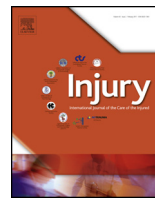




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## Financial and recovery worry one year after traumatic injury: A prognostic, registry-based cohort study

L. Ioannou<sup>a</sup>, P.A. Cameron<sup>b</sup>, S.J. Gibson<sup>c,d</sup>, J. Ponsford<sup>a,e</sup>, P.A. Jennings<sup>f,g</sup>,  
N. Georgiou-Karistianis<sup>a</sup>, M.J. Giummarra<sup>b,c,\*</sup>

<sup>a</sup> School of Psychological Sciences and Monash Institute of Cognitive and Clinical Neurosciences, Monash University, Faculty of Medicine, Nursing and Health Sciences, Clayton, Victoria, Australia

<sup>b</sup> Department of Epidemiology and Preventive Medicine, School of Public Health and Preventive Medicine, Monash University, Victoria, Australia

<sup>c</sup> Caulfield Pain Management and Research Centre, Caulfield Hospital, Victoria, Australia

<sup>d</sup> National Ageing Research Institute, University of Melbourne, Parkville, Victoria, Australia

<sup>e</sup> Monash-Epworth Rehabilitation Research Centre, Epworth Hospital, Richmond, Victoria, Australia

<sup>f</sup> Department of Community Emergency Health and Paramedic Practice, Monash University, Frankston, Victoria, Australia

<sup>g</sup> College of Health and Biomedicine, Victoria University, Victoria, Australia

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### ABSTRACT

**Background:** Levels of stress post-injury, especially after compensable injury, are known to be associated with worse long-term recovery. It is therefore important to identify how, and in whom, worry and stress manifest post-injury. This study aimed to identify demographic, injury, and compensation factors associated with worry about financial and recovery outcomes 12 months after traumatic injury.

**Methods:** Participants ( $n = 433$ ) were recruited from the Victorian Orthopaedic Trauma Outcomes Registry and Victorian State Trauma Registry after admission to a major trauma hospital in Melbourne, Australia. Participants completed questionnaires about pain, compensation experience and psychological wellbeing as part of a registry-based observational study.

**Results:** Linear regressions showed that demographic and injury factors accounted for 11% and 13% of variance in financial and recovery worry, respectively. Specifically, lower education, discharge to inpatient rehabilitation, attributing fault to another and having a compensation claim predicted financial worry. Worry about recovery was only predicted by longer hospital stay and attributing fault to another. In all participants, financial and recovery worry were associated with worse pain (severity, interference, catastrophizing, kinesiophobia, self-efficacy), physical (disability, functioning) and psychological (anxiety, depression, PTSD, perceived injustice) outcomes 12 months post-injury. In participants who had transport ( $n = 135$ ) or work ( $n = 22$ ) injury compensation claims, both financial and recovery worry were associated with sustaining permanent impairments, and reporting negative compensation system experience 12 months post-injury. Financial worry 12 months post-injury was associated with not returning to work by 3–6 months post-injury, whereas recovery worry was associated with attributing fault to another, and higher healthcare use at 6–12 months post-injury.

**Conclusions:** These findings highlight the important contribution of factors other than injury severity, to worry about finances and recovery post-injury. Having a compensation claim, failure to return to work and experiencing pain and psychological symptoms also contribute to elevated worry. As these factors explained less than half of the variance in worry, however, other factors not measured in this study must play a role. As worry may increase the risk of developing secondary mental health conditions, timely access to financial, rehabilitation and psychological supports should be provided to people who are not coping after injury.

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### Background

The consequences of traumatic injury are frequently complex. Several stressors affect life post-injury, and may bring about intrusive worry, especially in those who experience difficult ‘non-recovery’ trajectories, with persistent disability, chronic pain and/

\* Corresponding author at: School of Public Health and Preventive Medicine, Monash University, 553 St. Kilda Road, Melbourne, Victoria, Australia.  
E-mail address: [melita.giummarra@monash.edu](mailto:melita.giummarra@monash.edu) (M.J. Giummarra).

or secondary psychological health conditions [1–3]. While the majority of injured persons do recover and return to work and regular activities soon after injury, a significant minority report poorer quality of life and greater financial strain [4–6]. These outcomes are typically associated with increased healthcare utilisation, work disability, and increased reliance on disability or welfare benefits [7,8]. In addition to these stressors, for those who sustain transport or workplace injuries and are eligible for compensation, the compensation systems and procedures may inadvertently add further stress.

Numerous studies have shown that seeking compensation is associated with poor recovery outcomes including worse pain, disability and secondary psychological disorders [9]. While we must be mindful of the risk of attributing “reverse causality” [10], such that people with worse outcomes may be more likely to make a compensation claim, it is nonetheless clear that the process of seeking compensation is intrinsically stressful for about a third of claimants [11]. This is especially the case for those with pre-existing psychological conditions or acute stress reactions to the trauma [12]. These psychological risk factors may explain the negative association between compensation benefits and recovery [13,14]. Injury claimants who report higher stress from the compensation process are more likely to have poorer recovery outcomes, including more severe symptoms of anxiety and depression, worse disability, and lower quality of life, compared with claimants who did not report stress [11,15]. Moreover, reporting negative compensation system experiences is associated with worse pain, disability and psychological functioning 12 months after injury [16]. Altogether, these findings suggest that a strong association exists between prior vulnerability, stress and compensation-related experiences and the psychological recovery from injury; however, the role of compensation-related procedures in worry about the future is not known.

While most people are remarkably resilient after trauma and demonstrate adaptive coping strategies (e.g., problem-solving, seeking support, adjusting expectations etc.), some people use non-productive coping strategies (e.g., worrying, blame, avoidance, denial or anger) [17]. Emotion-focused coping behaviours, including worry, have ultimately been linked to greater distress and worse physical and psychological outcomes after trauma [18,19] and in those with chronic conditions [20]. Worry-related appraisals, such as catastrophizing, are key symptoms of several psychological disorders (e.g., anxiety, depression and post-traumatic stress disorder (PTSD)) [21], and disabling pain [22]. Until recently, worry was thought to be a *symptom* of psychological conditions, especially anxiety [23], however, numerous studies have since shown that worry is not just a symptom. Rather, worry is a unique construct both within and outside of psychological conditions [24,25] that may play a key role in exacerbating long-term psychological distress [26,27]. For instance, worry is not only associated with PTSD symptom severity following trauma, but the level of worry after a motor vehicle accident is predictive of the development of PTSD [28].

There is known to be a bidirectional relationship between worry and concerns about health, somatic health complaints (headache, sore throat, fatigue etc.) and musculoskeletal pain [29]. Worry is thought to play an important role in mediating the effects of stress on health outcomes, as worry states maintain physiological arousal and distress [24,30]. For example, women suffering osteoarthritis or fibromyalgia who were experiencing financial hardship due to their inability to return to work reported daily worry about financial matters, and had worse self-reported disability, and more severe musculoskeletal pain [31]. Financial hardship is a common outcome following traumatic injury and is associated not only with absence from work and loss of income, but also with health care access after serious injury [32]. The experience of persistent pain and disability,

and reduced capacity for work following injury may further increase worry not only about financial matters, but also about getting one’s life back on track in general.

Altogether, it is clear that worry plays a key role in the development and maintenance of psychological conditions [33] and chronic pain, and expressions of worry may be a therapeutic target warranting intervention in its own right [33]. The present study aimed to identify which injury and demographic factors at the time of the injury (age, education, fault, length of hospital stay, compensation status etc.), and compensation-related factors within the first 12 months of injury (e.g., medication usage, income benefits, healthcare costs) were associated with worry in persons admitted to hospital for a traumatic injury. In the state of Victoria, Australia, no-fault compensation schemes operate for both transport and workplace accidents such that all persons injured in a motor vehicle crash or at work are eligible for compensation from the Victorian Transport Accident Commission (TAC) and WorkSafe Victoria (WSV), respectively, regardless of their role in the injury incident. We hypothesized that, in addition to being eligible for compensation and attributing fault to another, income benefits, healthcare use and having negative compensation system experiences would be the major predictors of worry at 12 months post-injury.

## Methods

### Participant recruitment

Participants were recruited from the Victorian Orthopaedic Trauma Outcomes Registry (VOTOR) and Victorian State Trauma Registry (VSTR) between October 2012 and October 2014. These registries monitor orthopaedic and major trauma cases in Victoria, Australia, and have been described in detail elsewhere [34,35]. Participants were eligible if they were proficient in spoken or written English and aged 18–75, and were excluded if they had cognitive impairment, assessed qualitatively during trauma registry interview, needed a proxy, or were distressed to the degree that it impacted on their capacity to complete the registry interview. Patients were invited to participate during the 12 month registry telephone interview.

### Procedures

The study was approved by the university and hospital human research ethics committees, and participants provided written informed consent. This study was part of a larger project examining recovery from traumatic injury, and the full details of all measures and procedures have been published in the open access protocols repository *protocols.io* [36].

### Data linkage

Patient data were obtained from VOTOR and VSTR, and claims data for cases with a compensation claim were obtained from the Compensation Research Database (CRD) [37]. The CRD comprises secondary claims data from transport and workplace injuries that resulted in a compensation claim to the TAC or WSV. The payments and claims datasets were used to construct claims variables for TAC claimants. Payments and services datasets were used to construct claims variables for WSV claimants.

### Measures

Following the 12 month registry interview, additional questionnaires were administered either by telephone, online or in hardcopy to more comprehensively measure pain and mental

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