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Original article

Alcohol Misuse and Injury Outcomes in Young People Aged 10–24

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A B S T R A C T

Purpose: The burden of alcohol-attributable disease is a global problem. Young people often present to emergency health-care services with alcohol intoxication but little is known about how best to intervene at that point to improve future health outcomes. This study aimed to assess whether young people with an alcohol-specific hospital admission are at increased risk of injury following discharge.

Methods: A cohort study was conducted using a general population of 10- to 24-year-olds identified using primary care medical records with linked hospital admission records between 1998 and 2013. Exposed individuals had an alcohol-specific admission. Unexposed individuals did not and were frequency matched by age (±5 years) and general practice (ratio 10:1). Incidence rates of injury-related hospital admission post discharge were calculated, and hazard ratios (HR) were estimated by Cox regression.

Results: The cohort comprised 11,042 exposed and 110,656 unexposed individuals with 4,944 injury-related admissions during follow-up (2,092 in exposed). Injury rates were six times higher in those with a prior alcohol admission (73.92 per 1,000 person-years, 95% confidence interval (CI) 70.82–77.16 vs. 12.36, 11.91–12.81). The risk of an injury admission was highest in the month following an alcohol-specific admission (adjusted HR = 15.62, 95% CI 14.08–17.34), and remained higher compared to those with no previous alcohol-specific admission at 1 year (HR 5.28 (95% CI 4.97–5.60)) and throughout follow-up.

Conclusions: Young people with an alcohol-specific admission are at increased risk of subsequent injury requiring hospitalization, especially immediately post discharge, indicating a need for prompt intervention as soon as alcohol misuse behaviors are identified.

IMPLICATIONS AND CONTRIBUTION

This study uses linked population-based datasets to describe the association between alcohol-specific hospital admission and subsequent risk of injury-related hospital admission in adolescents aged 10–24. With the greatest risk in the month after an alcohol admission, evidenced-based primary and secondary injury prevention and harm reduction programs should be implemented.

Globally, alcohol has been estimated to cause 3.3 million deaths per year, representing 5.9% of all deaths in 2012, and 5.1% of the global burden of disease [1]. Hazardous and harmful drinking is on the rise in young people [2,3].

There are various adverse consequences of alcohol consumption and intoxication reported in young people. Acute impacts include depression, sleep disturbance, appetite change, reduced performance at school, crime, sexually transmitted infections, unwanted pregnancy, and mental health problems [4–7], as well as significantly higher engagement in multiple risk behavior, including physical inactivity, self-harm, unprotected intercourse, and substance misuse [8]. In addition, a limited number of studies have shown that there is an increased risk of self-reported injury, repeated, and medically treated injury in young people who drink alcohol excessively [9–14], and an association between heavy

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alcohol consumption in adolescence and increased injury risk in adulthood [15–17]. However, the detailed epidemiology of this relationship has not been described fully.

A small number of population-based cohort studies using hospital admission data from the United Kingdom have found that 10- to 19-year olds discharged from hospital after an adversity-related injury admission (related to violence, drugs/alcohol, or self-inflicted injury) have an increased risk of recurrent injury-related emergency admissions [18], subsequent re-admission, and death for up to a decade later, compared to those who had an accidental injury admission [19]. However, whether this type of association exists in cohorts of young people admitted into hospital because of excessive alcohol consumption is unclear.

Hospital admission resulting from excessive alcohol use provides a "teachable moment" for health promotion advice and the introduction of preventative interventions [18,20]. However, current interventions are fairly generic, focusing on alcohol use behaviors rather than the prevention of specific outcomes related to alcohol. By describing alcohol-related injury risk in more detail, by for example, age, sex, and socioeconomic status, we can then tailor interventions more appropriately and potentially increase their efficacy.

The aim of this study, therefore, was to determine whether having an alcohol-specific hospital admission is associated with a higher rate of subsequent hospital admission for injury and to describe in detail how this varies by, age, sex, and socioeconomic deprivation, and over time in a population-based cohort of young people aged 10–24 in the United Kingdom.

Methods

Data sources

Two population-based health databases from the United Kingdom were utilized in this study; the Clinical Practice Research Datalink (CPRD) and linked Hospital Episode Statistics (HES). The CPRD [21] is one of the largest primary care research databases in the world, containing records from over 11.3 million patients [22]. Approximately 6.9% of the UK population is included in the database, and as over 98% of the UK resident population is registered with a primary care general practitioner [23], the data are broadly representative of the age, sex, and ethnicity profile of the whole population [22,24]. The quality of CPRD data is subject to internal data quality checks, validation, audits, and up-to-standard requirements [24–26].

HES contains details of all hospital admissions and outpatient appointments at National Health Service hospitals and trusts in the United Kingdom, processing over 125 million records each year [27]. Each admission to hospital is coded using the International Statistical Classification of Diseases and Related Health Problems 10th Revision (ICD-10) with one primary diagnosis and up to 19 secondary diagnoses. Although HES contains admission and outpatient data, for this study, only hospital admission data were used to define both the exposure and the outcome. Linked HES-CPRD data are presently only available for English practices in CPRD who have consented to participate in the linkage scheme (398 of the 684 in the July 2014 CPRD release).

Study population

The study population consisted of young people aged 10–24, registered at a CPRD practice in the United Kingdom between January 1, 1998 and December 31, 2013, who had linked HES data available and had data that met CPRD data quality standards. Young people initially entered the cohort at the latest of their 10th birthday or registration with a CPRD practice and were followed up until the earliest of either their 25th birthday, death, leaving their general practitioner's practice, or the practice's last data collection date. Young people who died on or after their alcohol admission date, had an invalid discharge date (e.g., before admission), or had no follow-up time were excluded from the analysis (Figure 1).

Exposed group

Young people in the cohort who had an "alcohol-specific" hospital admission between the ages of 10 and 24 years were identified as the exposed group using an ICD-10 code list (Supplementary Table S1). An "alcohol-specific" admission is one in which the medical record included at least one ICD-10 code considered by Public Health England to be wholly attributed to alcohol (i.e., alcohol is 100% contributory as defined by an alcohol attributable fraction of 1.0) [28]. This code could appear in the primary or secondary diagnoses fields for the admission and individuals may have had other, concurrent, diagnosis codes at the time of admission. The first admission with an alcohol-specific diagnosis after cohort entry was used to define the date of admission, with exposed person-time starting at the date of "discharge" after that hospital admission.

Selection of unexposed comparison group

A sample of young people in the cohort who had not had an alcohol-specific hospital admission between the ages of 10 and 24 was selected as an unexposed comparison group. Ten unexposed controls were frequency-matched to each exposed case. Frequency matching matches groups of subjects rather than individuals, ensuring both groups had the same age (in 5-year age bands) and registered GP practice distribution. Unexposed controls were assigned a "pseudo-event" date, which was a randomly generated date between cohort entry and exit dates.

Outcome definition

The primary outcome was defined as the first record of a hospital admission with a primary or secondary diagnosis of injury within HES at least 1 day after the alcohol admission discharge/pseudo-event. ICD-10 injury codes included injury types S00–T98 and external causes (mechanisms, e.g., falls, transport, drowning/submersion) V01–Y98. If injury admissions were coded with more than one mechanism, a hierarchy was applied, adapting an existing framework [29] (Supplementary Table S2).

Confounders

Age at alcohol admission/pseudo admission, sex, region of residence, calendar year, and socioeconomic deprivation were included as possible confounders. Age was defined at the date of alcohol-specific hospital discharge for those exposed or pseudo-event date for those unexposed. Geographical region was examined using the regional variable within CPRD (based on Strategic Health Authority administrative areas). Socioeconomic deprivation was measured using quintiles of the Index of Multiple Deprivation based on the individual's residential postcode.