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# Psychosocial risk factors for chronic low back pain in primary care—a systematic review

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**Background.** Low back pain (LBP) is a major public health problem, often encountered in primary care. Guidelines recommend early identification of psychosocial factors that could prevent recovery from acute LBP.

**Methods.** To review the evidence on the prognostic value of psychosocial factors on transition from acute to chronic non-specific LBP in the adult general population. Systematic review is the design of the study. A systematic search was undertaken for prospective studies dealing with psychosocial risk factors for poor outcome of LBP in primary care, screening PuBmed, PsychInfo and Cochrane Library databases. The methodological quality of studies was assessed independently by two reviewers using standardized criteria before analysing their main results.

**Results.** Twenty-three papers fulfilled the inclusion criteria, covering 18 different cohorts. Sixteen psychosocial factors were analysed in three domains: social and socio-occupational, psychological and cognitive and behavioural. Depression, psychological distress, passive coping strategies and fear-avoidance beliefs were sometimes found to be independently linked with poor outcome, whereas most social and socio-occupational factors were not. The predictive ability of a patient's self-perceived general health at baseline was difficult to interpret because of biomedical confounding factors. The initial patient's or care provider's perceived risk of persistence of LBP was the factor that was most consistently linked with actual outcome.

**Conclusion.** Few independent psychosocial risk factors have been demonstrated to exist. Randomized clinical trials aimed at modifying these factors have shown little impact on patient prognosis. Qualitative research might be valuable to explore further the field of LBP and to define new management strategies.

**Keywords.** Low back pain, primary health care, prognosis, psychology, review (publication type).



## Introduction

Non-specific low back pain (LBP) is a major and increasing health problem in western countries. Besides the well-known pain and disability involved, it has a significant impact on work through the high levels of resulting sick leave,[1] and it generates very high costs.[2,3]

It is a frequent reason for seeking primary health care,[4] and practitioners often feel frustrated, due in part to the impression of failure and to the absence of specific treatment.[5,6] Indeed, the prognosis for LBP is not as good as previously thought,[7] particularly because of frequent relapse or transition to chronic LBP.

Many practitioners have long noted that psychosocial issues sometimes influence the natural history of LBP.[8] The biomedical framework of this disorder was reconsidered, first in the 1990s for chronic LBP and more recently for earlier stages, in order to adopt a broader biopsychosocial model that would better suit the complexity of this condition.[9–11]

As stated by the Cochrane Back Review Group,[12] highlighting factors that influence the outcome of

(sub)acute LBP is a major challenge to improving prognosis. In addition to the well-known biomedical conditions and occupational biomechanical characteristics, certain psychosocial factors have been causally linked with poor outcome in recent years. Recently published guidelines for LBP have recommended early identification of the psychosocial factors that could prevent rapid recovery.[13,14]

However, despite several studies on this topic, research to date has failed to determine which psychosocial factors might prospectively be associated with transition from (sub)acute (<3 months) to chronic LBP (>3 months) in primary health care. The aim of our systematic review of the literature was to address this specific issue, on which none of the recent reviews concerning LBP prognosis[15–26] has focused specifically.

We chose the World Health Organization's (WHO) definition of a psychosocial factor as any factor determining the way people 'deal with the demands and challenges of everyday life [ ... ], maintain a state of mental well-being and [behave] while interacting with others, their culture and environment',[27] and the characteristics of primary care were adopted from the European definition of family medicine (World Organization of National Colleges Academic Associations of General Practitioners / Family Physicians 2005), namely health care provided by open access care providers, acting as first contact and confronted with unselected health problems.

## Methods

*Identification and selection of the literature*

*Identification.* PubMed, PsychInfo and the Cochrane Library databases were systematically explored to search for all the literature available in French and English (lack of translation resources for other languages) published until December 2009. The following key words were used: low back pain, risk factors and primary health care, with or without various subheadings (full search algorithm available on request).

The reference lists for each article found and for recent reviews[15–26] were then systematically screened to reveal other relevant articles.

*Selection.* The inclusion criteria comprised: original prospective cohort study, adult population with non-specific LBP, primary health care setting, episode of LBP of <3 months at inclusion for >80% of the study population (not necessarily the first episode), follow-up period of at least 3 months, at least one psychosocial factor noted at inclusion and use of patient-centered outcome criteria.

Articles were excluded if they focused mainly on the incidence of LBP, if non-specific LBP could not be isolated from other disorders or if they presented secondary analysis from randomized controlled trials.

*Assessment of methodological quality of the literature*

The assessment criteria were derived from the evidence-based guidelines for specific back pain research from the Cochrane Collaboration Back Review Group for Spinal Disorders[28] and from the guidelines for assessment of prognostic studies from the National Health Agency.[29]

Seven fields were assessed:

Patient inclusion criteria were scored 2 if the paper clearly indicated the duration of LBP at inclusion, the proportion of radicular pain and the non-specific nature of the LBP. A score of 1 was allocated if only one or two of these elements were present and 0 otherwise.

For the assessment of psychosocial factors, a score of 2 was allocated if binary or crude data (e.g. marital status, annual income) and/or validated scales appropriate for primary care were used, a score of 1 if tools were described in sufficient detail to enable replication and 0 otherwise.

The same scoring system was applied to the evaluation of the outcome criteria.

Statistical analysis: a score of 4 was allocated if multivariate analysis investigated potential confounding factors belonging to the three main fields (biomedical, occupational biomechanical and psychosocial factors). When investigations involved only one or two of these, 2 or 3 points were given, respectively; 0 was allocated in cases of univariate analysis. One more point was allocated if measurements of variability for primary outcomes were available.

Cohort size was scored 5 if the study had >600 patients, 3 if 300–600 1 if 100–300 and 0 if ⩽100.

The drop-out rate was scored 2 if <20%, 1 if >20% but no or minor bias and 0 otherwise.

To evaluate study duration, a score of 2 was allocated for follow-up ⩾12 months, 1 for follow-up ⩾6 months and 0 otherwise.

Each field was scored, and a total score was determined for each study (maximum 20).

Two reviewers (AR and IR) independently assessed the quality of the methodology of the papers. When differences in scores existed, both reviewers reassessed the article until consensus was reached.

Papers scoring ⩾15 were considered to be high-quality papers.

*Literature analysis and data extraction*

Information regarding author, date, country, setting and quality assessment was extracted from each paper selected. When several articles were related to the same cohort, the mean of the scores for each paper was allocated, and they were considered together for subsequent analysis.

The psychosocial factors evaluated at baseline were noted for each study, and the outcome criteria used were classified into one of the following five fields: pain (duration, residual intensity at follow-up, etc.), disability, work status (duration of sick leave, compensation status at follow-up, etc.), participation (restriction in leisure, social, family activities, etc.) and patient satisfaction (self-perceived recovery, satisfaction with current symptoms, etc.). When criteria were made up of elements from several fields (e.g. no pain and no disability), they were classified as 'mixed criteria'.

The presence or the absence of any statistical associations between psychosocial factors and outcome criteria was recorded in contingency tables and referenced to the studies concerned, paying special attention to high-quality papers.

## Results

*Identification and selection of the literature*

Four hundred and twelve papers were identified and processed. Twenty-three of them met the inclusion criteria,[30–52] and they reported the results of 18 different studies (several articles being related to the same cohort) (Figure 1).

*Assessment of methodological quality of the literature*

Total agreement between the two reviewers or difference regarding only one of the seven fields assessed was achieved for 15 of 23 articles. Eight articles were reassessed.

Six studies of 18 (33%) were scored ⩾15 and considered to be high quality. This group comprised all the large cohorts (⩾500 patients) without serious methodological weaknesses.

*Literature analysis and data extraction*

*Characteristics of the studies.* Thirteen studies (72%) were undertaken in Europe, two in North America, two in Asia and one in Israel. They involved different primary care settings (mainly general practitioners but also physiotherapists, occupational practitioners, chiropractors and osteopaths, when they fitted the definitions selected for primary health care) (Table 1).

*Psychosocial factors.* Sixteen different factors were tested for their predictive value in the outcome of LBP in the literature selected. To clarify presentation, they were classified into three fields, i.e. social and socio-occupational factors, psychological factors and cognitive and behavioural factors. Description of some of them and, if applicable, scales used to asses them can be found in Tables 2–4.

Social and socio-occupational factors. Despite the large number of studies focusing on socio-economic classification, work status, educational level and civil status (five or six for each), a significant link with LBP outcome was found at best only once for each (Table 5).

The association between job satisfaction and various outcome criteria was also widely explored (six studies) and most often found to be not significant, as in the only one study considered high quality.[44]

The potential impact of compensation issues on LBP outcome was evaluated and yielded conflicting results. Previous sick leave for LBP and compensatable LBP was found to be predictive of a poor outcome in two studies scored high quality,[30,46] whereas no association was found in three other studies.[36,39,44]

Only three studies focused on social support; none could find any link with LBP outcome.

Psychological factors. Feelings of depression were found to be predictive of time to recovery (mixed criterion considering pain, disability and work status) in a large Australian study,[30] whereas no association was found in four of the five other studies that focused on depression (Table 6).

Few studies focused on the impact of anxiety or somatization on the evolution of LBP (three and two, respectively). No association was found with anxiety, and somatization was only found to be predictive of disability at 1 year in a cohort of 252 patients but no longer at 4 years.[50]

Only two studies (from seven) concluded that there was a link between psychological distress and LBP outcome.[35,36]

Cognitive and behavioural factors. No association was found between pain control and evolution of LBP in the three cohorts studied, including two high-quality ones (Table 7).[30,44]

Coping strategies and fear-avoidance beliefs were analysed in four and seven studies, respectively. A statistical link was highlighted in about half the studies. Passive coping was predictive of 'having persistent disabling LBP' at 3 months in a large British cohort of 974 patients, with a relative risk of 1.5 [confidence interval (CI) 1.1–2.0] for the highest scores for passive coping compared to the lowest scores.[34] High pain-related fear was the most powerful predictor of disability and of low participation level at 6 months in a Dutch population of 555 people.[33]

Self-perceived general health, mixing biomedical and psychosocial items, was often found to be linked with LBP outcome.

Among the four studies that focused on patients' expectations of recovery or care provider's judgement at baseline, three found in favour of their independent predictive value on LBP evolution. Two of these studies were considered to be high quality.[30,46] In the first, there was a linear relationship between patient's

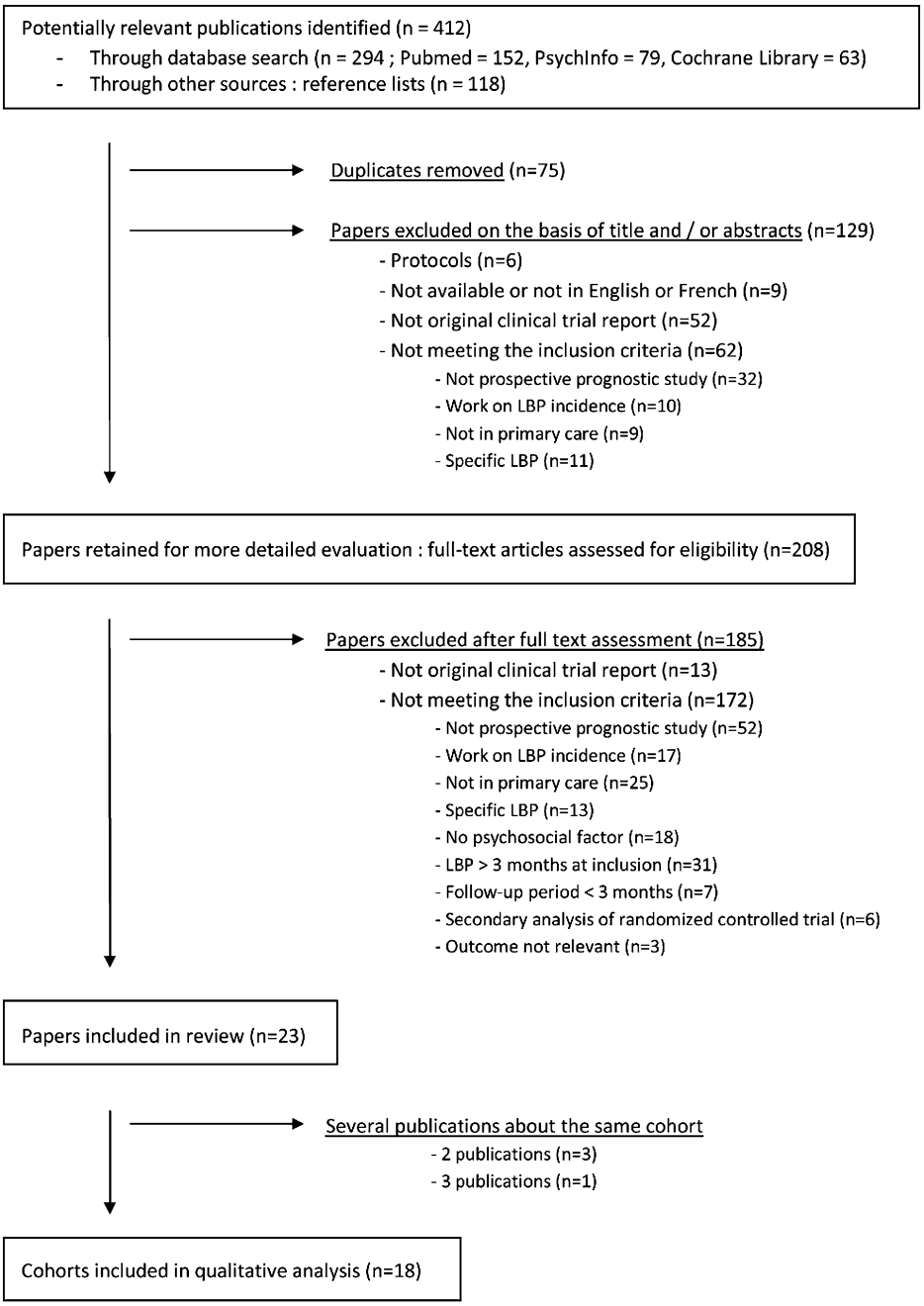


FIGURE 1 *Flow diagram*

self-estimated risk of persistence of LBP on a 10-point scale and time to recovery ($P < 0.001$). In the second study, patients whose care providers estimated them most likely to develop chronic LBP had an odds ratio of 10.40 (CI 2.20–49.10) for a poor outcome (on sick leave or not functionally recovered) at 12 months compared with patients whose care providers estimated no risk of chronic LBP.

Among the different types of outcome criteria, disability was more often found to be predicted by psychosocial factors than pain was. This was particularly the case for cognitive and behavioural factors and at least to a certain degree for psychological factors.

## Discussion

### *Statement of principal findings*

Most of the social and socio-occupational factors have been widely studied and were found not to influence the outcome of LBP independently in primary care

TABLE 1 *Studies included and their main characteristics*

| Author (year) | Country | Setting | Sample Size (*n*) | Follow-up duration (in months) | Drop-out rate (%) | Score (/20)[a] |
|---|---|---|---|---|---|---|
| Henschke (2008)[30]* | Australia | GP, Phys, Chir | 973 | 12 | 3 | 16* |
| Heneweer *et al.* (2007)[31] | The Netherlands | Phys | 66 | 3 | 15 | 10 |
| Reis *et al.* (2007)[32] | Israel | GP | 526 | 12 | 17 | 11 |
| Swinkels-Meewisse *et al.* (2006)[33]* | The Netherlands | GP, Phys | 555 | 6 | 22 | 15* |
| Jones *et al.* (2006)[34]* | UK | GP | 974 | 3 | 5 | 15* |
| Sieben *et al.* (2005)[35] | The Netherlands | GP | 222 | 13–37 | 22 | 12 |
| Grotle *et al.* (2007)[36] | Norway | GP, Chir | 123 | 12 | 9 | 14 |
| Grotle *et al.* (2006)[37] | | | | | | |
| Grotle *et al.* (2005)[38] | | | | 3 | 2 | |
| Coste *et al.* (2004)[39] | France | GP, Rheum | 113 | 3 | 2 | 14 |
| Schultz *et al.* (2005)[40] | Canada | Occ | 111 | 3 | 10 | 10.5 |
| Schultz *et al.* (2004)[41] | | | 192 | 3 to 18 | 17 | |
| Vingard *et al.* (2002)[42]* | Sweden | All | 791 | 24 | 18 | 16* |
| Sieben *et al.* (2002)[43] | The Netherlands | GP | 44 | 12 | 32 | 9 |
| Fransen *et al.* (2002)[44]* | New Zealand | Occ | 854 | 3 | 0 | 17* |
| Thomas *et al.* (1999)[45] | UK | GP | 246 | 12 | 27 | 10 |
| Schiottz-Christensen *et al.* (1999)[46]* | Denmark | GP | 524 | 12 | 3 | 15* |
| Williams *et al.* (1998)[47] | USA | NMC | 112 | 6 | 27 | 11.5 |
| Epping-Jordan *et al.* (1998)[48] | | | 140 | 12 | 44 | |
| van den Hoogen *et al.* (1997)[49] | The Netherlands | GP | 443 | 12 | 39 | 12 |
| Burton (2004)[50] | UK | Ost | 252 | 48 | 40 | 12.5 |
| Burton (1995)[51] | | | | 12 | 26 | |
| Klenerman (1995)[52] | UK | GP | 300 | 12 | 35 | 11 |

Asterisks indicate high-quality studies (qualitative score ⩾ 15/20). GP, General Practitioners; Phys, physiotherapists; Chir, chiropractors; Rheum, rheumatologists; Occ, occupational setting; All, all care providers in a specific region; NMC, Naval Medical Center; Ost, osteopaths.
[a]Score allocated according to the evaluation of the quality of the methodology.

TABLE 2 *Description of the social and socio-occupational factors studied in the papers included*

| Social and socio-occupational factors | Description | Measurement scales used in the papers included |
|---|---|---|
| SEC/work status | Contains different notions: level of income; distinction between blue-collar and white-collar workers; between employed and non-employed people | N/A |
| Educational level | Number of years in education or highest diploma | N/A |
| Civil status | Marital status or distinction between living alone and cohabiting | N/A |
| Job satisfaction | Overall satisfaction or in-depth evaluation of the psychosocial characteristics of the work situation | Job content questionnaire, overall job satisfaction scale, job descriptive index, modified work APGAR |
| Compensation issues | Compensation status (compensated sick leave, disability pension ...) or worker's perception of his compensation status and of the employer's response to his claim | N/A |
| Social support | Relation with and support from family, friends, neighbours, groups ... | Duke-UNC-functional social support, GHQ-social dysfunction, SF-36-social functioning |

SEC, socio-economic classification; N/A, not applicable; APGAR, adaptability, partnership, growth, affection, resolve; UNC, University of North-California; GHQ, General Health Questionnaire; SF-36, Short-Form-36 items.

settings. Only compensation issues have sometimes been found to be linked with LBP outcome, but the physical demands of jobs were rarely considered and could be a major confounding factor.[53]

A few studies concluded that depression and psychological distress impact on LBP evolution, but this may involve only a few people and would need large cohorts to be demonstrated. The other psychological factors studied (anxiety and somatization) seem not to be prognostic factors.

Passive coping strategies and fear-avoidance beliefs were found to be predictive of persistent disability rather than of pain evolution in half of the studies, especially at the early stages of evolution (first few

TABLE 3 *Description of the psychological factors studied in the papers included*

| Psychological factors | Description | Measurement scales used in the papers included |
|---|---|---|
| Depression | | Beck depression inventory, CES-depression scale, GHQ-severe depression, Hamilton rating scale for depression, Zung depression index |
| Anxiety | | GHQ-anxiety/insomnia, Spielberg state-trait anxiety inventory |
| Somatization | | Modified somatic perception questionnaire |
| Psychological distress | Assesses non-specific psychological distress rather than specific psychiatric diagnoses; often mixes items from depression and/or anxiety series with other elements | Hopkins Check List-25, negative emotionality scale, SF-36-mental health, ALBPSQ-psychological factors, distress and risk assessment method |

CES, Center for Epidemiological Studies; GHQ, General Health Questionnaire; SF-36, Short-Form-36 items; ALBPSQ, Acute Low Back Pain Screening Questionnaire.

TABLE 4 *Description of the cognitive and behavioural factors studied in the papers included*

| Cognitive and behavioural factors | Description | Measurement scales used in the papers included |
|---|---|---|
| Pain control | Assesses the patient's perception of control over his pain | Loci of control of behaviour scale, pain locus of control |
| Coping strategies | Evaluates cognitive and behavioural strategies developed by a patient to cope with his pain. The strategies are divided into two groups: active coping (e.g. increasing activities or diverting attention) and passive coping (e.g. praying or catastrophizing) | Coping strategies questionnaire, pain coping inventory, Vanderbilt pain management inventory, pain catastrophizing scale |
| FAB | Measures the fears related to pain and kinesiophobia (fears of re-injury due to movement) | Fear-avoidance beliefs questionnaire, Tampa scale for kinesiophobia |
| General health | Often mixes somatic and psychosocial items | SF-36, GHQ, Nottingham health profile |
| Patient's expectations | Patient's evaluation of risk of persistent LBP, patient's prediction about 'getting better soon', return to work, return to usual activities | N/A |
| Care provider's judgement | Care provider's opinion on: the patient's vulnerability to mental stress, susceptibility to develop LBP, involvement of psychosocial problems in LBP | N/A |

N/A, not applicable. SF-36, Short-Form–36 items; GHQ, General Health Questionnaire.

months). Self-perceived general health has often been linked to LBP outcome, but such a scale combines somatic and psychosocial factors, and co-morbidities may act as confounding variables. Finally, patients' and care providers' judgements about the likely evolution of an episode of LBP (more recently studied) seemed to have the most powerful and independent predictive power.

*Strengths and weaknesses of the study*

The limitation of this research into the main medical and psychological databases may have omitted studies only distributed through specific health organizations (national health insurance, health ministry, etc.), as in most previous reviews.[15–22,24,25]

We reviewed only quantitative research studies, in order to compare results with evidence-based principles. However, some qualitative research works have also produced interesting data, studying what is at stake for both patients and care providers. Some have explored their beliefs and their expectations,[54–56] evaluating the relevance of the biopsychosocial paradigm in its three dimensions (physical lesion, coexistent mental state and prevailing social pressures).[11,57] Others were aimed at confronting the history of LBP with the context of patients' lives.[58] Reviewing the qualitative literature on LBP in primary care would be very interesting and would require searching in other databases than those explored in this work and adopting a specific methodological process.

Socio-occupational factors are sometimes classified in the wide occupational field, with biomechanical factors. However, we believe that they belong to the psychosocial field defined by the WHO,[27] and these factors were indeed considered that way in a recent International Forum on LBP Research in Primary Care.[59]

Major heterogeneity in the patients' inclusion criteria, in the assessment tools used and in statistical methods (adjustment for confounding factors, modelling tools used, etc.) prevented us from carrying out any formal meta-analysis. Altman[60] listed the many frequent difficulties in systematic reviewing of

TABLE 5 *Associations between social and socio-occupational factors and LBP outcome*

| Baseline factors | LBP outcome | | | | |
|---|---|---|---|---|---|
| | Pain | Disability | Work status | Participation | Mixed criteria |
| SEC/work status | | | | | |
| Sign | | | | | 34* |
| NS | | 40 | 40 | | 39,42*,45,46* |
| Educational level | | | | | |
| Sign | | | | 33* | |
| NS | 36,47,49 | 33*,36,40,47 | 40,44* | | |
| Civil status | | | | | |
| Sign | | | | | |
| NS | 47 | 33*,40,47 | 40,44* | 33* | 46* |
| Job satisfaction | | | | | |
| Sign | 47 | 47 | | | 45 |
| NS | | 36,40 | 40,44* | | 39 |
| Compensation issues | | | | | |
| Sign | | 40 | | | 30,46* |
| NS | 36 | 36 | 40,44* | | 39 |
| Social support | | | | | |
| Sign | | | | | |
| NS | | 40 | 40,44* | | 39 |

For each possible association, the studies are presented in two lines depending on whether the association was found to be significant (Sign) or not (NS). When several papers were related to the same study, they are considered together and only the most recently published is referenced in Table 5. Asterisks indicate high-quality studies (qualitative score ⩾ 15/20). SEC, Socio-Economic Classification.

TABLE 6 *Associations between psychological factors and LBP outcome*

| Baseline factors | LBP outcome | | | | |
|---|---|---|---|---|---|
| | Pain | Disability | Work status | Patient satisfaction | Mixed criteria |
| Depression | | | | | |
| Sign | | 50 | | | 30* |
| NS | 47 | 40,47 | 40,44* | | 35 |
| Anxiety | | | | | |
| Sign | | | | | |
| NS | | 40 | 40,44* | | 30* |
| Somatization | | | | | |
| Sign | | 50 | | | |
| NS | | 36,50 | | | |
| Psychological distress | | | | | |
| Sign | 36 | 36 | | | 35 |
| NS | | 50 | 40,44* | 31 | 39 |

For each possible association, the studies are presented in two lines depending on whether the association was found to be significant (Sign) or not (NS). When several papers were related to the same study, they are considered together and only the most recently published is referenced in Table 6. Asterisks indicate high-quality studies (qualitative score ⩾ 15/20).

prognostic studies, particularly in producing summary estimates from such studies. The risk of producing biased summary results is often an argument against carrying out meta-analysis.

TABLE 7 *Associations between cognitive and behavioural factors and LBP outcome*

| Baseline factors | LBP outcome | | | | | |
|---|---|---|---|---|---|---|
| | Pain | Disability | Work status | Participation | Patient satisfaction | Mixed criteria |
| Pain control | | | | | | |
| Sign | | | | | | |
| NS | | 50 | 44* | | | 30* |
| Coping strategies | | | | | | |
| Sign | | 50 | | | | 34* |
| NS | | 50 | | | 31 | 35 |
| FAB | | | | | | |
| Sign | | 33*,43 | 52 | 33* | | 52 |
| NS | 36 | 36,50 | | | 31 | 35 |
| General health[a] | | | | | | |
| Sign | | 40 | 40,44* | | | 39 |
| NS | 49 | | | | | 45 |
| Patient's expectations[b] | | | | | | |
| Sign | | 40 | 40 | | | 30* |
| NS | | | | | | |
| Care provider's judgement | | | | | | |
| Sign | | | | | | 46* |
| NS | 49 | | | | | |

For each possible association, the studies are presented in two lines depending on whether the association was found to be significant (Sign) or not (NS). When several papers were related to the same study, they are considered together and only the most recently published is referenced in Table 7. FAB, fear-avoidance beliefs. Asterisks indicate high-quality studies (qualitative score ⩾ 15/20).
[a]Patient's self-perceived general health.
[b]Patient's expectations of recovery.

Finally, reviewing of studies worldwide involves being confronted with cultural and socio-economic differences. For example, some items from the Coping Strategies Questionnaire, such as praying, probably do not have exactly the same meaning across the world and are difficult to interpret identically in different cultures. The specific exploration of the influence of compensation issues should take into account the characteristics of the national health systems;[61] firm conclusions are particularly tricky to draw without that.

There are significant differences between primary and secondary care cohorts,[62] often meaning that conclusions based on secondary care studies are not relevant for primary care physicians. Focusing on primary health care settings is needed and this had not been undertaken until this review.

We based the qualitative evaluation of the studies included on the recommendations from the Cochrane Collaboration Back Review Group for Spinal Disorders on reviews of randomized clinical trials on LBP.[28] We adapted it to suit the nature of the studies

reviewed (prognostic studies), choosing to overweight large cohorts and multivariate analysis with sufficient adjustment, because of the anticipated weakness of the associations investigated, and the possible colinearity between the different predictive factors.[63] Exclusion of some papers according to their (low) scores would have led to lack of data for several predictive factors and outcome criteria. We then chose only to highlight the results from the high-quality studies according to our rating scale. We did not put forward strict and definitive levels of evidence for each factor because the necessary choice of thresholds is always arbitrary and debatable.

We also fulfilled most of the criteria of the PRISMA statement for the review process and its reporting[64] and of Hayden's recommendations regarding reviews of LBP prognosis.[65,66]

*Comparison with other studies*

Previous reviews of the literature have mixed data from different settings or exclusively included samples from occupational settings.[20,25,26] Some did not discriminate between acute and chronic LBP.[18,24,26,67] Several reviews were only interested in 'return to work' issues.[15,21,25] Although most reviews analysed the quality of the studies they included, only two of them presented pooled summary effects from meta-analysis[17,25] for only a few potential associations because of wide heterogeneity in primary studies.

Almost all reviews reported, as we did, some prognostic value of coping strategies and self-perceived general health. Some found that depression and psychological distress may be linked to various outcome criteria, even if they often fail to predict return to work.[17,23]

The oldest studies reported the promising value of socio-occupational factors,[15,67] but this seems not to have been confirmed.[17,21,25] The role of fear-avoidance beliefs remains controversial; a recent review concluded that any causal link between these beliefs and poor outcome was at best weak.[22]

Despite the large number of studies in the last 10 years, knowledge does not seem to have progressed and moreover, it has not been translated into improved prognosis. Several randomized controlled trials in (sub)acute LBP patients have been conducted on the basis of educational programmes[68–72] or cognitive–behavioural strategies addressing beliefs about LBP.[73,74] Despite a consistent impact on beliefs and behaviours, only two of these studies showed a modest improvement in some of their primary outcome criteria.[69,70]

In contrast, patients' and care providers' opinions have generated growing interest. In two recent cohorts of acute LBP, the care provider's prediction regarding the patient's prognosis was found to be almost as predictive as complex and specific multifactorial scales.[75,76] Moreover, in the second study, the prediction also 'remained informative when added to the final model, suggesting that [it] was based on factors other than those included' in the clinical scale.

*Implications of the study for clinical practice and future research*

Despite the considerable number of studies on the topic, the published literature barely succeeds in showing any modest predictive ability of a few individual psychosocial factors on LBP outcome and fails to demonstrate any useful impact of these issues on the prognosis of a cohort of LBP sufferers in primary care.

The first hypotheses may be lack of power of the studies and inadequacy of the measurement tools used. Even if this were true, the potential effects of standardized and population-based interventions may remain irrelevant clinically.

Some authors have argued quite rightly for better targeting of specific management strategies for patients who most need them.[77,78] Focus should even be completely reversed, switching from evaluating the impact of each psychosocial factor on the prognosis of a cohort to analysing the influence of the overall psychosocial issues on the particular history of a LBP sufferer. Psychosocial factors should be considered rather as 'yellow flags', i.e. only momentary and partial indicators of more complex and dynamic distress, which requires tailored management.

Some theoretical models have been developed in order to better comprehend the role of all the elements involved and the sequence of their effects.[10,79] The adaptation by Truchon of the Cohen's model to the development of LBP-related disability is of particular interest. In this model, environmental stressors may influence directly and/or indirectly (via cognitive appraisal or emotional state) the biological and behavioural responses of an individual to an episode of LBP. Such stressors can be life events that precede, surround or follow the onset of the episode (e.g. financial difficulties, death of a loved one, litigation with employer ...). In this model, pain and disability are clearly separated, pain being considered as a necessary but insufficient condition for disability. This is congruent with our observation, as disability and pain were sometimes not influenced by the same psychosocial factors.

Bidirectional relationships and interdependence between all the factors need to be taken into account, and the paradigm of a linear causality model, even multivariate, should be abandoned in order to view the situation from another standpoint.

Qualitative studies appear to be the most suitable method by which to collect the dynamic and interconnected data we need; exploration of the strong associations between patients' expectations or care providers' prognosis and LBP outcome may be the following step. Deeper understanding is needed before

developing new management strategies, implementing them in the single framework of the physician–patient relationship and finally evaluating them on a cohort scale.

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## Declaration

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