

Childhood injury prevention in Hong Kong

Hong Kong Childhood Injury Prevention Research Group

Injury is a major health problem in Hong Kong children. During the past two decades, injury and poisoning have surpassed infectious diseases as the leading cause of childhood mortality in Hong Kong. These two are also the leading cause of childhood disability. In 1995, injury and poisoning caused approximately 2% of the deaths among children aged 0 to 1 years, 26% of the deaths among children aged 1 to 4 years, and 36% of all deaths in children aged 4 to 14 years. Road traffic accidents, drowning and submersion, and accidental falls accounted for 30%, 20%, and 20%, respectively, of all deaths from unintentional injury in children younger than 15 years of age. Exact morbidity figures for injury and poisoning are not available but injuries are known to account for approximately 30% of paediatric attendances at the accident and emergency department of a regional hospital, 20% of all hospitalisations among children, and 65% of surgical and orthopaedic admissions. It has been estimated that approximately 2.9% of children will be admitted to hospital for an injury at least once before their fourth birthday. Hong Kong is a small, highly urbanised, and densely populated place that has undergone tremendous socio-economic development in the past three decades. The pattern of injuries has changed and shows some special characteristics. Information on the extent of the problem, the type of injury, and contributing factors are scarce. Preventive measures are reactive in nature, piecemeal, and usually not subject to evaluation. It is recommended that childhood injury prevention be accorded a high priority, child safety be given prime consideration in all policies involving children, and more research be conducted.

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Introduction

During the past two decades, injury and poisoning have surpassed infectious diseases as the leading cause of death and disability in children and youths in Hong Kong.¹ Injuries are not random, uncontrollable events and can be studied in an organised fashion using the three methods of scientific investigation—epidemiology, biomechanics, and behavioural science. Epidemiology provides an understanding of the distribution of injuries among different risk groups, so that targeted interventions can be designed. Biomechanics

gives an understanding of human vulnerability and resilience to trauma, so that trauma can be limited to tolerable amounts. Behavioural science provides information about the risk behaviours of children and adolescents, and ways to modify these.² By understanding how and why injuries arise, interventions can be developed and implemented that prevent or limit the extent of a given injury. In fact, more than 90% of injuries are predictable and preventable.

The epidemiology of childhood injury

Injury patterns are characterised by episodic occurrence, seasonal variation, long-term trends, and demographic distributions. An injury is the result of a complex interaction between human (host), vector (agent), and socio-economic environment and can be studied in much the same way as an infectious disease. However, unlike other diseases, there are three phases in an injury event—the pre-event phase, event phase, and post-event phase. The Haddon phase-factor matrix, which consists of two axes—the three types of risk or protection factors (human, technology, environment) versus the temporal axis (pre-event, event, post-event) for injury occurrence is one good study model. This

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matrix allows one to consider an injury in all the epidemiological dimensions at each phase in time, which generates further hypotheses about specific risk factors and determines points of intervention in the causal sequence.

Readily available and accurate injury data are needed to assess the size of the problem, to design prevention strategies, and to evaluate control measures. The mortality statistics for injuries are accurate and readily available in Hong Kong. Each mortality arising from an injury is certified by a coroner and duly recorded. From 1990 to 1996, between 50 and 80 children aged less than 15 years died as a result of injuries annually. In 1995, injury and poisoning caused approximately 2% of the deaths among infants aged 0 to 1 years, 26% of the deaths among children aged 1 to 4 years, and 36% of all deaths in children aged 4 to 14 years of age. Road traffic accidents, drowning and submersion, and accidental falls accounted for 30%, 20%, and 20%, respectively, of all deaths from unintentional injury in children younger than 15 years of age.¹ The average annual mortality rates were 4.8 per 100 000 for boys and 3.0 per 100 000 for girls. But mortality figures do not give a complete picture of the injury problem.

Injury morbidity data are much more difficult to obtain; accurate morbidity figures for injury and poisoning are not available in Hong Kong. Although all public and private hospital discharges are assigned codes from the International Classification of Diseases, external causes (E-code) are frequently not coded, and a breakdown by age is not available. A study in one regional hospital showed trauma accounting for 65% of surgical and orthopaedic admissions of children younger than 12 years of age, 15% of whom required an operation under general anaesthesia.³ With the computerisation of hospital records, these data may be available in the near future.

Most childhood injuries seem to be treated at accident and emergency departments rather than by private practitioners.⁴ Thus, attendance figures from these departments might be an indication of the prevalence of childhood injuries. Statistics from the Hospital Authority indicate that each year about 60 000 children younger than 15 years of age attend accident and emergency departments for trauma injuries (Lai KK, written communication, 1998). Injuries have been shown to account for approximately 30% of paediatric attendances at the accident and emergency department of a regional hospital and for 20% of all hospitalisations among children.⁵ It has been estimated that 2.9% of children will

be admitted to hospital because of injury at least once before their fourth birthday.⁶

Because Hong Kong is a small, highly urbanised, and densely populated place, the pattern of injuries shows some special characteristics. The overcrowded home environment leads to the use of bunk beds, camp beds, folding chairs, and folding tables by many families to save space. From 1985 to 1989, eight children suffocated to death because they became trapped in folding tables. Falling off a bed, especially from a bunk bed, is a common cause of head injury.

Many children are left unattended at home due to the increasing number of working parents. Coroners' statistics indicate that from 1989 to 1994, a total of 113 unattended children died in Hong Kong. Some types of injury show definite seasonal patterns—for example, fractures are more common during the summer holidays and burns occur over the time of mid-autumn festival.^{7,8}

Poisoning is relatively uncommon in Hong Kong. The pattern of poisoning is changing—for example, in the 1960s, salicylate, kerosene, and pesticide products were the main agents involved. Currently, drugs taken by parents or relatives are the main causative agents.⁹

Data from a prospective study conducted in the accident and emergency department in a regional hospital indicate that accidental falls accounted for 44% of injuries, traffic accidents 7.3%, sports injuries 6.0%, foreign bodies in the eyes or other orifices 5.6%, bicycle injuries 3.8%, burns and scalds 1.1%, poisonings 0.6%, and other injuries 31.7%. Approximately half of the injuries occurred at home.⁵ While there are several hospital-based studies into different aspects of childhood injuries, most are descriptive, and pre-event or event risk factors were not analysed.⁵⁻¹¹

Population-based injury statistics are ideal but are often difficult to obtain. To obviate the very high cost involved in getting an accurate estimate of the prevalence of childhood injuries and yet to be able to identify most, if not all, risk factors, an 'event enumerative approach' using social research principles can be adopted. In an ongoing large-scale hospital-based study, a list of event descriptors was derived through a 'saturation' process from more than 400 injury cases reported to an accident and emergency department in Hong Kong. Events are grouped based on age, sex, and the following six causative factors: (1) physical hazards; (2) behaviour hazards of carers; (3) behaviour hazards of peers; (4) child in a dangerous

state; (5) dangerous act of the child; (6) accident. The list of event descriptors, when properly validated, could be used in a preventive programme.¹²

Active and passive measures for the prevention of injuries

The identification of causal factors and high-risk groups are important for the design of appropriate preventive interventions. Such measures should aim to prevent the injury from occurring (pre-event) in the first place, diminish the damage caused by the injury once it occurs (event), or limit the long-term sequelae of the injury (post-event).

Interventions can be considered active or passive, depending on whether a change in behaviour is needed on the part of the host. Active measures require the participation of individuals and are behaviour-dependent. They usually require health education that attempts to persuade individuals to adopt and maintain a 'safe' behaviour. Passive measures do not require the individual's cooperation for protection and are dependent on environment or technology. Passive measures mainly employ safety technologies that use biomechanics to minimise the energy transmitted to the child during any contact so as to avoid tissue damage. Regulations or legislation are often required for their implementation and enforcement.

Passive measures that automatically protect children and youth through technological or environmental means are the most effective. There is no way, however, to remove all potential dangers and passive measures cannot be used to prevent all categories of injury. Next in order of effectiveness, are the legislative or regulatory measures that ensure the adoption of safe behaviours. While health education programmes aimed at modifying behaviours have not been found to be very effective by themselves, a number of community programmes that require local participation and use a broad range of interventions have been found to effectively reduce childhood injuries from a wide variety of causes. Two dominant approaches are used: the health planning approach, which emphasises behavioural change and safe education, and the community participation approach which emphasises public participation in shaping the physical environment.¹³ The design of such a programme needs to be based on accurate data obtained from a surveillance system. Any countermeasure usually requires the collaborative effort of health care workers, the mass media, educators, town planners, law enforcers, community leaders, and other concerned groups.

Preventive measures undertaken in Hong Kong

Good epidemiological data on childhood injuries in Hong Kong are not available. Preventive measures that are undertaken are fragmentary and reactive and most have not been evaluated.

Child product-related injuries

The Toys and Children Products Safety Bill was passed in 1993. The bill does introduce an element of protection, because toys and products for children must conform to certain standards or the manufacturer faces paying a penalty. But a penalty is only applied when some injuries have occurred to a child and the product has been found to be unsafe by the Customs and Excise department. Unfortunately, many of the beds for young children, baby walkers, pushchairs, and prams available in Hong Kong have been found by the local Consumer Council to be unsafe. There are no figures for the number of child product-related injuries that occur in Hong Kong.

Children left unattended at home

Many children are left unattended at home because both parents are working. In January 1991, four children, all under the age of 6 years, were burned to death in locked flats. These accidents aroused great concern among the public. Surveys done in Hong Kong reveal that between 7.1% and 42.3% of parents have on one or more occasions left children younger than 13 years of age alone at home.¹⁴ Coroners' statistics indicate that in the 5 years from 1989 to 1994, 113 unattended children died in Hong Kong. From 1986 to 1988, 15 children younger than 10 years old died from falling out of a window.

In October 1991, the Hong Kong Government published its consultation paper on 'Measures to prevent children from being left unattended at home'.¹⁵ After a 3-month consultation period, the government concluded that childcare facilities, support services, and public education need to be increased and mutual help groups encouraged. Nevertheless, it was considered neither desirable nor feasible to introduce any legislation to protect unattended children.

Since then, plans have been introduced to increase the number of childcare centres available to the public. At present, a total of 135 occasional childcare units, each with three places, are able to take care of children for brief periods during the day, thus allowing families to attend to urgent business. The uptake rate of these centres is still low and children left unattended at home with resulting injuries are still reported.

Road safety injuries

Every year in Hong Kong, there is a 5% increase in the number of registered vehicles on the roads; the competition for road space is becoming acute. Despite the increase in vehicle numbers, the number of traffic accidents has remained constant over the past few years. Traffic accidents are the main cause of traumatic death in children; about half occur in pedestrians.

Since 1991, accident records have been collected and analysed by the police to identify black spots and to formulate road safety strategies. Drivers who speed and ignore red lights continue to be major problems. More advanced speed detection equipment and 'red-light cameras' have been introduced recently. The red-light camera scheme introduced in 1994 has shown encouraging results in reducing the number of accidents and red-light violations at signal-controlled junctions. The project was expanded to cover more locations in 1995. The Road Safety Council is an advisory body with the task of coordinating all road safety matters in Hong Kong. Legislation was introduced in December 1995 that empowers police officers to test a suspected drunk driver for alcohol at the road-side. It is now mandatory to wear a seatbelt if sitting in a front seat. Legislation was introduced in June 1996 for the mandatory fitting and wearing of rear seatbelts in private cars. However, the legislation and enforcement of the use of infant seats is unsatisfactory.

Recent reports of injuries/death in children sustained while travelling by school transportation has aroused considerable public concern. A Consultation Paper on the safety provision of school transport was released in September 1995.¹⁶ After the consultation, the Transport and Education departments recommended that:

- (1) With effect from February 1997, all school buses with over 16 seats be required to have compulsory provision of escorts to take care of children;
- (2) With effect from August 1996, bus operators be required to provide details of their clients' information to the Transport Department in their application to run an annual bus service;
- (3) With effect from August 1996, all school buses display a sign on the back of the vehicle to warn motorists that the bus is carrying children;
- (4) With effect from February 1997, all school buses and nanny vans be required to install alarm systems at the front sliding doors and emergency doors;
- (5) With effect from February 1997, a standard bright colour be assigned for all nanny vans;

(6) With effect from February 1998, a sound system be installed in buses to allow communication between the driver and passengers (nanny and pupils); and

(7) All schools be encouraged to set up a School Bus Service Committee for the purpose of monitoring school bus services.

The Student Road Safety Patrols were founded in 1963. By the end of 1995, there were 241 teams operating under the auspices of the Road Safety Association of Hong Kong in operation at more than 200 schools. The patrols gave an excellent record of not having any accidents during the 32 years of operation. In addition, 558 schools have organised school staff road safety patrols.

Injuries due to burns and scalds

Fire is a major risk to lives in Hong Kong because the city is densely populated and has many high-rise buildings. The number of fire calls is increasing each year, while the number of people injured or killed has remained steady. Each year, about 50 to 60 major fires occur (number 3 alarm signal and over). The main causes are the careless handling or disposal of smoking materials, overturned cooking stoves, and electrical faults. In 1994, 183 (1%) cases of fire were due to children playing with matches. Approximately 2000 children are admitted to hospital annually because of burn or scald injuries. Approximately 90% are due to scalding by hot liquid and the majority occur in children younger than 4 years of age.⁸

Recreational and sport-linked injuries**Swimming injuries**

Swimming is the most popular past-time during summer. Each year some 13 million people visit beaches and a further 6 million use the numerous public swimming pools that are managed by the two municipal councils. At present, there are 42 gazetted bathing beaches and 28 public swimming pool complexes. Regular lifeguard services are provided at all public beaches and swimming pools and campaigns are conducted to ensure that the public are aware of water safety issues.

Playground injuries

Figures on playground injuries are not available from the Urban and Regional Councils. A 1-year surveillance performed in 1991 by the Accident and Emergency Department of the Princess Margaret Hospital revealed that about 8.7% of childhood injuries occur in playgrounds, mostly due to falls from a height or on level ground.⁵ Most playgrounds in Hong Kong are of a

good standard and well maintained; the Committee on Safety in Outdoor Pursuits of the Council for Recreation and Sports constantly reviews matters relating to safety in sports and recreational activities. Each year, two major publicity campaigns—one on land sports and another on water sports—are organised. More thoughtful designs of playgrounds would also help prevent injuries.

Bicycling injuries

Injuries due to bicycling are not very common, as bicycling is mainly a recreational activity in Hong Kong. The present legislation states that children younger than 11 years are not allowed to ride on the road unless accompanied by an adult; however, this is rarely enforced. The wearing of bicycle helmets is uncommon. Several campaigns have been launched to raise public awareness but without much success. In addition, the potential for an accident exists whenever pedestrian traffic and cycling are mixed—for example, in some older housing estates, on offshore islands, and in the New Territories.

Safety education

The various departments of the Hong Kong Government provide a wide range of educational programmes on home safety. However, there is no comprehensive surveillance system or preventive programme for childhood injuries. Injury prevention is still not a health priority in Hong Kong.

Conclusions

Injury is a major health problem for Hong Kong children. Information about the extent of the problem and the contributing factors is scarce and preventive measures are inadequate. It is recommended that:

- (1) Childhood injury prevention be accorded a high priority and child safety be given prime consideration in all policies involving children;
- (2) A 'Childhood Injury Information System' should be set up to collect, collate, and generate timely and accurate information concerning the incidence, circumstances, and contributing factors, severity, and long-term outcome of childhood injuries; interpret and analyse this information to identify problems, hazards, risk groups, and injury-producing behaviours; and lastly, to disseminate the information to the relevant authorities and agencies for appropriate action;
- (3) Injury prevention should be recognised as a major public health issue and adequate resources allocated for research in the area and the development

of prevention programmes;

- (4) Effective injury control needs a multidisciplinary approach and community participation. A 'Child Safety Council' should be established to steer and coordinate all activities related to childhood injury prevention.
- (5) Health care professionals should contribute towards injury control and support a safe environment scheme by providing expertise, information, public education, the training of professionals, and by communicating the seriousness of the problem.

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