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Original Article

Are psychological factors prognostic indicators of outcome in patients with sub-acute neck pain?

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ABSTRACT

The aim was to determine if psychological factors favourably influence the short and long-term outcome of patients with sub-acute neck pain in terms of global perceived recovery, pain, using a Numerical Rating Scale (NRS) and functional disability, using the Neck Disability Index (NDI).

This study was conducted within the framework of a randomised clinical trial comparing two types of conservative therapy in 146 patients with sub-acute neck pain. Multilevel techniques were used for data-analysis.

The short and long term results for the three outcomes were very diverse. The sub-scales of the used questionnaires, i.e. the Pain Coping and Cognition List (PCCL), and the 4 Dimensional Symptom Questionnaire (4DSQ), did not contribute significantly to all of the multilevel models. Only the factor 'fear of movement' was consistently and significantly present in the univariable analysis for all outcomes at both follow-up measurements. The explained variance in the short term ranged from 16% to 30%, and from 6% to 34% in the long term. This can be considered to be low.

We conclude that all psychological factors showed a considerable variation on the specific measurement and time point used. Only 'fear of movement' consistently impedes short term and long term recovery. Further prognostic research is needed to achieve more consistent results.

1. Introduction

Neck pain is a common musculoskeletal disorder. The point prevalence of neck pain in the general population varies between 9.5% and 22.0% (Borghouts et al., 1999; Picavet and Schouten, 2003), and each year approximately one-third of all adults will experience neck pain (Croft et al., 2001). The Quebec Task Force on Spinal Disorders (1987) discriminates between the acute phase (0–6 weeks), the sub-acute phase (6–12 weeks) and the chronic phase (longer than 12 weeks). Some 5–10% of all neck complaints will develop into chronic neck pain, the main feature of which is pain in the cervical region, often accompanied by restriction in the range of motion. This leads to functional limitations, for instance when looking over the shoulder or working with a computer (Ariens et al., 1999). The pain can arise from many structures in the cervical region, especially the spine and soft tissues, but there are no data on the prevalence of specific causes of acute or chronic neck pain (Bogduk and Barnsley, 2000) and there are no valid clinical means with which to distinguish one suggested cause of the pain from another. Therefore, the most accurate diagnosis in most cases is a-symptomatic or non-specific neck pain (Bogduk and Barnsley, 2000). Risk factors for the occurrence of neck pain are physical load factors, such as vibration, flexion of the neck, bad sitting posture, and heavy lifting (Ariens et al., 1999). In an extensive review, Linton (2000) found that psychological factors are related to neck pain and back pain from the onset to the chronic phase. Furthermore, psychological factors were found to be pivotal in the transition from acute to chronic pain, as well as influential in the onset of pain. Based on the results of that review, it can be hypothesised that these factors can influence the course of neck pain and the outcome of treatment strategies over time. However, Linton did not use any quality-rating methods to assess the articles in his review, and furthermore, in the primary care setting only two of the studies included neck pain, which was not analysed separately. Whether or not psychological factors predict a favourable outcome for sub-acute neck pain can therefore not be

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concluded from this review. Bot et al. (2005) found that psychosocial factors, such as passive coping and fear avoidance, also predicted the outcome of neck and shoulder symptoms.

Hill et al. (2007) reported predictors of poor outcome, such as lower social class, catastrophising, anxiety and depression, low treatment expectations, severity of baseline neck pain or disability, presence of co morbid back pain, and older age. In the literature the main field of interest is either whiplash-associated disorders (WAD) or neck pain as a separate entity. Factors associated with poor recovery in patients with WAD are high initial pain intensity, age, gender and high acute psychological responses (Cote et al., 2001; Scholten-Peeters et al., 2003). However, Hendriks et al. (2005) reported that care-providers could easily identify patients who were at risk for poor recovery with a simple visual analogue scale for initial pain intensity and work-related activities. The traumatic event that precipitates the onset of WAD may have different psychological consequences, and for that reason it is difficult to generalise the results to other neck pain conditions. Sterling et al. (2005) stated that both physical and psychological factors play a role in recovery from whiplash injury, and Nederhand et al. (2004) found that an additional test for fear of movement, in combination with a test for disability, can be used to predict future outcome.

There is increasing evidence that psychological factors can influence the course of pain, and can also play an important role in the development of chronic musculoskeletal disorders, but, the consistency of those findings is rather low. Nevertheless, for the further development of effective treatment strategies it is important to determine consistent factors that predict the clinical course of sub-acute neck pain.

In primary care, some prognostic factors are routinely included in history-taking, for example high pain levels, and a previous history of neck pain (Croft et al., 2001; Hoving et al., 2004), but a structural search for psychological factors is not common practice. Factors such as the attitudes and beliefs of the patient, coping, depression, psychological distress, illness behaviour and anxiety are all factors which, according to the bio-psychosocial model, can influence the course and experience of pain (Gatchel, 1996; Linton, 2000). Previous studies have investigated only a few psychological factors, with the use of mixed study populations, including patients with acute and chronic neck pain or patients with shoulder pain, and have reported inconsistent results. Therefore, we carried out a secondary analysis of data on patients with sub-acute neck pain, obtained from a randomised clinical trial in which a large number of psychological factors were studied.

Our objective was to determine psychological factors that predict the short and long-term outcome of sub-acute neck pain in terms of global perceived recovery, pain, and functional disability. In the analysis we took into account the variability of the practitioners (manual therapists and physical therapists), because inter-practitioner variability can be substantial, due to differences in practice organisation, professional norms, therapist style, and background.

2. Materials and methods

Our prognostic study was conducted within the framework of a randomised clinical trial on the effectiveness of manual therapy compared to a behavioural graded activity programme provided by physical therapists, for patients with sub-acute neck pain (Pool et al., 2006). In this trial it was concluded that on the primary outcome measures, i.e. Global Perceived Effect (GPE), Numerical rating scale for pain (NRS) and the Neck Disability Index (NDI), there was only a marginal difference of effect, in favor of the behavioural graded activity programme which only reached statistical significance on the NDI (Pool, 2007). At baseline, 146 patients completed a questionnaire which included questions about potential prognostic indicators such as gender, age, history of neck complaints, and severity of the pain (see Table 1). Furthermore, the 4 Dimensional Symptom Questionnaire (4DSQ), which is a valid questionnaire, with acceptable reliability (Terluin et al., 2006), was used to measure somatisation, distress, depression and fear. The Pain Coping and Cognition List (PCCL) (Stomp-van der Berg et al., 2001) was used to measure catastrophising, coping, and internal and external pain control. The PCCL is based on a compilation of the Pain Coping List, the Pain Control List and the Coping and Pain Questionnaire. The internal consistency of the PCCL seems to be good (Cronbach's α between 0.80 and 0.85), its test-retest reliability is moderate to good (r between 0.64 and 0.79) and it has fair construct validity. Fear of movement was measured with the Tampa Scale for Kinesiophobia (TSK) (Kori et al., 1990), which has good internal consistency and substantial test-retest reliability. The level of chronicity was assessed with the Graded Chronic Pain Scale (GCPS) (Von Korff, 2000). The patient's preference or non-preference for therapy (manual therapy or physical therapy), and the general practitioner's attitude towards neck pain were assessed with the Pain Beliefs and Attitude Scale (Ostelo et al., 2003).

Potential non-psychological predictors such as age, severity of complaints (7-point Likert scale), headache (yes/no) and history of neck pain as reported in former studies, were also investigated, in order to assess the added value of psychological factors.

Three primary outcome measurements were defined and measured at 12 and 52 weeks.

1) Perceived recovery was rated by the patient on a 7-point ordinal rating scale (GPE) (Beurskens et al., 1996), ranging from 'completely recovered' to 'worse than ever'. Recovery was a priori defined as 'completely recovered' or 'much improved', as reported by the patient.
2) The severity of the neck pain was scored on an 11-point NRS. Recovery from pain was a priori defined as an NRS score of ≤ 1.
3) Functional status was measured with the NDI (Vernon and Mior, 1991).

The Medical Ethics Committee of the VU University Medical Center in Amsterdam approved the study protocol.

Table 1
Summary baseline characteristics of study population.

Total participants	146
Age	45.1 (11.2)
Gender (% female)	61
History neck complaints (%)	54.8
Headache (%)	61.4
Mean pain (SD)	5.3 (2.2)
NDI (SD)	14.0 (6.8)
Tampa (SD)	32.3 (6.1)
4DSQ (SD):	
Distress	8.6 (6.9)
Depression	0.6 (1.6)
Fear	1.7 (3.2)
Somatisation	9.7 (4.5)
SF 36 (SD)	
Phys. component summary	44.8 (7.3)
Mental component summary	47.5 (12.2)
PCCL (SD)	
Catastrophising	2.3 (0.9)
Coping	3.4 (0.9)
Internal pain control	3.7 (0.9)
External pain control	3.1 (0.9)