



Risk factors for chronic disability in a cohort of patients with acute whiplash associated disorders seeking physiotherapy treatment for persisting symptoms

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Abstract

Objectives (1) To identify risk factors for chronic disability in people with acute whiplash associated disorders (WAD). (2) To estimate the impact of the numbers of risk factors present.

Design Prospective cohort study. Data were collected, on average, 32 days after injury (SD = 10.9) and 12 months later. Baseline measures of pain, disability, neck movement, psychological and behavioural factors were independent variables and chronic disability at 12 months was the dependent variable in a multivariable logistic regression analysis.

Setting National Health Service physiotherapy departments.

Participants Participants ($n = 599$) with symptoms 3 weeks after injury, self-referred to physiotherapy as part of a randomised controlled trial. 430 (72%) participants provided complete data for this analysis.

Main outcome measures Chronic disability based on Neck Disability Index scores.

Results 136 (30%) participants developed chronic disability. High baseline disability (OR 3.3, 95%CI 1.97 to 5.55), longer predicted recovery time (OR 2.4, 95%CI 1.45 to 3.87), psychological distress (OR 1.9, 95%CI 1.05 to 3.51), passive coping (OR 1.8, 95%CI 1.07 to 2.97) and greater number of symptoms (OR 1.7, 95%CI 1.07 to 2.78) were associated with chronic disability. One risk factor resulted in 3.5 times the risk (95%CI 1.04 to 11.45) of chronic disability but this risk increased to 16 times (95%CI 5.36 to 49.27) in those with four or five risk factors.

Conclusion Baseline disability had the strongest association with chronic disability but psychological and behavioural factors were also important. Treatment strategies should reflect this which may require a change to current physiotherapy approaches for acute WAD. The number of risk factors present should be considered when evaluating potential for poor outcome.

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Introduction

Whiplash associated disorders (WAD) describe the symptoms experienced following a whiplash injury [1]. WAD are a significant public health problem as it is estimated that only 50% of individuals who develop WAD recover fully and there remains uncertainty as to the reasons for this [2].

This prospective cohort study investigated if psychological and physical factors were risk factors for the development of chronic disability following an acute whiplash injury. We were interested in identifying risk factors that were potentially modifiable and could be treatment targets for physiotherapy management. We undertook a series of systematic reviews to synthesise evidence of existing risk factors, to identify areas of uncertainty, and methods of measurement [3,4]. In terms of psychological and behavioural factors, we concluded from the reviews that there was evidence that low self-efficacy and elevated scores on the Impact of Events Scale (post traumatic distress) were associated with chronic

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disability but evidence supporting other factors was less clear (fear avoidance, catastrophising, coping, depression and anxiety) [4]. Expectations of outcome and treatment preferences had yet to be investigated in acute WAD when the systematic reviews were conducted but warranted investigation. We found evidence that age, gender, initial injury severity and a history of previous neck pain were associated with poor outcome in acute WAD [2,3,5] but evidence for physical measures such as range of movement was inconclusive [3] and needed further investigation.

Most prospective cohort studies view risk factors in isolation, however, Carroll [6] emphasises that risk factors do not work alone. Little work has been published on understanding the impact of multiple risk factors. There is a need to further our understanding to aid the development of more effective treatments for patients with acute WAD.

Therefore, the two aims of this paper were:

1. To identify risk factors for developing chronic disability in a cohort of patients with acute WAD seeking physiotherapy treatment for persistent symptoms at least 3 weeks post injury.
2. To estimate the impact of the number of risk factors present at baseline on outcome.

Methods

Patient sample

All participants had sustained an acute whiplash injury and were experiencing neck pain at least 3 weeks after injury. Participants were part of a large cohort of patients who attended NHS emergency departments (ED) following their whiplash injury and had then self-referred to receive physiotherapy as part of a randomised controlled trial [7]. Participants were randomly allocated to one of two physiotherapy treatments (a package of physiotherapy treatment or an advice session) [8]. Individuals were eligible if they had sustained a whiplash injury of WAD grade I-III [Quebec Taskforce grading system [1]] within the last 6 weeks, reported neck symptoms in the previous 24 hours, had not sustained any fractures or loss of consciousness at the time of the injury/ED presentation, were not hospitalised, had no contraindications to physiotherapy treatment and were 18 years or older.

Data collection

Participants attended a research clinic where they provided written consent to take part in the study, completed a questionnaire and a standardised examination was undertaken by research staff. Follow up was carried out 12 months after ED attendance by masked postal questionnaire. Participants were recruited from January 2006 until November 2007.

Baseline measurements

A large data set was collected at baseline (Table 1). Variable selection was informed by our systematic literature reviews [3,4], the broader pain literature and underpinned by the biopsychosocial model of pain [9]. Variables were grouped in 3 categories: injury severity and range of movement (these are elements commonly assessed by physiotherapists in clinical practice), psychological and behavioural factors, pre-existing factors. Treatment allocation was also included in the analysis as participants were taking part in a randomised controlled trial (RCT).

We searched the literature to identify appropriate methods of data collection. Validated questionnaires with acceptable levels of reliability were chosen where possible. Some questions were designed for the study when there was no suitable questionnaire available (e.g., predicted time to recovery). Overburdening participants was a concern, so short versions of questionnaires were used if available (e.g., Coping Strategy Questionnaire) or a single question was designed to measure the construct of interest (e.g., ability to cope).

Injury severity and range of movement

Baseline disability was measured by the Neck Disability Index (NDI) [10]. Participants rated their pain intensity using the modified Von-Korff Pain Scale [11] which produces a single score encompassing current pain, average pain and worst pain in the last week. The Quebec Taskforce WAD grading system [1] was used to grade injury severity in the ED by the treating clinician and at the time of enrolment in the study. Participants also indicated the presence of 15 symptoms related to their whiplash injury using the physical symptoms subscale from the cervical spine outcome questionnaire [12].

Neck range of movement (ROM) were taken using the cervical ROM device [13]. The participant was assessed in a seated position and measures of cervical flexion, extension, lateral flexion and rotation were taken in a standardised manner according to a protocol. A total ROM was calculated by adding the measurements together.

Psychological and behavioural factors

The use of active and passive coping was measured using the short version (7 items) of the coping strategies questionnaire (CSQ) [14]. The items were grouped into two subscales representing the use of passive coping strategies (2 items) and active coping strategies (5 items) [15]. The Pain Catastrophising Scale (PCS) was used to measure the frequency with which an individual expresses catastrophic thoughts when they are in pain [16]. The physical activity subscale of the Fear Avoidance Beliefs Questionnaire (FABQ) was used to assess fear avoidance (beliefs about the effect of physical activity on their pain) [17]. The words “back pain” were replaced with “neck pain”. Psychological distress was measured using the general health questionnaire-12 [18] which consists of 12 items that assess the severity of different problems over the

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