

and mortality in preschool children beyond the first year of life.^{8,9} In the U.S., TBI is a significant source of morbidity and mortality, accounting for approximately 1/3 of injury-related deaths.¹⁰ Trauma is a major cause of death in children, and traumatic brain injury accounts for 40% of fatalities. The incidence of traumatic brain injury in children is approximately 200 per 100,000, with a mortality rate of 10% (20 deaths per 100,000).¹¹ Since 1966, injury has been the leading cause of death in the age group of 0-6 years in Taiwan, accounting for approximately 40% of causes of preschool children deaths in 2000.¹² TBI leads not only to all kinds of health problems, but also to heavy burdens for the involved victims, the families and society in terms of medical costs and loss of productivity.¹³

Few epidemiological studies provide national death certificate data, which indicate that TBIs were identified in 36% of all children who died of injuries.¹⁴ In the U.S., males are twice as likely to suffer severe TBI than are females. Motor vehicle crashes and falls account for 1/2 of all TBIs. Other causes include violent assaults, sports, and recreational injuries.^{15,16} Published incidence rates of blunt TBI in emergency department settings range from 180¹⁷ to 444¹⁸ per 100,000 cases of TBI among young children.¹⁹ In Hong Kong, falls are the major cause of TBIs leading hospital to admission in infants and children in preschool age groups.²⁰ Winn et al. found that the data illustrated differences between the situations of the pedestrian injury events among 0-2 and 3-4 year olds. Children aged 0-2 years old were more likely to be injured in non-traffic events, whereas children between the ages of 3 and 4 years were more frequently injured in traffic-related circumstances.²¹

Although there are many studies on TBI, to the best of our knowledge, few nationally representation-based studies of TBI in preschool children have been conducted. The aim of this study, therefore, was to describe the characteristics of preschool children who have experienced TBI in Taiwan in an effort to find ways of reducing their dev-

astating injuries.

MATERIALS AND METHODS

Definition

Our definition of TBI encompasses brain concussions, skull fractures, brain damage with clear neurological deficits and clinically observable cognitive deficits, post-traumatic amnesia, neurological sequelae, and any evidence of intracerebral hemorrhage. The presence of any 1 of the above conditions confirmed the diagnosis of TBI in the registry.^{22,23}

Data Collection

From July 1, 1998 to June 30, 2001, the Head & Spinal Cord Injury Research Group of the Taiwan Neurosurgical Society compiled a traumatic brain injury registry. Data for patients aged 6 years and younger were collected in this study from 31 major hospitals, which accounted for about 80% of all hospitals capable of treating TBI in Taiwan. Patients who died at the scene or during transportation were excluded from this study.

Data on TBI were recorded by experienced neurosurgeons from each hospital and were extracted by a research assistant from the Injury Prevention Center to maximize reliability and consistency. International Classification of Diseases, Ninth Revision (ICD-9) (24) codes 800-804 (fracture of the skull or face bones), 850.0 (concussion without loss of consciousness), 850.1-850.2 (concussion with loss of consciousness), 851-851.1 (cerebral/cerebellar/brain stem contusion or laceration), 852.0-853 (extracerebral and/or intracerebral hematoma, SAH, SDH, EDH, or ICH), 854.0 (unspecified intracranial injury), 900.0 (injury to blood vessels of the head and neck), and 950.0-951.5 (injury to cranial nerves) were used to identify the cases.

Injury Coding

The severity of TBI was classified using the Glasgow Coma Scale²⁵ as follows: (i) severe, a score of 8