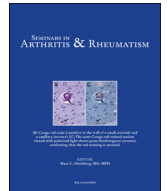




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## Are cognitive and behavioural factors associated with knee pain? A systematic review

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## ABSTRACT

**Objectives:** Although studies that have examined the relationship between cognitive and behavioural factors and knee pain report conflicting results, no systematic review has been performed to summarise the evidence. The aim of this systematic review was to examine the relationship between cognitive and behavioural factors and pain at the knee.

**Methods:** Electronic searches of MEDLINE, EMBASE and PsycINFO were performed to identify relevant studies published up to April 2014 using MeSH terms and keywords. Studies that met a set of predefined criteria were included. Coping, self-efficacy, somatising, pain catastrophising and helplessness were grouped together as “cognitive factors,” while kinesiophobia and pain-related fear-avoidance were considered “behavioural factors.” Two independent reviewers extracted the data and assessed the methodological quality of the selected studies. Due to the heterogeneity of the studies, a best-evidence synthesis was performed.

**Results:** A total of 14 studies were included in the review, of which nine examined cognitive factors, one investigated behavioural factors and four studied both cognitive and behavioural factors. Eight of 14 studies were of high quality. The best-evidence synthesis showed moderate evidence for a relationship between cognitive factors and knee pain and limited evidence for no association between the behavioural factors and knee pain.

**Conclusion:** This review found evidence for a relationship between cognitive factors, but not behavioural factors, and knee pain. These findings will need to be confirmed with high-quality longitudinal studies, but the data suggest that cognitive factors may be important to target in the management of knee pain.

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## Introduction

Knee pain is a common clinical symptom, with almost half of those aged 50 years and over reporting pain at the knee, and 25% of them experiencing symptoms of a chronic nature [1]. Moreover, one in six individuals with knee pain will consult a doctor in the course of a year and one-third of them will have severe pain and disability [2]. The main underlying cause of knee pain is

osteoarthritis, which imposes a significant health care burden. However, even in the setting of knee osteoarthritis, it is becoming increasingly evident that structural changes alone do not account for all knee pain [3]. Rather, knee pain is a complex interaction of factors, including structural damage, peripheral and central pain processing mechanisms, culture, sex and psychosocial factors [4].

The role of cognitive and behavioural factors in chronic musculoskeletal pain has been investigated over several decades. Behavioural concepts were first described by Fordyce [5] who highlighted a distinction between the original cause of pain and pain behaviours, which were defined as reports of or displays of pain that may persist for longer than normal expected healing time. The concept of cognitive constructs, which include pain-related thoughts and beliefs, developed and was combined with behaviour theories to form the cognitive behavioural model [6].

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The model holds the assumption that chronic pain is multifactorial and is influenced by a variety of physical and psychosocial factors, including the way individuals react to their pain (their behaviour), which is a product of their thoughts and beliefs (cognitions).

Cognitive and behavioural factors have been shown to be predictors of pain and disability in a variety of musculoskeletal conditions, including chronic low back pain [7] and neck pain [8]. It has also been suggested that cognitive and behavioural factors are involved not only in the pathogenesis of acute to chronic musculoskeletal pain but in the progression of chronicity of pain [9]. While two systematic reviews have specifically examined one or two psychosocial factors, along with a number of demographic, physical and patient-related factors, as prognostic factors for knee pain [10,11], no systematic review has specifically focused on examining the relationship between cognitive and behavioural factors and pain at the knee. Moreover, a recent comparative study found that patients with knee OA who received training in coping compared to arthritis education or standard care had lower levels of pain, physical disability and pain behaviour at six months follow-up [12]. Understanding the role of psychosocial factors in knee pain is important in the development of non-pharmacological management strategies for the management of this debilitating condition. The aim of this review was to systematically review the literature to determine whether cognitive (coping, self-efficacy, somatization, pain catastrophising and helplessness) and behavioural (kinesiophobia and pain-related fear-avoidance) factors are associated with knee pain.

## Methods

A systematic review was conducted according to the 2009 PRISMA statement [13].

### Data sources and search strategy

Electronic searches of MEDLINE, EMBASE and PsycINFO were performed to identify studies that examined the relationship between psychosocial factors and knee pain up to April 2014 using the following MeSH terms: “knee pain” and “knee osteoarthritis” and the following keywords: “knee,” “osteoarthritis,” “pain,” “psychosocial,” “psychosomatic,” “psychological” and “psychophysiological.” The search was limited to human studies of adults, published in the English language.

### Inclusion and exclusion criteria

Studies were included if they examined cognitive factors, including coping, self-efficacy, somatisation, pain catastrophising and helplessness and/or behavioural factors, including kinesiophobia (pain-related fear of movement) and pain-related fear-avoidance, in relation to knee pain outcomes. A number of the studies examined the constructs of anxiety or depression; however, these have been systematically reviewed in a previous study [14]. Studies on knee pain were included whether or not knee osteoarthritis was specified.

The following were the exclusion criteria: (1) studies that did not separate knee pain from pain in other regions, such as the hip and back; (2) studies investigating the reverse outcome (i.e., the effect of pain on psychosocial health); (3) studies that did not focus on pain at the knee as the outcome; (4) study participants who had inflammatory arthritis or other associated medical conditions affecting joints; (5) study populations who had undergone knee surgery and (6) studies examining depression and anxiety as psychosocial factors.

### Data extraction

Data on the characteristics of the included studies were extracted, including (1) study design, study population, number of participants, mean age, percentage of female participants, definition of OA and previous knee injury; (2) methods of assessment of cognitive (coping, self-efficacy, somatisation, pain catastrophising and helplessness) and behavioural (kinesiophobia and pain-related fear-avoidance) factors; (3) outcome measures assessment of knee pain and (4) study results (Tables 3–5).

### Methodological quality assessment

The methodological quality of each study was assessed independently by two reviewers (J.D. and S.F.) using the standard criteria adapted from the study by Lieve et al. [15]. Scores were compared and a consensus score was obtained for each study (Table 1). Some of the standard criteria pertain specifically to either case-control or cohort studies and therefore could not be applied to every study. Only relevant criteria were included in calculations of the total and percentage mean quality score for each study. Any study that obtained a score above the mean of 68.3% was considered to be of high quality.

### Data synthesis

Due to heterogeneity in methodology between the studies, the decision was made to use a best-evidence synthesis to summarise the data [15] (Table 2). Studies were ranked according to their design, with cohort studies considered to be of a higher level of

**Table 1**

Criteria used to assess the methodological quality of selected cohort and cross-sectional studies

| Item                           | Criteria  | Study type |
|--------------------------------|---|------------|
| Study population               |   |            |
| 1                              | Selection before disease was present or at uniform point            | CH/CC/CS   |
| 2                              | Cases and controls were drawn from the same population              | CC         |
| 3                              | Participation rate $\geq$ 80% for cases/cohort                      | CH/CC/CS   |
| 4                              | Participation rate $\geq$ 80% for controls                          | CC         |
| 5                              | Sufficient description of baseline characteristics                  | CH/CC/CS   |
| Assessment of risk factor      |   |            |
| 6                              | Psychosocial assessment was blinded                                 | CH/CC/CS   |
| 7                              | Psychosocial factors were measured identical for cases and controls | CC         |
| 8                              | Psychosocial factors were assessed prior to the outcome             | CH/CC/CS   |
| Assessment of outcome          |   |            |
| 9                              | OA was assessed identical in studied population                     | CH/CC/CS   |
| 10                             | Presence of OA/pain was assessed reproducibly                       | CH/CC/CS   |
| 11                             | Presence of OA/pain was assessed according to standard definitions  | CH/CC/CS   |
| Study design                   |   |            |
| 12                             | Prospective design was used   | CH/CC/CS   |
| 13                             | Follow-up time $\geq$ two years                                     | CH         |
| 14                             | Withdrawals $\leq$ 20%  | CH         |
| Analysis and data presentation |   |            |
| 15                             | Appropriate analysis techniques were used                           | CH/CC/CS   |
| 16                             | Adjusted for at least age and sex                                   | CH/CC/CS   |

CH—applicable to cohort studies; CC—applicable to case-control studies; CS—applicable to cross-sectional studies; OA—osteoarthritis.

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