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Health outcomes and costs for injured young people hospitalised with and without chronic health conditions

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ABSTRACT

Background: The prevalence of chronic health conditions such as diabetes among young people is increasing. Limited information is known about the impact of these conditions on young people who have been traumatically injured. Injury is the global leading cause of death and disability in young people. The aim of this study is to compare health outcomes for injured young people with and without chronic health conditions.

Method: A retrospective examination of injury in young people aged ≤25 years with and without a chronic health condition using linked hospitalisation and mortality records during 1 January 2010 to 30 June 2014 in New South Wales, Australia. Health outcomes, including hospital length of stay (LOS), 28-day unplanned hospital readmission, hospital treatment costs, and 30-day and 12-month mortality were examined. A 1:1 matched design was used to determine excess mean hospital LOS and cost for young people with a chronic health conditions versus no health condition.

Results: There were 184,819 injury-related hospitalisations of young people; 13.8% had a chronic health condition. Compared to young people who did not have a chronic health condition, those with one were found to have double the mean hospital cost, higher unplanned hospital readmission, and a higher rate of mortality. Injured young people had a three times higher likelihood of having a prolonged LOS if they had a chronic health condition (Adjusted odds ratio: 3.89; 95% CI: 3.69–4.11). Renal conditions, anaemia, coagulation defects, hypertension, and mental health conditions had the highest excess LOS and anaemia, hypertension, coagulation defects and renal conditions had the highest excess mean cost for matched injured individuals with and without the health condition.

Conclusions: Health outcomes following injury are worse for young people with a chronic health condition. The increasing prevalence of young people with a chronic health condition has implications for treatment, resource use, provision of support services, and survival following traumatic injury.

Introduction

Traumatic injury accounts for a high proportion of hospitalisations of children and young people worldwide [1–3]. Epidemiological studies have indicated that the prevalence of comorbid conditions in young people is increasing [4–6]. Previous research has identified that injured young people who experience a chronic health condition have an increased hospital length of stay (LOS), incur higher hospital treatment costs, have a poorer health-related quality of life [7], and have a higher risk of mortality than young people without a chronic condition [4,5].

While overall survival following injury in young people has improved [8,9], pre-injury health conditions experienced by young people can influence health care resource use [4] and long-term recovery [10]. Information on common chronic health conditions experienced by young people who sustain an injury could highlight where further trauma care gains could be made by providing a greater understanding of their influence on health outcomes following injury [10].

There is limited information regarding the type of chronic health conditions experienced by injured young people, and their impact on health outcomes by type of health condition. This research aims to identify common chronic health conditions experienced by young people who sustain an injury and are

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hospitalised and compare health outcomes for injured young people with and without chronic health conditions, including hospital LOS, unplanned hospital readmission, hospital treatment cost, and mortality.

Method

A retrospective analysis was conducted of injury-related hospitalisations of young people aged 25 years or less identified in linked hospital admission (1 January 2010–30 June 2014) and mortality records (1 January 2010–31 March 2015) in NSW, the most populous state of Australia, providing care to over seven and a half million people. Ethical approval was obtained from the NSW Population and Health Services Research Ethics Committee (2015/06/590).

Linked hospitalisation and mortality data

The Admitted Patient Data Collection (APDC) includes information on all inpatient admissions from all public and private hospitals in NSW. Diagnoses and external cause codes were classified using the International Classification of Diseases, 10th Revision, Australian Modification (ICD-10-AM) [11]. Injury-related hospitalisations were identified using a principal diagnosis classification of injury, excluding complications of care and sequelae of injuries (ICD-10-AM: S00-T78). Level 1 trauma centres were identified as hospitals that provided 24-h full spectrum of care for critically injured patients, from initial reception and resuscitation to discharge and rehabilitation, as well as conducting research, education, quality improvement programs, prevention and outreach programs [12]. Mortality data were sourced from the NSW Registry of Births Deaths and Marriages (RBDM). All deaths in NSW are registered with the RBDM and information collected from death certificates includes demographic data and fact of death. The hospitalisation and mortality data were probabilistically linked by the Centre for Health Record Linkage (CHeReL) using *ChoiceMaker* [13]. Upper and lower probability cut-offs for a linkage were 0.75 and 0.25 and record groups with probabilities between the cut-offs underwent clerical review.

Identification of chronic health conditions

Chronic health conditions common for young people were identified from the literature [4,5,14–18]. A chronic condition was one that would reasonably be expected to last 12 months and that resulted in limitations for self-care, independent living or social interactions and/or resulted in the need for ongoing health care using medical products, services or specialist equipment [4]. For this study a chronic condition also had to be able to be identified using diagnosis classifications from ICD-10-AM (Table 1). A 12 month look back period to 1 January 2009 was used for the identification of chronic health conditions.

Injury severity

The International Classification of Injury Severity Score (ICISS) was used as an estimate of injury severity. The ICISS is derived for each individual by multiplying the probability of survival for each

Table 1
Health conditions and ICD-10-AM classifications.

Health condition	ICD-10-AM classifications
Circulatory system	
Hypertension	I10-I15
Congenital malformations	
All congenital malformations	Q00-Q99
Congenital malformation of the heart and great arteries	Q20-Q25
Digestive system and allergies	
Celiac disease and other serious allergies	K52.2, K90.0, T78.0, T78.2, T78.4
Endocrine, nutritional and metabolic conditions	
Diabetes	E09-E14
Obesity	E66
Cystic fibrosis	E84
Immune system conditions and coagulation defects	
Anaemia	D50-D53 and D55-D64
Coagulation defects (e.g. haemophilia)	D65-C68
Mental health conditions	
Autism spectrum disorders	F84
Behavioural and emotional disorders of childhood	F90-F98
Cognitive and behavioural delay	F80-F83 and F88-F89
Eating disorders	F50
Hyperkinetic disorder	F90
Mental retardation	F70-F79
Mood affective disorders	F30-F39
Neurotic, stress-related and somatoform disorders	F40-F48
Personality disorders	F60-F69
Schizophrenia, schizotypal and delusions disorders	F20-F29
Neoplasms	
All malignancies	C00-D48
Acute lymphoblastic leukaemia and acute myeloid leukaemia	C91.0, C92.0
Brain cancer	C71
Nervous system conditions	
Cerebral palsy	G80
Epilepsy	G40
Renal conditions	I12.0, I13.1, NO3, NO5, N18-N19, N25.0, Z49, Z94.0, Z99.2
Respiratory conditions	
Chronic lower respiratory disease	J40-J47
Asthma	J45

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