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Prognostic indicators of social outcomes in persons who sustained an injury in a road traffic crash

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ABSTRACT

Introduction: There is a lack of longitudinal studies with adequate sample size and follow-up period which have objectively assessed social outcomes among those with mild or moderate musculoskeletal injury or that are not limited to hospital inpatients. We aimed to address this gap by prospectively assessing the potential predictors of return to pre-injury work and daily activities.

Methods: Persons with mild/moderate musculoskeletal injuries from a vehicle-related crash were surveyed within the first 3 months after the crash (baseline; $n = 364$), and at 12 ($n = 284$) and 24 months ($n = 252$). Participants self-reported return to work, and whether it was return to full or modified duties at work. Analyses were restricted to 170 participants who reported being in pre-injury paid work and had provided information at either 12 months only or at both 12 and 24 months. Return to usual activities was assessed using the European Quality of Life-5 Dimensions (EQ-5D) scale 'Usual Activities' dimension.

Results: Twenty-four months after injury 82% ($n = 121$) had returned to work. After multivariable adjustment, not being admitted to hospital was associated with 44% higher likelihood of returning to work at 24 months. Not having any pre-injury chronic illness was associated with returning to work after 24 months, multivariable-adjusted risk ratio (RR), 1.21 (95% confidence intervals, CI: 1.02–1.45). Each 1-SD increase in Medical Outcomes Survey Short Form-12 Mental Component Summary (SF-12 MCS) score at baseline was associated with returning to work at 24 months RR 1.13 (95% CI: 1.02–1.25). Younger age, higher SF-12 physical component summary (PCS), and EQ-5D visual analogue scale (VAS) scores were mutually independent predictors of returning to usual activities 24 months later.

Conclusion: A range of bio-psychosocial factors, particularly quality of life measures, independently predicted social outcomes including return to work and return to usual daily activities. These determinants could be measured early in the recovery process and be potentially amenable to intervention.

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Introduction

Injuries are known to have important consequences for survivors of vehicle crash; particularly for those whose injury does not resolve promptly and precludes return to work and/or pre-injury function, activity and participation in life [1,2]. Non-return to work in particular represents a serious social and economic cost, in terms of care provision, sick leave, absenteeism and loss of economic productivity [3].

Studies investigating vocational outcomes after a vehicle-related injury are largely conducted among patients recruited from hospitals, trauma centres or intensive care units, and many of these focus on chronic musculoskeletal pain [4–7]. A recent Australian study of patients with musculoskeletal and orthopaedic traffic injuries, including those whose injuries were not sufficiently severe to require hospitalization, showed that one in three patients with compensated time off work after a road traffic injury had a work disability beyond 6 months; and one in six had a loss in earnings capacity [6]. Hospital stay, as determined 1-week after the accident, was a strong predictor of long-term work disability in

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this cohort [6]. Nevertheless, participants with no hospital stay also accounted for 27% of all work disability days in this study. In the study by Meerding et al. [8], work absence was reported by 54% of non-hospitalized patients, and after 2 months, the proportion of non-hospitalized patients who had returned to work was 95%. In a more recent New Zealand study of 2626 workers injured at work or elsewhere [9], 17% of workers were classified as delayed return to work, of these 76% of were disabled (measured by a disability scale) at either 3 or 12 months post-injury. Additionally, a retrospective study of 600 participants with whiplash injury following a vehicle-related crash showed that job type, severity of injury and social class influenced the time taken off work after road traffic accidents causing whiplash injury [10]. Finally, a recent Dutch cohort study [11] reported that 58.8% of those with post-whiplash syndrome after a road traffic crash were work disabled. Age and concentration problems were observed as important mutually independent predictors of work disability 12 months later in this cohort.

This study followed a cohort of people with mild or moderate injuries sustained in a vehicle-related crash who had made compensation claims, and aimed to comprehensively determine the socio-demographic, psychological, health- and injury-related characteristics that independently predicted the following social outcomes: (1) Return to work, sustained return to work and resuming full-duties at work 12 and 24 months after the injury; and (2) Return to pre-injury activity and participation in life at 12- and 24-month follow-up.

Methods

Study population

Potential participants were identified from the New South Wales (NSW) Motor Accidents Authority (MAA) Personal Injury Registry database. The MAA is the government regulator of companies providing third party motor vehicle accident insurance in NSW. The injury database consists of people who made claims on the Compulsory Third Party scheme through the Accident Notification Form or from the Personal Injury Claim Form. The Accident Notification Form is for a limited insurance claim that provides early payment of reasonable and necessary medical expenses, and/or lost earnings up, to a maximum of AU$5000. It is completed and sent to the insurer within 28 days of the crash. The Personal Injury Claim Form is for a full insurance claim (eligibility for a full claim is subject to being judged as "not at fault" in the motor vehicle crash, while this is not the case for the limited claim).

People aged 18 years or older who had sustained injuries in a motor vehicle crash in NSW between March and December 2010 were identified and invited to participate in the study. Participants were excluded if they: (a) sustained severe injuries (severe traumatic brain injury or spinal cord injury; (b) had an injury requiring hospitalization for more than 7 days; (c) had a New Injury Severity Score (NISS) >8); (d) were unable to complete questionnaires by telephone in English; or (e) if contact could not be initiated within 60 days of the crash date.

A total of 1515 insurance claims that were lodged between March 2010 and December 2010 were deemed to be potential participants (Fig. 1), and these individuals were sent a letter of invitation by the MAA together with the Participant Information Sheet. An opportunity to opt out of the study within 2 weeks was provided, following which, verbal consent was sought. The study was approved by the relevant health research ethics committee. Of the 1515, 1098 were not eligible or refused to participate. Of the remaining 417 who participated in the baseline interview, 53 were excluded as they had missing NISS or an NISS >8 (those with severe injury). This left 364 participants that could be included in analyses. Twelve- and 24-month follow-up assessments were completed on 284 (78% of eligible participants at baseline) and 252 (69% follow-up rate) of 364 enrolled and eligible participants, respectively (Fig. 1).

Assessment of socio-demographic, psychological, injury- and health-related predictors

Participants in the study were interviewed by telephone on average 56 (range 25–92) days following the date of the accident. The interview schedule was structured and used a closed format. Information on participant's demographics, return to work, motor vehicle crash details and pain, disability and health-related quality of life was collected. The interview took nearly 45 min and all interviews were administered by one trained and experienced research nurse. Occupation of the participant at the time of the accident was recorded in a free-text format. These were categorized into white collar work (including executives, professionals, technical, sales, and administrative occupations) and blue collar work (including operators, fabricators, labourers, and production, craft, and repair occupations for analysis. Trained and experienced coders were used to code the reported injuries. The Abbreviated Injury Scale (AIS) coding system was used to classify the participants into the mild (NISS 1–3) and moderate (NISS 4–8) injury severity groups based on the NISS [12]. NISS data is determined progressively in the claim process as medical records become available to trained coders at the MAA. Other data related to the injury, such as the type of injury sustained (presence and type of fracture, presence of whiplash etc.) were collated from the MAA Personal Injury Registry database.

Chronic illness was determined by asking participants if they had been diagnosed with any of the following by a doctor: asthma, cancer, heart or circulatory condition, diabetes, mental and behavioural problems, and/or other chronic condition that was not listed. If participants reported that they had had any of the above long term illness for more than 3 months then this was considered as having a chronic illness. Chronic pain was characterized by participants reporting that they had been diagnosed with the following for more than 3 months: arthritis, neck and back problems/disorder, and pain.

Participants were asked to describe their general health status prior to the motor vehicle accident, using a five point Likert scale (excellent, very good, good, fair, or poor). Body mass index was calculated from self-reported height and weight. BMI was classified according to WHO guidelines: <20 kg/m^2 (underweight), 20–24.9 kg/m^2 (normal), 25–29.9 kg/m^2 (overweight), ≥ 30 kg/m^2 (obese).

EQ-5D-3L was used to measure health related quality of life [13]. The first part of the EQ-5D-3L has five dimensions: mobility, self-care, usual activities, pain/discomfort and anxiety/depression. Each dimension is divided into three degrees of severity: no problem, some problems and major problems. The EQ-5D-3L VAS, which was modified slightly from the original version with the question (given that it was administered over the phone rather than the participant self-administering EQ-5D-3L VAS): 'To help you say how good or bad your health state is, I have a scale in front me (rather like a thermometer), on which the best health state you can imagine is marked 100 and the worst health state you can imagine is marked 0' [13,14]. The Medical Outcomes Survey Short Form-12 (SF-12) was used as another measure of health-related quality of life [15]. The SF-12 has 12 questions selected from the SF-36 Health Survey [16]. Scoring of the SF-12 provides results on 8 domains (physical functioning, role limitations due to physical problems, bodily pain, general health, vitality, social functioning, role limitations due to emotional problems, and mental health). Two component scores, the physical and mental component

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