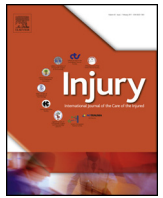




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Injury among adolescents with intellectual disability: A prospective cohort study

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ABSTRACT

Introduction: Injury is the leading cause of mortality and morbidity in adolescents worldwide, and injury rates have been shown to be higher among youth with intellectual disability. Despite this, injury among adolescents with intellectual disability remains poorly investigated. This study aimed to identify characteristics associated with injury among adolescents with intellectual disability living in the community.

Methods: A cohort of adolescents with intellectual disability living in southern Queensland, Australia was investigated prospectively between January 2006 and June 2010. Personal characteristics were collected via postal questionnaire. Injury information, including mechanism and location of injury, was extracted from general practitioner records. The association between demographic, social and clinical characteristics of participants and episodes of injury was investigated using negative binomial regression.

Results: A total of 289 injuries were recorded from 432 participants over 1627.3 years of study-time. The overall annual injury incidence was 17.5 (95%CI 14.7, 20.9) per 100 person years. Presence of ADHD and less severe disability was associated with increased risk of injury. Down syndrome and reduced verbal communication capacity were associated with decreased risk of injury. Falls accounted for the highest single mechanism of injury (19.0%) with the majority (73.2%) of injuries involving either upper or lower limbs.

Conclusions: ADHD is a co-morbidity that increases risk of injury among adolescents with intellectual disability. A critical component of injury prevention is avoidance of the great variety of environmental risk factors for injury relevant to this population.

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Introduction

More than half a million Australians (2.9%) have intellectual disability [1]. Adults with intellectual disability have significantly poorer health status than their non-disabled peers [2,3], with mortality rates up to three times higher [4], more than twice the number of health problems [5], and a greater number of unrecognised diseases [6]. Fewer studies have investigated mortality and morbidity among children and adolescents with intellectual disability but these studies suggest similar trends of increased burden of disease [7,8]. Over the last two decades injury

prevention among youth with disabling conditions, such as intellectual disability, has received increased attention with studies reporting that young people affected by disability have a higher risk of injury than their unaffected peers [9–16].

Injury is one of the leading causes of disease burden among children and adolescents worldwide, with The World Health Organisation listing unintentional injury as the leading cause of death in all age groups from 1 to 44 years [17]. In Australia, injury is the leading cause of death in those aged 12–24 years, accounting for more deaths than all other causes of death combined [18]. While some studies have demonstrated substantially increased injury-related mortality and morbidity among youth with intellectual impairment [9,12,19–21], results have been inconsistent with non-comparable samples. Any increased injury risk in adolescents with intellectual disability may be due to disabling conditions that are often co-morbid with intellectual disability, such as attention deficit hyperactivity disorder (ADHD) [22], epilepsy [23,24], autism [25,26], psychopathology [27–29], and

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perceptual and communication impairments, such as hearing and visual limitations [14,30,31], as these conditions have also been found to be associated with increased injury rates. Despite the significant burden of injury demonstrated among the general population of adolescents, and the preventable nature of injury-related mortality and morbidity there is a lack of high-quality research into the epidemiology of injury among adolescents with intellectual disability. The aim of this study is to characterise the rate of injury in a sample of adolescents with intellectual disability living in the community, and identify characteristics associated with higher injury rates.

Methods

Study population

A cohort of adolescents with intellectual disability who lived in the community in southern Queensland, Australia was followed prospectively between January 2006 and June 2010. Data were collected as part of a larger randomised control trial, the Ask Study, which investigated the effectiveness of a Health Intervention Package, which consisted of classroom teaching focused on health communication, use of a hand-held personal health diary, and a health check [32]. The intervention was designed to assist in the transition of adolescents from the paediatric to adult healthcare systems. Children and young people were eligible for participation in the Ask Study if they had an Education Queensland verified intellectual disability, which requires evidence of impairment from a guidance officer or psychologist. Participants were eligible for participation in this sub-study while they were aged between 13 and 19 years. Participants attended either a Special Education Unit (SEU) or Special Education School (SES). An SEU is located on the campus of a mainstream primary or secondary school. An SES is a segregated special school for children and adolescents who have significant intellectual disabilities and/or multiple disabilities, and usually require specialist teaching and therapy services that support an individualised education program. Individual consent was received from the participants' parent/carer, and their General Practitioner (GP). Participants from both the intervention and control arms of the Ask trial were eligible for inclusion in the current study. Ethics approval was granted by The University of Queensland Behavioural and Social Sciences Ethical Review Committee (Clearance No: 2004000081) and the Queensland Government Department of Education and the Arts (File No: 550/27/424).

Data collection

Information regarding the adolescent and their family was collected using postal questionnaires completed by the adolescent's parent or carer in May 2007. Contact details of the participants' usual GP were supplied, and consent to access the adolescent's medical records was sought. In July 2009 parents confirmed that the GP nominated remained the adolescent's usual GP and, if this was not the case, nominated an alternative GP. Consent was then sought from this second GP and records were collected from both practices. Copies of all medical records, including correspondence and results of investigations, were obtained from January 2006 to date of contact. For security reasons, data were collected from practices by project staff. Most practice records were computerised and practice managers or doctors produced a print-out of all data. Other practices provided photocopies of printed records. Injury data collected before the child turned 13 years, and after 20 years, was not included in the analyses.

Measures

Injury

All symptoms and conditions diagnosed by the participants' GP or specialist, including injury details, were extracted by a single experienced paediatric nurse from medical records. Identified injuries were then reviewed independently by two GPs (one of whom was D.W.) in order to ensure that recorded data related to independent injury episodes, that episodes were appropriately categorised, and to identify the mechanisms and locations of injuries. Where there was disagreement, a third expert (R.W.) adjudicated. Injury episodes were categorised according to their cause or mechanism as falls, assault/altercation, sports/play related, cut/laceration, bike/board related, burns, seizure/syncope related, motor vehicle related, self-injury, and other/miscellaneous. Self-injury was defined as self-inflicted injury sufficient to cause tissue damage, but without suicide intent [33]. Injury locations were categorised as upper limb, lower limb, head/neck, back, torso (including chest and abdomen), and pelvis.

Demographic and social characteristics

Demographic characteristics recorded in the parent/carer questionnaire included age and sex. Social characteristics included years of schooling of the primary carer, and the participant's family structure (dual-parent/single-parent/other). Social position was measured at the postcode level using the Australian Bureau of Statistics Socio-Economic Index for Areas, a measure of Relative Disadvantage [34]. The general health of the adolescent was assessed on a five-point scale (poor/fair/good/very good/excellent). Mobility was classified as independent/walks with aid/uses wheelchair/immobile. Communication level was categorised as verbal/some verbal/non-verbal. Psychopathology was measured using the Developmental Behaviour Checklist-Short Form (DBC-P24), an overall measure of behavioural and emotional disturbance [35]. Participants were categorised as having 'no behavioural problems' if their Mean Behaviour Problem Score was less than 0.48 [35]. Participants with behavioural problems were further classified as having 'minor' or 'major' problems using a cut-off of 0.83, the median score for those with behavioural problems. Cause of disability (Down syndrome/other syndrome/cause unknown) was identified, as were the presence of epilepsy, and hearing and vision problems. Medical records were used to identify participants with diagnosed autism and ADHD.

Statistical analysis

Data were summarised as frequency (percentage) for categorical variables. Annual injury incidence rates per 100 person years and 95% confidence intervals (95%CI) were calculated. The association between demographic, social and clinical characteristics and injury episodes was investigated using negative binomial regression with time-in-study as a model offset. First univariable analyses were conducted and then multivariable analyses where the models were adjusted for age, sex, school type, cause of disability, general health and carer education. Age was included as a time-varying variable and other variables were time-fixed. Variables included in multivariable models were selected based on a literature review. Results are reported as incidence rate ratios with 95% CIs. Analyses were conducted using Stata statistical software v12.0 (StataCorp, College Station, TX, USA).

Results

There were 592 carers of children and young people with intellectual disability who completed questionnaires, with the vast

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