



Research papers

Post-trauma ratings of pre-collision pain and psychological distress predict poor outcome following acute whiplash trauma: A 12-month follow-up study

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Abstract

Patients with acute whiplash trauma were followed to examine if post-trauma ratings of pre-collision pain and psychological distress were associated with reduced work capability and neck pain at 12 months follow-up. The study included 740 consecutive patients (474 females, 266 males) referred from emergency departments or primary care after car accidents in four counties in Denmark. After the collision patients received a questionnaire on psychological distress, unspecified pain and socio-demographics and 12 months later a follow-up on work capability and neck pain was performed. Risk factors were identified by multiple logistic regression analysis. Factors associated with affected work capacity at the 12-month follow-up were pre-collision unspecified pain condition (OR = 2.4, $p = 0.002$) and socio-demographic characteristics: female gender, low educational level, unemployment and blue collar worker. Factors associated with considerable neck pain at follow-up were pre-collision unspecified pain (OR = 3.5, $p < 0.000$), pre-collision high psychological distress (OR = 2.1, $p = 0.03$) and socio-demographic characteristics: female gender and formal education >4 years. Pre-collision neck pain and severity of accident were not associated with poor outcome. In conclusion unspecified as opposed to specified pain (neck pain) before the collision is associated with poor recovery and high accumulation of pre-collision psychological distress is associated with considerable neck pain at follow-up. However, no conclusions on causality can be drawn. Personal characteristics before the collision are important for recovery and attention to pre-collision characteristics may contribute to the prevention of poor recovery after acute whiplash trauma.

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1. Introduction

Whiplash has become an increasingly significant problem in many industrialized countries, rising to almost epidemic proportions [23], and has comprehensive individual as well as social costs [14,59]. Whiplash

trauma is an acceleration–deceleration mechanism of energy transfer to the neck and head from rear-end or side-impact motor vehicle collision [59]. It may be associated with a variety of symptoms, e.g. neck pain, headache, and cognitive symptoms. This condition is named whiplash-associated disorders (WAD) [59]. Chronic WAD is by consensus defined as patients remaining symptomatic or showing residual disability after 6 months [59]. The reason why some develop persistent

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symptoms remains unknown. In more than 90% of 'whiplash injury claims', no organic pathology can be detected [17,29,31]. Furthermore, no clear-cut association between trauma mechanism and persistent symptoms has been demonstrated [62]. The cause is probably multifactorial and covers a biopsychosocial spectrum.

Studies of the association between pre-collision pain (pre-collision neck pain or headache) and recovery have produced conflicting results. Some found evidence of an association with poor recovery [52,53,55,60], others found no association with recovery [8,12,30]. Research has tended to focus on specific pain (e.g. neck pain) rather than unspecified pain conditions. Only one study examined overall pre-collision pain as a potential prognostic element and found that pre-collision widespread body pain, but not pre-collision neck pain, was associated with persistent neck pain [4].

Studies of the association between pre-collision psychological distress and recovery have shown contradictory results. It has been concluded that there is only limited evidence of an association between pre-collision psychological distress and disability [54]. The focus has been more on single specific psychological dimensions or disorders (e.g. anxiety, depression) than on concurrent psychological distress factors. To our knowledge no studies have examined the predictive value of high overall psychological distress, i.e. accumulation of pre-collision psychological distress factors.

Conflicting findings in studies examining pre-collision variables may be attributed to differences in study population and definitions of outcome. No definition of recovery has yet been generally established. This calls for prospective studies including more than a single outcome measure to examine if results are consistent across outcome measures. Research on risk factors has tended to focus on post-collision rather than pre-collision characteristics. Areas that have received less attention are pre-existing health problems including pre-collision unspecific pain and overall pre-collision psychological distress.

The aim of this study was to examine the following potential pre-collision risk factors for two distinct, poor outcome measures (affected work capability and neck pain) at 12 months follow-up after acute whiplash trauma: (a) pre-collision psychological distress, (b) pre-collision health problems (unspecified pain condition and persistent illness), and (c) socio-demographic characteristics (age, gender, education, and occupation).

2. Methods

2.1. Study design and population

From April 2001 to June 2003, consecutive patients were referred from emergency departments or general practitioners after car accidents in four counties in Denmark. They were

referred to this two-centre study conducted by the Danish Pain Research Center and the Back Research Center. Potential participants were informed about the study and its design in a written invitation for pre-inclusion.

A randomized clinical trial (RCT) was performed within the framework of this study. The RCT includes a subgroup of the overall sample, whereas the current study included the entire cohort. For a detailed description of the RCT study design and intervention, we refer to Kongsted et al. [41]. No statistically significant differences were observed across the treatment groups, (1) immobilization of the cervical spine in a semi-rigid collar, (2) advice to 'act-as-usual' (no active treatment), and (3) active mobilization. Further reference to this RCT will therefore not be made in this article.

Inclusion criteria: Patients aged 18–70 years who were exposed to rear-end or frontal car collision, experienced WAD symptoms within 72 h, and who could understand written and verbal Danish. Exclusion criteria: Patients who could not be examined within 10 days after the collision, fractures or dislocations of the cervical spine (WAD grade 4), amnesia or unconsciousness in relation to the accident, injuries other than the whiplash injury, significant pre-collision physical or psychiatric disorder, self-reported average neck pain during the preceding 6 months exceeding 5 on a box scale 0–10, where 0 = no pain and 10 = worst possible pain, and alcohol or drug abuse. Among the 1495 patients assessed for eligibility, 548 met the exclusion criteria (e.g. 22.6% could not be examined within 10 days after the collision, 17.7% had injuries other than the whiplash injury) and 200 declined (Fig. 1); thus 740 patients joined the study.

2.2. Data collection and ethics

Potential participants were interviewed in their homes within a median of 5 days ($q_1 = 3$, $q_3 = 6$, max 10) post-collision by a project nurse, who provided information about the project, performed the inclusion and asked the patients to fill in a range of questionnaires. The patients signed a written consent if they agreed to participate. The study was approved by the local ethical committees and conducted in accordance with the Helsinki II declaration. No information about results or participation in the project was given to the patients' insurance company.

2.3. Pre-collision psychological distress

In the initial questionnaire, patients were asked about pre-collision psychological distress. Their psychological distress symptoms were assessed with the Whiteley-7 (illness worrying) [18], the SCL-SOM (somatisation) [11], the SCL-OC (obsessive-compulsiveness) [11], the SCL-HOS (hostility) [11], the SCL-8 (mental illness) [19,20], the SCL-DEP6 (depression) [9], and the SCL-ANX4 (anxiety) [9]. All seven distress scales are self-report symptom inventories where the patient rates the presence and severity of each symptom on a five point Likert scale of distress, ranging from 0 = 'not at all' to 4 = 'extremely'. The patients were asked: 'During the last 4 weeks before the collision how much were you bothered by: Headache, etc.' The SCL-SOM, SCL-OC, and SCL-HOS scales are subscales from

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