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A population-based study of treated mental health and persistent pain conditions after transport injury

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ABSTRACT

Background: Persistent pain and mental health conditions often co-occur after injury, cause enormous disability, reduce social and economic participation, and increase long-term healthcare costs. This study aimed to characterise the incidence, profile and healthcare cost implications for people who have a treated mental health condition, persistent pain, or both conditions, after compensable transport injury.
Methods: The study comprised a population cohort of people who sustained a transport injury (n = 74,217) between 2008 to 2013 and had an accepted claim in the no-fault transport compensation system in Victoria, Australia. Data included demographic and injury characteristics, and payments for treatment and income replacement from the Compensation Research Database. Treated conditions were identified from 3 to 24-months postinjury using payment-based criteria developed with clinical and compensation system experts. Criteria included medications for pain, anxiety, depression or psychosis, and services from physiotherapists, psychologists, psychiatrists, and pain specialists. The data were analysed with Cox Proportional Hazards regression to examine rates of treated conditions, and general linear regression to estimate 24 month healthcare costs.
Results: Overall, the incidence of treated mental health conditions ($n = 2459$, 3.3%) and persistent pain ($n = 4708$, 6.3%) was low, but rates were higher in those who were female, middle aged (35–64 years), living in metropolitan areas or neighbourhoods with high socioeconomic disadvantage, and for people who had a more severe injury. Healthcare costs totalled more than $A707 M, and people with one or both conditions (7.7%) had healthcare costs up to 7-fold higher (adjusting for demographic and injury characteristics) in the first 24 months postinjury than those with neither condition.
Conclusions: The incidence of treated mental health and persistent pain conditions was low, but the total healthcare costs for people with treated conditions were markedly higher than for people without either treated condition. While linkage with other public records of treatment was not possible, the true incidence of treated conditions is likely to be even higher than that found in this study. The present findings can be used to prioritise the implementation of timely access to treatment to prevent or attenuate the severity of pain and mental health conditions after transport injury.

Background

Persistent pain and mental health conditions are leading causes of disability [1], and affect up to one in four people after a transport injury [2,3]. Several factors are known to increase the risk of developing both persistent pain and mental health conditions postinjury, including demographic characteristics (e.g., being female [4], middle to older age [5], or having lower education [6],) and pre-existing health (e.g., pre-existing comorbidities and disability [4]), and socioeconomic characteristics (e.g., having a compensation claim or pursuing litigation [7], and living in a region with higher socioeconomic disadvantage [4]). More severe physical and/or psychological trauma (e.g., injury severity [8,9],

Abbreviations: CI, confidence Interval; HR, hazard ratio; IQR, interquartile range; Med, median.

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external fault [10] or blame attribution [5,11] and acute stress response to the injury [12]) also increase the likelihood of experiencing persistent pain or mental health conditions. While these characteristics are likely to be associated with higher levels of health service use, as per Andersen's Behavioural Model of Health Service [13], few studies have specifically examined their association with the rates of treatment for pain or mental health after transport injury. This is a major gap, considering that this knowledge has the potential to improve service funding models and policies to enable timely and targeted provision of preventive interventions postinjury. The present study therefore set out to examine the incidence of *treated* persistent pain and mental health conditions within 24-months of transport injury. Moreover, we sought to characterise the association between demographic and injury characteristics, and rates of developing treated conditions, and healthcare costs accrued for those with one or both treated conditions.

Methods

Setting

The compensation system of Victoria, Australia, supports people injured in transport accidents involving motorised or rail-based vehicles. The system is funded through annual motor vehicle registration payments, and supports healthcare, income replacement, and other services. As a no fault compensation system, claimants are eligible regardless of who was responsible for the crash [14].

Data source

The study was approved by the institutional Human Research Ethics Committee, and conforms to the Helsinki Declaration. De-identified data were obtained from the Compensation Research Database [61] and included (a) demographics: age, sex, residential region (rural/regional versus metropolitan, based on the Accessibility and Remoteness Index of Australia) [15] and neighbourhood disadvantage (quintile rankings of State-based Index of Relative Socio-Economic Advantage and Disadvantage) [16]; and (b) injury and crash characteristics: year of injury, road user type (e.g., motor vehicle driver, motor vehicle passenger etc.), fault attribution (client and police report of whether another was at fault), injury type, level of impairment (from a clinical assessment), and work disability within 30-days postinjury. Payments data were used to calculate duration of hospital stay (based on service dates), surgery dates, income replacement, and treatments received.

Participants

Adults injured between 2008 and 2013 who survived to 24-months postinjury, and had an approved compensation claim, were included, see Fig. 1. The first accident date was the index date if a person had >1 claim. Cases were excluded if they were younger than 18 years old at the time of injury, had surgery >6-weeks postinjury (which could independently lead to persistent pain), did not reside in the State of Victoria, or had no treatment or income replacement payments within 12-weeks postinjury. These restrictions were applied as the study sought to identify whether early interventions could be implemented for people who had active engagement with the compensation system during the acute to sub-acute postinjury period.

Primary outcomes: Treated conditions

An expert advisory group comprising clinical pain and psychiatry experts and compensation system data scientists and research partners developed the treated condition criteria. The clinical advisors recommended treatment patterns and thresholds that would be consistent with treatment of a mental health or pain condition, respectively. These criteria were identified between 12-weeks and 24-months postinjury. The 12-week wash out period served to align with the definition of chronic pain (i.e., pain that persists beyond 3-months, or the time required for injured tissue to heal) [17], and persistent mental health conditions, and to reduce the likelihood of misclassifying treatment in the acute and sub-acute period as indicating the presence of a persistent problem. Only clinical services involving patient-clinician interaction were included, and those specific to report writing or travel were excluded.

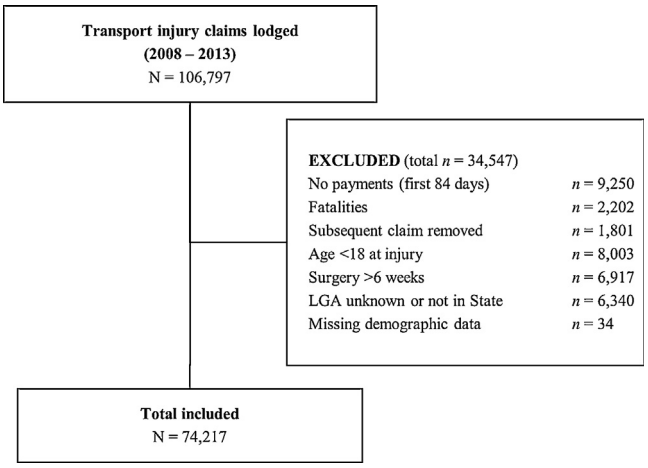

Fig. 1. Participant inclusion chart.

Treated *mental health conditions* were defined as any of the following:

i ≥10 psychological services, which was within typical effective treatment dose for psychological therapy (ranging from 8 to 12 sessions) [18], and is consistent with nationally funded psychological treatment rebates through Medicare (Australia's national health system).
ii ≥2 psychiatric services, considering a single attendance is not likely to be sufficient for *treatment* of a mental health condition.
iii ≥3 antidepressants. This number of scripts is consistent with indications that depression symptom management typically requires >8-weeks for effectiveness. Tricyclic antidepressants were only included in the neuropathic pain treatment criteria given that this is their most common indication.
iv ≥1 anti-psychotic medication or sedative medication, as an indication of significant mental health problems.

Treated *persistent pain* was defined as any of the following:

i ≥4 physiotherapy attendances within 28 days for ≥3 consecutive 28 day periods. This frequency is equivalent to weekly treatment over three or more months, in line with recommended treatment doses for effective physiotherapy treatment [19]. Hydrotherapy or treatment of neurotrauma sequelae were excluded as these were considered to be less likely to be focused on pain management.
ii ≥1 service from a pain medicine physician.
iii ≥1 attendance at a Network Pain Management Provider (i.e., multidisciplinary pain management services registered with the State work and transport injury compensation systems who provide medication management, allied health therapy and education in a pain clinic setting).
iv ≥1 hospital admission for a pain condition.

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