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Surveillance of unintentional child injury in Hong Kong

Key Messages

1. Falls, being struck by others, and motor vehicle-related injuries were the top three common external causes of unintentional childhood injuries in Hong Kong.
2. Among residential injuries, contact with a blunt force, a penetrating force, and thermal and radiant mechanisms were the leading causes of injury.
3. Home, followed by school and the playground, appeared to be the prime sites of unintentional childhood injuries.
4. Caregivers of children suffering home injuries expressed concern about preventing injury but exhibited a lack of substantial action toward modifying the child's potentially injurious behaviour.

Introduction

Childhood injury is a major health problem in Hong Kong. Between 1999 and 2000, injury and poisoning were the leading causes of death in Hong Kong in children aged 1 to 14 years. Injury and poisoning caused 6.8 deaths per 100 000 in children aged 1 to 4 years, and 3.7 deaths per 100 000 among those aged 5 to 14 years.

Records of injury, mortality, and the number of hospitalisations are routinely compiled by the Department of Health and the Hospital Authority. However, the present system does not provide further details on injury morbidity, in particular, childhood injuries that lead to long-term public health consequences in terms of health loss. In spite of sporadic efforts, there is no general profile of childhood injury morbidity in Hong Kong, and little is known about residential childhood injuries.

Aims and objectives

This study was conducted from October 1999 to September 2001. The study aimed to compile a local profile of unintentional childhood injuries, in particular those that took place in a residential setting, using data from three local hospitals: the Prince of Wales Hospital in Shatin, Pamela Youde Nethersole Eastern Hospital in Chai Wan, and United Christian Hospital in Kwun Tong. It was anticipated that profiling would: (1) provide an overall pattern of unintentional childhood morbidity, (2) characterise unintentional residential childhood injuries (URCI) and their correlates, such as socio-economic background, demographic information, and antecedent context, and (3) facilitate injury prevention initiatives and prevention efforts.

Methods

Participants

Children under the age of 16 years who were admitted into the accident and emergency department (AED) for an episode of injury or poisoning in participating hospitals were included in this study. Between 1 January 2000 and 31 December 2000, a total of 18 919 childhood trauma cases admitted to the AED met the inclusion criteria. All cases were subjected to screening and identified as 'domestic' or 'unclassified' trauma. Domestic trauma, in this context, referred to injuries that took place at home and school or elsewhere apart from injuries attributed to industrial accidents, sports, traffic accidents, and assault.

Unintentional residential childhood injuries subset

From the general profile, 5077 URCI cases, defined as any episode of unintentional childhood injury that took place in the home environment (person's usual residence), were identified; the corresponding "parts of building" sub-module under the "place of occurrence" section of the International Classification for External Causes of Injuries were identified.¹

General profile of paediatric accident and emergency department admissions

Among participating hospitals, gender, date of birth, district of residence, triage category, trauma type, discharge destination, and specialty referred to were

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extracted from the Accident and Emergency Information System (AEIS). External causes and nature of the injury, according to the International Classification of Disease (ICD), 9th edition-clinical modification, were coded from the AEIS reports and comments. A total of 2132 observed trauma cases were coded with ICD E & N codes. Correspondence analysis was adopted to identify age-related external causes of injury.

Unintentional residential childhood injuries subset

For the URCI profile, external causes and nature of the injury were coded by a research nurse for all injury types. Six telephone nurse interviewers, recruited from the participating hospitals, interviewed the identified URCI cases. Primary caregivers of the injured child, usually the mother, were interviewed. In the absence of the primary caregiver, other caregivers such as the father, grandparents, or domestic helper were interviewed.

Results

Each of the participating hospitals contributed about one third of the observed 18 919 AED admissions for analysis.

General profile of paediatric accident and emergency department admissions at participating hospitals

Over 60% of the admissions were male. The age distribution according to quinquennial age-group was: 0-4 years (34%), 5-9 years (28%), 10-14 years (31%), 15-19 years (7%) [mean age, 7.52 years; standard deviation (SD), 4.74 years]. Compared with the 0-14 years age distribution in the general population, young children (in particular those under the age of 5 years) were more frequently injured.² Home (30%) was the most common place of injury, followed by school (11%) and recreational areas (9%). Over 50% of the admissions occurred in the evening, only 6% at night. Most admissions were semi-urgent and categorised as domestic, sports, or unclassified trauma; 7% required emergency or critical care. Around 70% of the cases were discharged home, 12% hospitalised, and 18% referred for further medical attention including follow-up at AED or referral to specialist out-patient clinics.

The three most common external causes of injury were falls (37.8%), being struck by others (15.8%), and motor vehicle-related injuries (7.1%). These injuries included contusions (26.2%), superficial injuries (13.8%), and open wounds to the skull, neck, and trunk (13.7%).

Adolescents presented with sports injuries, late effects of medical or therapeutic procedures, self-inflicted injuries, and assault; primary-school-aged children presented with motor vehicle-related injuries, being struck by others, electric shock/radiation, and injuries of unknown cause; 1-year-old children presented with injuries caused by animal bites, intrusions into orifices, being caught between objects, cutting/piercing, scalding; and infants presented with falls and burns.

Unintentional residential childhood injuries subset

Of all AED admissions reviewed, 5194 (27.5%) were identified as sustaining an URCI episode, 709 (13.7%) of which reported having an URCI in the past 6 months. Excluding 98 (1.9%) who declined and 19 (0.4%) incomplete interviews, a total of 5077 (97.7%) URCI cases were analysed from 18 919 attendance records of children presenting to the AED for injury or poisoning. Those children with URCI were younger (mean age, 4.53 years; SD, 3.9 years) and predominantly male (male:female=1.46:1).

Over 50% of observed injuries took place in the living room. The leading mechanism of injury for all age-groups was "contact with blunt force" including low falls (<1 metre) and high falls (>1 metre), slipping and falling, and tripping, followed by "penetrating force" among the 5-15 years group, and "thermal and radiant mechanisms" including contact with hot liquid, steam or gas, flame burns, or electric shock in children under 5 years of age. Most incidences of "poisoning by or exposure to chemical or other substances" (90.9%) were caused by pharmaceutical substances or other domestic chemical substances and were triaged to three or higher for urgent treatment at the AED. Eleven of 12 incidents involved irritation of the eyes. Over two thirds of observed injuries in the category "other and unspecified mechanisms of injury" (68.8%, of which 51.4% were girls) involved intrusion of foreign bodies into the eyes or natural orifices.

The leading objects involved in injuries among these children were building components or fittings (52%), furnishings (16.5%), miscellaneous objects and substances (7.2%). Other common contributors to injury were people (20.4%) and water on the floor surface (4.4%). The most common mechanism-object combinations were falls from a bed (7.9%), sofa (3.5%), chair or stool (3.2%), being crushed by a door (2.5%), and other slip-and-fall incidents (2.5%).

Most of the URCI injuries were of mild-to-moderate severity and comprised contusion of the face, scalp, or neck (19.5%), open wound of the face (12.2%), abrasion or friction burn of the face, neck, and scalp except eye (6.4%). This resulted in a hospital admission rate of 11.4%, comparable with the AED admission rate for non-URCI (12.2%).

About one quarter (27.2%) of the interviewed parents or caregivers gave verbal warnings with respect to potentially injurious behaviour (94.7%) rather than engaging in active intervention such as behaviour modification (2%) or changing the home environment (0.4%) to prevent an injury. With regard to the injury episode that led to the AED admission, the majority of injured children were out of reach (80%) or out of sight (62%) of their caregivers.

Discussion

The patterns of age-related injuries in this study were consistent with the findings observed in earlier work, in particular the trend that scalding prevailed among younger children while older children were more likely to suffer from motor vehicle-related injuries.³ Home, followed by school, and the playground, were the most common sites of unintentional childhood injuries.⁴ From the AED attendance records, the overall proportion of URCI among all attendances was 27.4%. However, 50% of all of AED attendances by children aged 0 to 4 years were caused by an URCI episode.

Hospitalisation rates were similar between URCI and other AED intakes. Residential injuries, in spite of their mild injury severity compared with other injury types such as traffic-related or domestic violence, constitute a comparable utilisation of hospital resources.

The predominance of injuries caused by falls observed in this study should be considered from the perspective of the limited household space in Hong Kong and accentuates the problem of children using their living room as recreational space. Compared with other Asian countries, the average floor area per person in Hong Kong (9 m²) is lower than neighbouring urban centres Singapore and Jakarta but higher than less developed cities such as Delhi and Hanoi.

The morbidity pattern observed in this study contradicts the traditional perception of high-risk areas in homes. Rather than the kitchen, which is regarded as the more risky area in the household, most of the observed injuries took place in either the living room or bedroom.⁵ This observation lends support to the hypothesis that children are more likely to be injured in the environment in which they spend most of their time.⁶

Installation of sliding doors in cramped quarters is a safe alternative for preventing crushing injuries caused by wooden doors, though the benefits and feasibility of mass

installation are unknown. Alerting children to an opening door by fastening a chime/bell onto the door, may also be effective and more feasible for preventing injuries of this type. Other common household injuries include burns and scalds from hot liquid food. As the eradication of hot liquid food would be very difficult, prevention with regard to scald injuries of this type should be shifted to promoting safe handling of hot food.

Caregivers in this study were exceedingly concerned about preventing injury but exhibited a lack of substantiated action towards modifying the child's potentially injurious behaviour. Providing caregivers alternatives to verbal warnings, such as resources to modify their household environment or their child-rearing practices, is a priority and challenge for local injury prevention programmes.

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