

Injury prevention and the attainment of child and adolescent health

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Abstract Urgent attention is required to tackle the problem of child and adolescent injury across the world. There have been considerable shifts in the epidemiological patterns of child deaths; while great progress has been made in preventing infectious diseases, the exposure of children and adolescents to the risks of injury appear to be increasing and will continue to do so in the future. The issue of injuries is too often absent from child and adolescent health agendas. In December 2008, WHO and the United Nations Children's Fund published the *World report on child injury prevention*, calling global attention to the problem of child injuries. This article expands on the report's arguments that child injuries must be integrated into child health initiatives and proposes initial steps for achieving this integration.

الترجمة العربية لهذه الخلاصة في نهاية النص الكامل لهذه المقالة. . الترجمة العربية لهذه الخلاصة في نهاية النص الكامل لهذه المقالة. . الترجمة العربية لهذه الخلاصة في نهاية النص الكامل لهذه المقالة. . الترجمة العربية لهذه الخلاصة في نهاية النص الكامل لهذه المقالة.

Introduction

Urgent attention is required to tackle the problem of child and adolescent injury across the world. There have been considerable shifts in the epidemiological patterns of child deaths; while great progress has been made in preventing infectious diseases, the exposure of children and adolescents to the risks of injury appear to be increasing and will continue to do so in the future. The international focus of child health interventions has been on reducing mortality of children aged less than 5 to achieve the Millennium Development Goals. This has meant that the 5-18-year age group, in which injuries constitute a great burden, has received less attention. Indeed across the whole age spectrum of childhood and adolescence, the issue of child and adolescent injuries is often absent from discussions and is largely invisible in policies.

In December 2008, WHO and the United Nations Children's Fund published the first *World report on child injury prevention*,¹ calling attention to the problem internationally. The report focused on the five leading causes of child injury deaths – road traffic injuries, drowning, poisoning, burns and falls – and set out what can be done to prevent these injuries. This article expands on the report's arguments that child injuries must be integrated into child health initiatives and proposes some initial steps for achieving this integration.

The importance of child injury

Injury is a significant cause of death and morbidity among children from the age of one,¹ and increases to become the leading cause of death among children aged 10 to 19 years (Fig. 1). Each year approximately 950 000 children aged less than 18 years die as a result of an injury or violence. Nearly 90% of these – about 830 000 – are due to unintentional injuries – about the same number that die from measles, diph-

theria, polio, whooping cough and tetanus combined. Most of these unintentional injuries are the result of road traffic crashes, drowning, burns, falls and poisoning, with the highest rates occurring in low-income and middle-income countries (Table 1). In addition to these deaths, tens of millions more children sustain injuries that do not kill them but are serious enough to require hospital treatment and sometimes result in disability.

The importance of child injury can be obscured by a focus on the major causes of mortality of children aged less than 5, which in most of the world's countries do not include injury. Even in regions where injury deaths are known to be underreported and child survival is determined mainly by perinatal causes, lower respiratory infections, diarrhoeal disease, malaria and measles, child injury has an impact on mortality rates of children aged less than 5 and comprises a substantial proportion of child deaths after the age of 5 years. In countries that have made substantial progress in eliminating or reducing childhood deaths from other causes, however, child injury clearly emerges as a major problem. For example in high-income countries, unintentional injuries account for nearly 40% of all child deaths, even though these countries generally have substantially lower child injury fatality rates than low- and middle-income countries.¹

An example from Bangladesh illustrates the point of the relative position of injuries compared with other causes of death. Long-term trend data from the Matlab community laboratory are available for the period 1974 to 2000. Drowning has always been a significant cause of death and in the pre-immunization era, it killed as many children aged less than five as measles. When vaccine-preventable causes were virtually eliminated, drowning rates remained much the same. The relative proportion of drowning mortality has thus increased, rising from 9% of deaths in 1–4 year-olds in 1983 to 53% in 2000.^{2,3}

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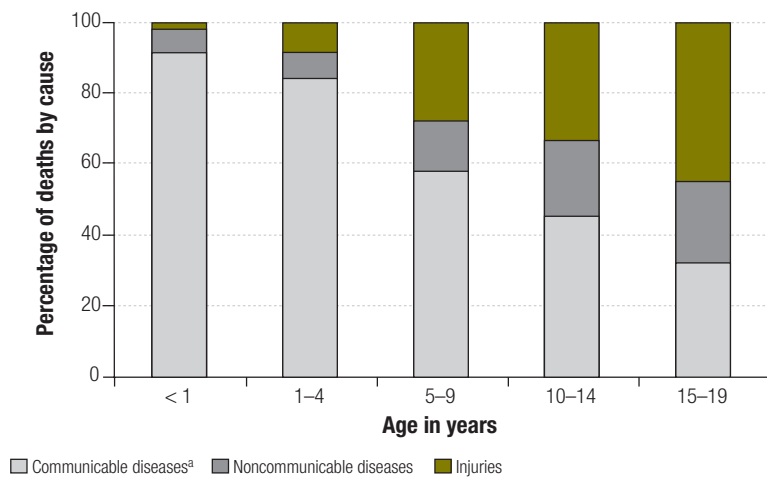
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Why must we act now?

Data show clearly that child injuries take an unacceptably high toll on children's health and development and on society (Box 1). Furthermore, if current trends continue, the global burden of injuries is expected to rise in the next 20 years.⁴ If the groundwork to prevent child injuries is not laid now, the processes that currently drive change in our world are likely to exacerbate the problem. Some processes such as globalization and urbanization may bring benefits that can bolster prevention efforts – for example: increased resources, improvements in access to and quality of health services, knowledge transfer of effective injury prevention measures, and fostering a culture of safety. Without a concerted effort to harness these benefits in the implementation of child injury prevention measures, however, the negative effects of the processes will prevail.

Rapid and unplanned urbanization continues to produce squatter camps, slums and informal urban settlements, which pose high risks of injury for children across the developing world.^{5,6} The process of motorization also affects child injury risk. Roads have always been dangerous places for children but the growing rate of traffic volume, and the worldwide modal shift of transport systems to roads, means that the issue is increasingly pressing. Road traffic injuries already are the leading cause of death among 15–19 year-olds and the second leading cause of death among 10–14 year-olds,¹ and deaths and injuries from road traffic crashes are forecast to rise dramatically across the world in the coming decades.^{4,7} Environmental change may also have an impact on injury rates. Children can be exposed to injury risk either through an increase

Fig. 1. Main causes of death among children, world, 2004¹



^a Includes communicable, maternal, perinatal and nutritional conditions.

in “extreme” events that pose hazards directly, such as flooding or mud flows, or through longer-term degradation of environments such as droughts, desertification or rises in sea level.⁸ Poor children in low- and middle-income countries, who often live in overburdened informal urban settlements or marginalized rural areas, are especially vulnerable to the negative effects of processes such as urbanization, motorization and environmental change. These major global processes may have a significant influence on child-injury epidemiology and prevention, and child injury in a rapidly changing world needs to be at the heart of future public health policy and practice.⁹

What can be done?

The evidence base for child injury prevention is not fully developed, especially regarding evidence of effective practice

in low- and middle-income countries, but enough is known about what works to begin taking action. Countries that have achieved the greatest gains in child injury prevention have implemented a combination of multisectoral strategies to reduce the risk of new injuries occurring, to reduce the severity of injuries that do occur, and to reduce the frequency and severity of injury-related disability. These proven interventions (Box 2) must be further disseminated in the countries where they are already in place, and they must be adapted, implemented, and their impact monitored in countries and communities with high child injury rates and little prevention activity to date. It has been estimated that worldwide implementation of a set of 12 widely-tested interventions covering road safety, drowning, poisoning and burns could save more than 1000 children's lives a day.¹⁰

Policies and programmes to reduce child injuries should incorporate several effective approaches including the following:

Legislation and enforcement

Legislation requiring the use of protective equipment such as helmets, child passenger restraints, seat-belts, smoke alarms, child-resistant containers and fencing around swimming pools can lead to increased usage of such equipment and thereby reduce the risk of injuries and their severity. Mandatory standards for various goods and services (e.g.

Table 1. Unintentional injury death rates per 100 000 children aged less than 20 years by cause and country income level, world, 2004¹

Country income level	Road traffic	Drowning	Fire burns	Falls	Poisons	Other ^a	Total
High-income countries	7.0	1.2	0.4	0.4	0.5	2.6	12.2
Low- to middle-income countries	11.1	7.8	4.3	2.1	2.0	14.4	41.7
World	10.7	7.2	3.9	1.9	1.8	13.3	38.8

^a “Other” includes categories such as smothering, asphyxiation, bites, hypo/hyperthermia, as well as natural disasters.

Box 1. Facts about child injuries

- Approximately 830 000 children aged less than 18 years die every year as a result of an unintentional injury.
- Unintentional injuries are the leading cause of death for children aged more than 9 years.
- Road traffic injuries and drowning account for nearly half of all unintentional child injuries.
- Tens of millions of children require hospital care every year for non-fatal injuries.
- Road traffic injuries and falls are the main causes of injury-related child disabilities.
- 95% of child injuries occur in low- and middle-income countries.
- Child injuries remain a problem in high-income countries, accounting for 40% of all child deaths.
- Many high-income countries have been able to reduce their child injury deaths by up to 50% over the past three decades by implementing multisectoral, multipronged approaches to child injury prevention.

playground equipment, safety equipment, toys, furniture and packaging) also show commitment to child safety and can reduce risk. To be effective, of course, legislation and regulations must be enforced. In many cases the degree of enforcement determines the effectiveness of these prevention measures.

Product modification

Modification of products such as cooking stoves, lamps, playground surfaces, furniture and furnishings (e.g. cribs, stairway railings) and modification of product packaging can be effective prevention strategies by reducing the risk of injury, reducing access to a hazard and/or by reducing injury severity.

Environment

Environmental modification is an especially important strategy for preventing road traffic injuries. Under this type of strategy, area-wide engineering measures, such as traffic-calming schemes or separating motorized and non-motorized traffic, are used to reduce the risk of a crash.

Home visits

Supportive home visiting programmes with visits carried out by trained, professional visitors (e.g. nurses) can provide family support, lead to improvements in the home environment and be used for parent education and training.

Safety devices

Promotion of safety devices (e.g. helmets, smoke alarms, seat-belts) can take place through a variety of methods, including media campaigns, professional counseling and enforcement of legislation.

Education

Education, skills development and behaviour change programmes for children and parents should be incorporated as one component of a multifaceted child injury prevention strategy,

but should not be used as stand-alone measures since there is no evidence that this type of programme reduces injury risk in the absence of other measures.

Care and rehabilitation

Improvements in access and quality of prehospital and essential trauma care and rehabilitation are important measures for reducing the severity of injuries and their sequelae, for reducing the frequency and severity of injury-related disability and for improving outcomes for children living with injury-related disability.

The *World report on child injury prevention* declares that, given what is presently known about child-injury prevention, “the cost of doing nothing is unacceptable”.¹ It would be tragic to achieve significant gains in child survival only to lose those gains to injuries.

Box 2. Proven interventions in child injury prevention¹**Road safety**

- Introduce (and enforce) minimum drinking-age laws
- Set (and enforce) lower blood alcohol concentration limits for novice drivers
- Wear motorcycle and bicycle helmets
- Set (and enforce) seat-belt, child-restraint and helmet laws
- Reduce speed around schools, residential areas, play areas
- Separate different types of road user
- Introduce (and enforce) daytime running lights for motorcycles
- Introduce graduated driver licensing systems

Drowning

- Remove (or cover) water hazards
- Require four-sided fencing around swimming pools
- Wear a personal flotation device
- Ensure immediate resuscitation

Burns

- Set (and enforce) laws on smoke alarms
- Develop and implement a standard for child-resistant lighters
- Set (and enforce) laws on hot tap water temperature, and educating the public
- Treat patients at a dedicated burns centre

Falls

- Redesign nursery furniture and other products
- Establish playground standards for the depth of appropriate surface material, height of equipment and maintenance
- Legislate for window guards
- Implement multifaceted community programmes such as ‘Children can’t fly’

Poisoning

- Remove the toxic agent
- Legislate for child-resistant packaging of medicines and poisons
- Package drugs in non-lethal quantities
- Establish poison control centres

Getting serious about child-injury prevention

Child safety as a public health concern has gained momentum and a strong research foundation over the past decades, as demonstrated by the material reviewed for the *World report on child injury prevention*. To achieve large gains in child safety, however, child injury prevention knowledge and practice must now be integrated into mainstream child and adolescent health initiatives; this need is recognized in the report and constitutes one of the seven main recommendations. From a child-health perspective, this integration is essential, given the burden of child injuries. From a child safety perspective, such integration is needed to overcome obstacles to child injury prevention. Injury prevention must be included in child and adolescent health research agendas and as part of child and adolescent health policy development and practice. Several steps may be taken to begin this integration.

The *World report on child injury prevention* identifies formidable challenges that must be overcome to make significant progress in child injury prevention (Box 3). Many of these challenges are not unique to the injury field. Child and adolescent health practitioners have been struggling with similar challenges to address pneumonia, malaria, malnutrition, HIV/AIDS and the provision of quality pregnancy, childbirth and neonatal care. They have learned lessons about implementing successful multisectoral interventions, generating political will, addressing human-resource constraints, adapting effective interventions and improving data. These lessons must be shared and compared with similar lessons learned in the context of child injury prevention.

Countries with a high burden of child injuries need to give special attention to addressing the issue and linking prevention efforts with other child/adolescent health initiatives. In countries with a high burden of violence against children and young people, violence prevention measures should be included

Box 3. Challenges in child-injury prevention

- Few countries have good descriptive data on the problem
- Limited evaluation of what works in low- and middle-income countries
- Limited human capacity to address the issue
- The perception that child injury is due to chance
- Poor collaboration between agencies to address child injuries in a coherent manner
- Lack of funding to support prevention efforts
- Lack of political commitment and understanding

as part of larger child injury prevention initiatives. Health information systems should monitor child injuries as an indicator of child health. Child injuries should be covered in situation assessments, conducted as part of child and adolescent health policy development at the national and local level. Where injury surveillance systems are not in place, community-based surveys may be required to yield better estimates of the magnitude of child injury.

Child injury prevention can be linked to specific related issues in child and adolescent health. Measures to reduce indoor air pollution, for example, are a recommended component of strategies to prevent pneumonia, a leading killer of children aged less than five.¹¹ Strategies to reduce indoor air pollution also can have a direct impact on the risk of burns, such as recently witnessed in Guatemala.¹² Initiatives to create healthy environments for children could be natural partners for child injury prevention.

Child injury prevention can be integrated with broader child and adolescent health promotion strategies. Healthy public policy – a key health promotion tool – is an essential component of child injury prevention, as indicated by the impact of enforced legislation and regulations. Health-promoting initiatives in schools can incorporate injury prevention and safety promotion in policies designed to create a healthy school environment and also in the curricula of school health programmes aimed at students. Similarly, child-injury prevention can be taken up by “healthy cities” programmes in areas where the burden is large but not cur-

rently on the agenda. Community-led approaches to child injury prevention can work well and make a good match with the community-based approaches at the foundation of many health promotion initiatives. Finally, education, skills development and behaviour change approaches to child injury prevention can be integrated with health promotion campaigns designed to change child and adolescent behaviour.

Conclusion

Children have the right to health, a safe environment and protection from injury. Countries that have signed the Convention on the Rights of the Child are obliged to take legislative, administrative, social and educational measures to ensure to the maximum extent the survival and development of the child; this obligation includes protecting children from injury.¹³ Unless the multisectoral initiatives described above are disseminated and implemented in a timely manner worldwide, the burden of injuries on children’s health and survival will increase, and some of the investment in and gains won through child survival initiatives will be eroded as children lose their lives and health to injury later in childhood. The obstacles that currently hinder progress in child injury prevention can be partially overcome by integrating child injuries in the larger child and adolescent health agenda, both in policy and in practice. Conversely, progress in child and adolescent health will be limited if child injuries are not addressed systematically. ■

Competing interests: None declared.

Résumé

Prévention des traumatismes et progrès vers la santé de l'enfant et de l'adolescent

Il convient de s'intéresser et de s'attaquer rapidement au problème des traumatismes affectant les enfants et les adolescents à travers le monde. Les schémas épidémiologiques de la mortalité infanto-juvénile ont subi des évolutions considérables ; alors que de grands progrès ont été réalisés dans la prévention des maladies infectieuses, il semble que les enfants et les adolescents soient de plus en plus exposés au risque de traumatisme et que cette situation ait tendance à perdurer dans l'avenir. La question des traumatismes est trop souvent absente des programmes en faveur de la santé des

enfants et des adolescents. En décembre 2008, l'OMS et le Fonds des Nations Unies pour l'enfance ont publié le *Rapport mondial sur la prévention des traumatismes chez l'enfant*, qui appelle à être attentif dans le monde entier à la problématique des traumatismes chez l'enfant. Le présent article développe l'argumentation de ce rapport en faveur de l'intégration de la prévention des traumatismes dans les initiatives pour la santé des enfants et propose des étapes initiales pour réaliser cette intégration.

Resumen

La prevención de las lesiones y la consecución de la salud del niño y del adolescente

El problema de las lesiones de los niños y los adolescentes requiere atención urgente en todo el mundo. La distribución de las muertes infantiles ha sufrido cambios epidemiológicos considerables; se han hecho grandes progresos en la prevención de las enfermedades infecciosas, pero la exposición de los niños y adolescentes a los riesgos de lesiones parece estar aumentando, y seguirá haciéndolo en el futuro. El problema de las lesiones está a menudo ausente

de los programas sobre la salud del niño y del adolescente. En diciembre de 2008 la OMS publicó el *Informe Mundial sobre Prevención de las Lesiones en los Niños*, en el que se llamaba la atención para este problema. En el presente artículo se amplían los argumentos expuestos en dicho informe en defensa de la integración del problema de las lesiones en las iniciativas sobre la salud de los niños y se proponen medidas iniciales para lograr dicha integración.

ملخص

الوقاية من الإصابات وصحة الأطفال والمراهقين

الصحة العالمية واليونيسف التقرير العالمي حول الوقاية من الإصابات لدى الأطفال، ودعت المنظمات إلى إيلاء اهتمام عالمي لمشكلة إصابات الأطفال. ويوسع هذا المقال من مجالات النقاش التي وردت في التقرير حول إصابات الأطفال وأنها ينبغي أن تدمج في مبادرات صحة الطفل، ويقترح اتخاذ خطوات مبدئية لتحقيق هذا الإدماج.

تمس الحاجة لإيلاء الانتباه والتصدّي للمشكلات في إصابات الأطفال والمراهقين في جميع أرجاء العالم. فقد حدث تحول واضح في الأنماط الوبائية لوفيات الأطفال؛ ففي حين أحرز تقدّم كبير في الوقاية من الأمراض المعدية، فإن تعرّض الأطفال والمراهقين لأخطار الإصابات في تزايد وسيواصل تزايد في المستقبل. وتغيب قضية الإصابات من جداول الأعمال الخاصة بصحة الأطفال والمراهقين في غالب الأحيان. وفي كانون الثاني/ديسمبر 2008 أصدرت منظمة

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