as living rooms (over 25%), and combined overcrowding with access to sharp knives, fire, electrical points and fuel containers.[16]

This study focused only on homes and their immediate surroundings, thus ignoring events and potential threats at the neighbourhood level, including road traffic injuries. Furthermore, Mehrauli is a formal neighbourhood, and conditions are not as hazardous as those in nearby slums. But despite these limitations, the study is presented in this section because of its systematic assessment of household hazards, linked through in-depth interviews to the actual occurrence of injury over a year. The study serves as an excellent model for the kind of evaluation that could routinely be conducted in more hazardous informal settlements as well.



6.4 Implementing interventions

Once patterns of risk are established for a community, there are numerous potential entry points for the implementation of effective interventions. The important common thread is that they make sense locally, and that local residents and institutions can get behind them. There are many possible entry points that child-focused NGOs might consider. One way, for instance, would be to focus on inexpensive, realistic interventions to make home environments safer, such as the elevation of cooking surfaces and the availability of safe storage units.

One especially practical approach might be to integrate injury prevention into support for local childcare provision. This fundamental (and often inadequate) service within urban poor communities ideally promotes the capacity of local women, and sometimes men and older siblings, to pursue livelihoods or schooling, while enhancing the safety, health and development of young children. In Bangladesh, for instance, improved provision of good childcare was associated with 80% lower rates of drowning.[68]

Child-focused NGOs can provide much critical support in this regard, but in terms of injury prevention, this could be quite specific. Part of the training made available to daycare providers, for instance, could include raising awareness about injury. This might include careful assessments of the risks within the daycare environment, which without adequate attention may be as high as anywhere in a settlement. The research within eight slums in Vellore, for instance, revealed that the presence of environmental hazards in the homes of local babysitters was higher than in any other local setting.[32] Support to these providers might include funds for remediating these hazards. Providers could also receive first aid training, and could be encouraged to share their learning with parents. Daycare centres could serve more generally as a clearinghouse for local efforts, making public health information available, working together to build safe play spaces for local children, and lending out safety equipment, such as gates for stairways, to families with young children.

Another important entry point would be local slum-upgrading projects. These schemes offer an incomparable opportunity to correct many local safety hazards in the course of reblocking and rebuilding. This could include such measures as:

- The provision of safe play spaces close enough to every home for routine use
- Recreational facilities for older children so that streets are not used for this purpose
- Widening lanes for the passage of emergency vehicles (as well as waste removal)
- Ensuring that streets also include safe crossing places and sidewalks for pedestrians, and especially for children on their way to school
- Providing street lights, safe electrical lines and covered ditches, and
- Arranging housing in a way that creates safe internal courtyards facing away from traffic.

Realising these kinds of changes would clearly need to be a stated priority objective from the outset. Yet it is surprising that so little work exists exploring upgrading as an avenue for injury prevention, given the huge potential on this front. By contrast, there is copious work outlining the implications of upgrading for health.[75] About ten years ago, UN Habitat prepared a useful report describing the ways that slum-upgrading projects have incorporated measures to reduce local violence. Many of the same basic injury-prevention principles would apply for upgrading – including building partnerships and encouraging the participation of those most affected. Child-focused NGOs could serve an important intermediary role here, ensuring that children's safety be part of the agenda for any planning sessions, providing support for parents and older children in identifying the hazards, and advocating with local government for attention to this important issue.

7. CONCLUSION

Despite more general improvements worldwide, rates of unintentional injury for children and adolescents remain inexcusably high in LMICs, receiving far less attention than that directed to infectious diseases and malnutrition. The burden of child injury is particularly high in slums and informal settlements, reflecting the especially challenging living conditions in these areas, as well as the lack of emergency response and healthcare services. Rapid rates of motorisation and the growing pressures of climate change in settlements poorly equipped to deal with extreme conditions exacerbate the problem. Adequate responses are also compromised by a widespread inclination to see injuries as 'accidents' – random events that cannot be avoided. Meanwhile, children suffer not only the immediate distress and the possibility of long-term disability, but also a constriction in the types of opportunities for play and mobility that are available in safer communities.

Because injuries are so closely related to local environmental conditions, there are no one-size-fits-all solutions. Even more than with other problems besetting poor urban residents, adequate responses must be locally relevant, depending on local situation analyses and risk assessments, and drawing on the knowledge and involvement of local residents. There are many potential actors in the networks of support, and child-focused NGOs can play an especially valuable role, helping to raise awareness at all levels of this under-recognised issue, and encouraging the processes that can realistically address it.

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