



An early intervention programme had no detectable influence on the health status of people with musculoskeletal injuries following road traffic crashes: Comparative study

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ABSTRACT

Objective: To compare the health status of people with minor injuries from road traffic crashes that are exposed to an early, active intervention programme (intervention group) with those receiving usual care (control group) over a 12 month period.

Design: Prospective comparative study using sequential cohorts.

Subjects: People presenting to hospital emergency departments with mild to moderate musculoskeletal injuries following road traffic crashes.

Main outcome measures: Physical Component Score (PCS) and Mental Component Score (MCS) of the Short Form 36 (SF-36) health status measure; Hospital Anxiety and Depression Scale (HADS) and the Functional Rating Index (FRI) recorded immediately post-crash, at 6 months and at 12 months after injury.

Results: There were 95 participants allocated to the control group and 98 allocated to the intervention group. Participants were enrolled at a mean of 9.3 days following the crash. There were no significant differences in baseline health measures between the groups. Apart from a small improvement in anxiety for the intervention group, there were no significant differences in health status between the groups. Twenty percent of participants in the intervention group received treatment from external healthcare providers that was inconsistent with the recommendations of the intervention programme.

Conclusions: The intervention programme failed to result in a clinically significant improvement in health outcomes compared with usual care. There is some evidence to suggest that the intervention had some psychological benefits, as evidenced by the small improvement in anxiety levels. Limited adherence, frequent use of co-interventions, or other factors (such as intervention content or intensity) may have reduced its effect.

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Introduction

Injuries from road traffic crashes cost the Australian health care system \$950 million each year.¹ The injuries that are most frequently reported as needing treatment in the emergency department setting include whiplash associated disorder and injury to the lower back, shoulder, hip and knee. Recovery from these injuries is variable. Some international studies report that symptoms resolve rapidly within the first 10 days,^{2,3} whilst others

report a protracted recovery in which symptoms persist for several years.^{4,5} In Australia, these injuries are usually minor in nature; however, over 70% of people report severe disability and 60% report symptoms of anxiety associated with their injuries.⁶

Musculoskeletal pain is exacerbated by behavioural adaptations such as protective posturing, pain avoidance and kinesiophobia.^{7,8} This can lead to a cycle of physical de-conditioning, neural hypersensitivity and potentiation of the pain syndrome.⁹ Some of this maladaptive behaviour is based on patients' inaccurate perceptions of the severity and prognosis of injury.⁸ Post-crash health care is frequently fragmented and disparate as people consult a number of health service providers in an attempt to better understand their injuries. Thus, the method of healthcare delivery can potentially contribute to the inaccurate perceptions of injury severity and disability.

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Well managed, early intervention following soft tissue injury allows thorough, evidence-based clinical assessment, and provides patients with accurate information regarding their condition. This provides the opportunity to guide patients down an active treatment pathway, and thereby avoid a maladaptive pain-dysfunction cycle. Early physical activity following acute whiplash injury is often recommended as part of an active treatment programme.¹⁰ Home exercise programmes and early activity have been shown to be superior to passive therapies in returning patients to normal function.¹¹ Furthermore, the benefits of physical therapy may be augmented when combined with cognitive behavioural therapy.¹²

In 2006, the Accident Care Evaluation (ACE) study was initiated in the Australian Capital Territory (ACT) to improve the health status of people with minor injuries sustained in road traffic crashes. The results reported here compare the long-term health of participants undergoing standard care to participants who attended an early intervention programme. The primary aim was to evaluate the effect of the early intervention programme on physical and psychological health for people with musculoskeletal injuries following a road traffic crash. The programme comprised assessment by a musculoskeletal physician, patient education on pain management and pain physiology, promotion of self-management, and encouragement of early activity. The hypothesis was that the provision of the programme would lead to improved health outcomes for people injured in road traffic crashes in the ACT.

Methods

Design and data source

The ACE study was a prospective, sequential cohort intervention study in which a control group of participants was recruited from September 2006 to July 2007, followed by an intervention group that was recruited from August 2007 to May 2008. All baseline data were recorded prior to the delivery of the intervention.

Ethics approval

Human Research Ethics Committee approval was granted by all participating institutions: Australian National University, The Canberra Hospital, Calvary Public Hospital and the University of Sydney.

Inclusion and exclusion criteria

Data were collected from people identified from emergency department (ED) registers in the two public hospitals in the ACT. Participants were invited to join the study if they presented to the ED with mild to moderate musculoskeletal injuries (Injury Severity Score < 15) that had been sustained in a motor vehicle or motorcycle crash that had occurred no more than 7 days prior to presenting to the ED; were aged between 18 and 70 years; and were usually resident in the ACT. Patients were excluded if they had sustained a head injury; spinal fracture or cord injury; required admission to hospital for more than 3 days; were from a non-English speaking background; did not wait to be seen for treatment; were pedestrians; or were pregnant. Patients that were not able to be contacted or were not available to provide baseline data within four weeks of their crash were also excluded.

All recruited participants completed a questionnaire providing socio-demographic, injury (e.g. location and number of injury sites) and crash related information. Injuries were assigned an

Abbreviated Injury Score (AIS)¹³ by research staff trained in injury coding. An Injury Severity Score (ISS),¹⁴ was derived from the AIS. ISS was categorised into minor injury (ISS 1–3) and moderate (ISS > 4). Health status was assessed with the Medical Outcomes Study Short Form 36 (SF-36), the Functional Rating Index (FRI), and the Hospital Anxiety and Depression Scale (HADS). Health measures were assessed post-crash, reflecting the baseline post-injury status, and at 6 months and 12 months.

Health status measures

The SF-36 Version 2.0 (Acute, Australian)¹⁵ measures health related quality of life across eight dimensions. Physical and Mental Component Scores are summary scores of the eight dimensions and are compared with Australian norms.¹⁶ The FRI combines concepts of the Oswestry Low Back Disability Questionnaire and the Neck Disability Index. Ten items measure both pain and function of the spinal musculoskeletal system.¹⁷ The HADS is a 14 item scale with two sub-scales; one for measuring depression (HADS-d) and one for anxiety (HADS-a).^{18–21}

Definitions

Employment was defined as being in full-time or part-time paid work. Students who performed some type of paid part-time work were also included in this group. Post secondary education was defined as completion of a tertiary degree or Technical and Further Education (TAFE) or college education. The 1997 Australian Standard of Classification of Occupation (ASCO) classification was used to define occupational group.²²

Control group

The control group received the standard of care usually provided to residents of the ACT following a road traffic crash. This includes attending a hospital emergency department to rule out major trauma, followed by discharge to the care of their general practitioner. There is generally no coordination in the care that is given and patients typically access a range of health care providers such as physiotherapists, chiropractors and massage therapists.

Intervention group

Intervention group participants were referred to the ACE clinic. At the initial assessment, participants were provided with a detailed explanation of the nature and likely natural progression of their injuries. A treatment plan was discussed and written treatment advice provided. Where appropriate, a simple, written home-exercise programme was prescribed. The exercise instruction sheets had step-by-step guidelines and digital photographs to assist with exercise recall and technique. Participants were also given written advice about any specific concerns related to protective posturing and the use of medication. Each participant nominated a general practitioner (GP) or practice as their primary carer. Following each ACE clinic visit, a follow-up letter detailing the outcomes of the consultation and recommended treatment plan was sent to the participant's primary carer.

If indicated, medical imaging was arranged, followed by further clinical review. In addition, if the ACE clinic physician had concerns about a participant with regard to marked apprehension, anxiety, protective posturing or abnormal illness behaviour, arrangements were made to review the participant at the ACE clinic two weeks after the initial consultation. The ACE clinic physician considered referral for specialised psychological support if participants demonstrated ongoing maladaptive behaviour.

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