

# Psychosocial Predictors of Pain and Disability Outcomes in People with Chronic Low Back Pain Treated Conservatively by Guideline-Based Intervention: A Systematic Review

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**Objective:** Previous evidence has recommended conservative interventions as the best treatment in individuals with chronic low back pain (CLBP). However, the influence of psychosocial factors on the treatment outcomes is unclear. Therefore, this systematic review aimed to address the psychosocial factors that influence changes in pain and disability in patients with CLBP after a guideline-based conservative intervention.

**Methods:** Four electronic databases were systematically searched from inception until September 2020 for prospective studies examining the relationship between psychosocial factors and the outcomes of pain and disability after conservative intervention. All included studies were selected, extracted, and critically evaluated by two independent reviewers.

**Results:** In total, 15 studies were included in this systematic review. The results support the link between the baseline fear of movement, depression, self-efficacy, and catastrophizing with future functional disability outcomes after conservative interventions. However, these factors were less likely to predict changes in pain intensity outcomes after conservative interventions. Self-efficacy seems to mediate between some of the baseline psychosocial factors (eg, fear) and future pain and disability.

**Conclusion:** Fear of movement, self-efficacy, catastrophizing and depression were consistently reported to predict disability outcomes irrespective of the type of conservative intervention. This highlights the importance of addressing these factors in conservative management of CLBP.

**Keywords:** chronic low back pain, outcomes, conservative interventions, psychosocial

## Background

Lower back pain (LBP) is a common health condition and one of the leading causes of disability worldwide.<sup>1</sup> The prevalence of LBP has recently increased in the general population with varying outcome degrees, ranging from spontaneous recovery to progression to the chronic stage.<sup>1–3</sup> Previous research has found that 10–40% of individuals suffering from LBP develop chronic symptoms and suffer some form of disability.<sup>4</sup>

It is important to note that psychosocial factors contribute significantly to pain persistence, response to conservative treatment and rehabilitation, and the likelihood of developing disability.<sup>5–9</sup> For example, self-efficacy belief has been identified as a mediator in the relationship between depressive symptoms and affective

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pain intensity,<sup>10</sup> in which individuals with higher self-efficacy were significantly more tolerant of pain and capable of performing daily-life activities.<sup>10</sup> Further, individuals who have a higher level of catastrophizing may perceive and report a higher pain level.<sup>7</sup> Thus, several studies have analyzed the potential link between psychosocial factors such as catastrophizing and fear avoidance and response to treatment in patients with chronic low back pain (CLBP).<sup>2,5,7,8,11,12</sup>

Many previous systematic reviews have presented the relationship between disability and psychosocial factors in patients with LBP.<sup>12</sup> These reviews investigated topics related to catastrophizing thoughts and disability,<sup>13,14</sup> depression association with disability,<sup>13,15–17</sup> the predictive value of self-efficacy on changes in disability,<sup>13,18</sup> functional coping mechanisms,<sup>19</sup> and fear-avoidance beliefs as examined extensively in several different publications.<sup>12–15,20</sup> For the most part, studies on this topic are based on a prognostic study model, which attempts to examine the predictive value of these psychosocial factors on outcomes changes without considering the specific types of treatment administered.<sup>21</sup> Considering the type of treatment may improve the design of available interventions for people with low back pain and improve their clinical outcomes.<sup>21</sup>

Further, most of the aforementioned studies and reviews highlight the importance of psychosocial factors as predictors of changes in disability level and the subsequent recovery from pain in mixed groups of LBP (ie, chronic and acute), as well as patients in both prospective cohorts and cross-sectional studies.<sup>8</sup> However, previous reviews have underlined that most of the included studies were not high quality, the patient population was heterogeneous, and the study design was sometimes inappropriate.<sup>22</sup> As a result, it is often impossible to draw solid and reliable conclusions from this type of review.

Although psychosocial factors to predict outcome in LBP may be similar in acute and chronic conditions,<sup>23,24</sup> it is noteworthy that acute and chronic LBP have different associations with psychosocial factors.<sup>23,25</sup> This suggests that some psychosocial factors might be more prognostic in LBP when considering disease duration (chronicity).

Apart from Wessels et al,<sup>19</sup> none of the reviews mentioned above have explored the psychosocial factors associated with changes in pain and disability in people with CLBP after conservative therapy. However, this review only included six studies related to this association and

suggested that no conclusion could be drawn due to this limited number of studies. Although a similar systematic review was published,<sup>22</sup> it has some limitations. First, the cross-sectional studies included could not explain the change after the intervention. Secondly, limiting the search terms to only “physiotherapy” might miss multiple studies. Therefore, it is crucial to further examine the predictive ability of psychosocial factors on changes in pain and disability among individuals with CLBP. Understanding this association is vital to establish appropriate interventions targeting psychosocial factors in practice.

## Aim

The aim of this study was to identify the prognostic value of psychosocial factors on the change in pain and/or disability in participants with CLBP following conservative interventions as recommended by clinical guidelines (NICE, 2016).

## Methods

### Protocol Registration

The systematic review protocol was registered in PROSPERO (registration number: CRD 42020131481) and conformed to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) statement.<sup>26</sup>

### Eligibility Criteria

#### Participants

Research studies published in English and that met the following inclusion criteria were included in the review. Studies were included if participants were adults aged 18 years or over and diagnosed with CLBP. CLBP is defined as a pain between the bottom of the ribs and the buttock creases that lasts for at least three months.<sup>27</sup> Studies were excluded where participants had any identified pathoanatomical diagnosis of CLBP such as stenosis, fracture, malignancy, vertebral fracture, infections, or cardiovascular, respiratory, neurological, gastrointestinal, urogenital, or related conditions.<sup>27</sup> All studies must provide information that CLBP patients received a guideline-recommended conservative intervention either alone or as part of a multidisciplinary approach.

#### Study Design

Only research studies with prospective designs were included. Studies must report the psychosocial outcomes (fear, anxiety, etc.) and their correlation with pain and

disability. Studies with mixed patient groups (acute and chronic) were included if a separate analysis of patients with chronic cases was reported.

### Outcome Measures

Primary outcome measures of the included studies included pain, disability, and/or psychosocial outcome measures. Studies must report predictive measures like odds ratio (OR), relative risk (RR), and regression coefficient. Studies reporting only Pearson correlation coefficients were excluded.

### Information Source

Two independent reviewers (AH, MA) conducted a comprehensive search using four electronic databases (PubMed, Medline, CINAHL, and PsycINFO) from inception to September 2020 to extract relevant studies. In addition, the reference lists of the extracted articles were manually searched to include any articles missed by the electronic search.

### Search Strategy

Searching the electronic databases involved the following three steps, which were combined with an “AND” statement:

- Studies related to CLBP populations were identified using the following keywords: Low Back Pain, Recurrent Low Back Pain, Lower Back Aches, Low Back, Back Pains, Lower Back Pain, Back Ache, Chronic Low Pains, Chronic Lower Back Pain; Low Back Ache, Back Aches, Low Back Aches, Low Backache, Backache, Low Backaches, Backaches. In combination with the “OR” statement.
- The NICE guideline recommends the following non-invasive treatments for LBP: self-management, exercise, manual therapy, psychological therapy, and combined psychological and physical therapy programs. Therefore, the following words were used to identify studies with the intervention of interest: Exercise; Psychosocial Therapy, Self-management, Psychological Therapy, Manipulation; Mobilization, Soft Tissue Techniques, Cognitive Behavioral Therapy, Psychosocial Approach; Education; Multi-Disciplinary, Biopsychosocial Rehabilitation, Physiotherapy, Physical Therapy, Rehabilitation, Active Therapy. In combination with the “OR” statement.

- The study included psychosocial outcomes identified using the following words: Sensitivity, Anxiety, Vigilance, Hypervigilance, Attention, Kinesiophobia, Fear, Fear Avoidance Beliefs, Beliefs, Cognitive, Depression, Coping, Pain Coping, Fear, Avoidance; Anxiety, Return to Work, Absentees; Self-Efficacy, Sick Leaves, Mediation, Predictors, Prognostic. Combined with the “OR” statement.

### Study Selection

All titles and abstracts were screened independently by two reviewers (AA and MA). Studies with acute LBP or no separate data for CLBP were excluded. A third reviewer was brought in to resolve any disagreements. Finally, all excluded studies and reasons for exclusion were logged.

### Extraction Procedure

Two independent reviewers (AA and MA) carried out the data extraction of all included studies. Data included: title and authors, objectives and study design, duration of study participation, description of the population from which the participants were drawn, type of intervention, inclusion and exclusion criteria, baseline pain severity, mean age, psychosocial outcome reported; and the study outcomes, conclusions, and limitations reported by the authors.

### Quality and Risk of Bias Assessment

The Newcastle-Ottawa quality assessment scale for observational studies was used to examine the quality of prospective cohort studies.<sup>20</sup> The scale consists of eight questions covering three domains: selection, comparability, and outcome assessment. A higher score indicates good quality, and the overall rating is based on the scores good, fair, and poor quality. This scale was chosen as it is simple to use and has been validated in case-control and prospective investigations. Inter-rater reliability was moderate to good (ICC = 0.52; CI = 0.14–0.76).<sup>28</sup>

A secondary analysis of previously-published RCTs was used in five studies to find the prognostic psychosocial factors, and the quality of these studies was assessed using the Quality in Prognostic Studies (QUIPS) tool.<sup>29</sup> This tool has six domains covering study participation, attrition, prognostic factor measurement, outcome measurement, confounding, and statistical analysis and reporting.

## Results

A total of 15 studies met the inclusion criteria after the full-text screening. The process using the PRISMA flow-chart is shown in Figure 1. The number of participants was 4496 (range, 26–1760) with a mean age of  $44.1 \pm 5.1$  years, and a higher proportion of women (60%). The mean pain intensity measured at baseline in the reported studies was  $5.1 \pm 0.86$ . The mean dropout rate was 16%. All prospective cohort studies reported measurements before and after each intervention (Table 1).

## Methodological Quality and Risk of Bias

The overall quality of the prospective cohort studies was fair as per the Newcastle-Ottawa quality assessment scale, with four studies scored as good, two as fair, and four as poor quality. The QUIPS assessment tool for prognostic studies for the remaining studies showed a low risk of bias. Details of scores can be found in Tables 2 and 3.

## Synthesis of the Results

The included studies investigated different conservative interventions and used various outcome measures when reporting the association between the intervention and outcome. Therefore, proceeding with meta-analysis was not feasible. Only two studies reported a mediation relationship between disability and pain with psychosocial outcome measures, and the remaining 13 studies were concerned with the prognostic association.

Several psychosocial factors -presented below- correlated with pain and disability outcomes following conservative interventions in patients with CLBP. Additionally, Different outcome measures were used in the selected studies (Table 4).

## Fear and Avoidance

Fear-avoidance factors were a significant predictor of disability outcomes in four studies,<sup>25,30–32</sup> with regression coefficient  $\beta$  ranging from 0.08 to 0.30. Moreover, one more study reported an OR value of 1.11.<sup>33</sup>

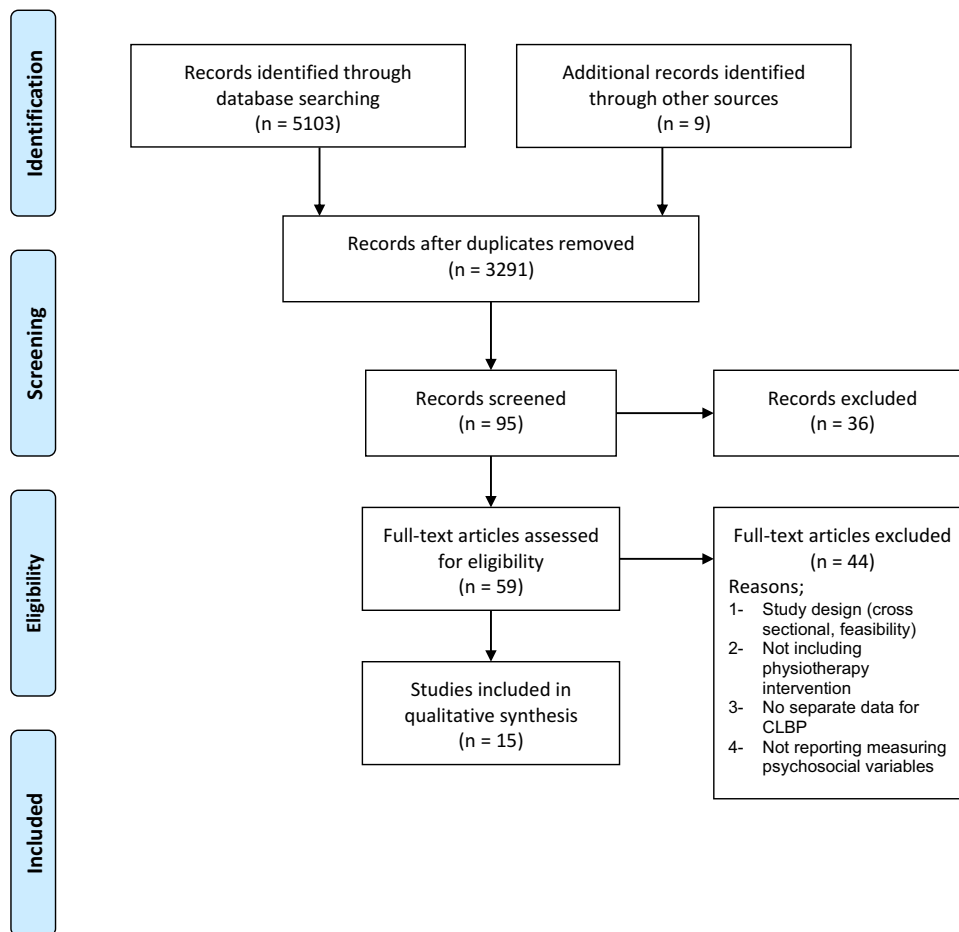


Figure 1 Flowchart.

**Table I** Characteristics of the Included Studies

Study	Origin	Sample Size (n)	Study Design	Type of Intervention	Baseline Pain Severity (VAS)	Age (Mean)	Follow Up (Months)
Evans 2010 <sup>34</sup>	USA	26	Prospective cohort study	Physiotherapy and Yoga for 6 weeks	7.5	52	1.5
Trinderup 2018 <sup>33</sup>	Denmark	559	Prospective cohort study	Multidisciplinary rehabilitation for 12 weeks	N/A	39.9	12
Grotle 2010 <sup>25</sup>	UK	668	Secondary analysis of RCT	Type of intervention is Not reported	3	45	12
Grotle 2007 <sup>30</sup>	Norway	50	Prospective cohort study	Type of intervention is Not reported	6.1	40.5	12
Kendell 2018 <sup>23</sup>	Australia	290	Prospective cohort study	Exercise and psychological therapy	5.8	51	12
Macedo 2014 <sup>37</sup>	Australia	172	Secondary analysis of RCT	Motor control exercise and graded activity in LBP	6.1	50	10
Niemistö 2004 <sup>40</sup>	Finland	204	Secondary analysis of RCT	Manipulation or stabilization exercise for LBP	M/A	37	12
Rasmussen 2012 <sup>35</sup>	Sweden	71	Prospective cohort study	Exercise	5.4	38	36
Sherman 2013 <sup>36</sup>	USA	74	Secondary analysis of RCT	Yoga or stretching or self-care for 12 weeks for LBP	4.4	49	3
Skidmore 2015 <sup>10</sup>	UK	109	Prospective cohort study	Multidisciplinary rehabilitation for 4 weeks	N/A	42	1
VanDer Hulst 2008 <sup>38</sup>	Netherland	162	Secondary analysis of RCT	Multidisciplinary rehabilitation for 3 weeks	5	39	6
Verkerk 2015 <sup>39</sup>	Netherland	1760	Prospective cohort study	Multidisciplinary rehabilitation for 8 weeks	5.5	40	12
Woby 2004 <sup>31</sup>	UK	83	Prospective cohort study	Cognitive behavioral therapy	4	41	2
Woby 2007 <sup>47</sup>	UK	102	Prospective cohort study	Cognitive-behavioral therapy	4.4	43.9	2
Woby 2008 <sup>32</sup>	UK	166	Prospective cohort study	Cognitive-behavioral therapy	4	44.4	2

**Abbreviations:** VAS, visual analogue scale; RCT, randomized control trial.

Only one study reported baseline fear-avoidance as a predictor of pain level after treatment.<sup>30</sup> The relationship between pain-related fear with disability and pain was mediated by self-efficacy. The outcome measures used to measure fear and avoidance were the Tampa scale of kinesiophobia in three studies and the fear-avoidance belief questionnaire.

## Self-Efficacy

Baseline self-efficacy was reported to predict disability outcomes in three studies<sup>10,32,34</sup> with regression coefficient  $\beta$  ranging from 0.21 to 0.37. Further, one study reported an OR of 9.8 of self-efficacy to predict the disability outcomes.<sup>35</sup>

The reduction in disability outcomes was 28.3%, mediated by a change in self-efficacy outcomes.<sup>36</sup> With regard to pain intensity, three studies reported a predictive role of low self-efficacy to high pain intensity in CLBP with regression coefficient  $\beta$  ranging from 0.23 to 0.56.<sup>32,34</sup> Further, one study reported an OR value of 1.150.<sup>37</sup>

Outcome measures used were the pain self-efficacy questionnaire, self-efficacy scale, and chronic pain self-efficacy scale.

## Catastrophizing and Pain Coping

Scoring a high level of catastrophizing and pain coping outcomes was a prognostic indicator of higher disability with regression coefficient  $\beta$  of 0.11 and an OR of 1.5.<sup>25,37</sup>

**Table 2** Quality Assessment of Cohort Studies

		Selection	Comparability	Outcomes	Overall Score
1	Evans et al, 2010 <sup>34</sup>	2	1	1	4
2	Trinderup et al, 2018 <sup>33</sup>	3	1	3	7
3	Grotle et al, 2007 <sup>30</sup>	2	1	2	5
4	Kendell et al, 2018 <sup>23</sup>	3	1	3	6
5	Rasmussen et al, 2012 <sup>35</sup>	3	1	3	6
6	Skidmore et al, 2015 <sup>10</sup>	2	1	2	5
7	Verkerk et al, 2015 <sup>39</sup>	3	1	3	7
8	Woby I et al, 2004 <sup>31</sup>	2	1	1	4
9	Woby et al, 2007 <sup>47</sup>	2	1	1	4
10	Woby et al, 2008 <sup>32</sup>	2	1	1	4

The outcome measure used in these studies were, the catastrophizing pain scale for catastrophizing and coping strategies questionnaire used for pain coping.

### Depression

Two studies reported a predictive relationship between depression and disability and pain. A higher depression score at baseline was a predictor of poor improvement in pain and disability, with regression coefficients  $\beta$  of 0.24 and 0.17, respectively.<sup>10,38</sup>

Each study used two different outcome measures, namely the depression symptoms checklist SCL-90 and the hospital anxiety and depression scale.

### Work

Two studies reported a positive association between work outcomes and pain and disability outcomes. Work participation is a prognostic indicator for improvement in pain and disability with OR values of 1.21 and 1.34, respectively.<sup>39</sup> The number of days missed because of CLBP was reported to be predictive, with higher disability levels in one study.<sup>40</sup>

### STarT Back Tool

High and medium modifiable psychological risk factors were associated with a greater risk of poor recovery on the disability scale compared to the lower risk group, according to the STarT Back Tool in one study.<sup>23</sup>

### Discussion

This study aimed to identify the psychosocial factors that influence changes in pain and disability in patients with CLBP after guideline-based conservative intervention. The results highlight that fear-avoidance beliefs, self-efficacy, catastrophizing, pain coping, depression, days missed due to back pain, work participation, and STarT back questionnaire score could predict disability status among CLBP patients receiving conservative interventions according to average-fair quality studies. However, change in pain score was predicted by only two psychosocial factors: self-efficacy and depression according to average-poor quality studies.

This paper builds on the findings established by the systematic review of Wessels et al,<sup>19</sup> that functional coping and pain intensity are correlated with post-treatment disability level, as reported in six studies. On the one hand,

**Table 3** Quality Assessment of Other Prognostic Studies

Criteria	Grotle 2010 <sup>25</sup>	Niemistö 2004 <sup>40</sup>	Macedo et al, 2014 <sup>37</sup>	Sherman 2013 <sup>36</sup>	Van Der Hulst 2008 <sup>38</sup>
Study participation	Low risk	Low risk	Low risk	Low risk	Low risk
Study attrition	Moderate risk	Low risk	Low risk	Moderate risk	Moderate risk
Prognostic factor measurement	Low risk	Low risk	Low risk	Low risk	Low risk
Study confounders	Moderate risk	Moderate risk	Moderate risk	Moderate risk	Moderate risk
Outcome measures	Low risk	Low risk	Low risk	Low risk	Low risk
Statistical analysis and reporting	Low risk	Low risk	Low risk	Low risk	Low risk

**Table 4** Summary of Reported Pain and Disability Outcomes, Type of Association and Type of Intervention in the Included Studies

Psychosocial Outcome	Study	Finding	Value
<b>Fear</b>	Grotle et al, 2007 <sup>30</sup>	High level of fear Avoidance beliefs work subscale (FABQ-W) was associated with the disability (ODI) score after 12 months.	$\beta = 0.08$ ; $P < 0.01$ , CI is not reported
	Grotle et al, 2010 <sup>25</sup>	High level of fear of pain (TSK) was prognostic indicator of higher disability (RMDS) after 12 months	$\beta = 0.30$ , $P = 0.048$ , CI is not reported
	Woby et al, 2004 <sup>31</sup>	Reduction in Fear Avoidance beliefs (FABQ-PT and W) was predictive for a reduction in disability level (RMDQ) after 8 weeks	( $\beta = 0.31$ ; $P < 0.01$ ) ( $\beta = 0.02$ , $P < 0.05$ ) CI is not reported
	Woby et al, 2008 <sup>47</sup>	Decreases in fear of pain (TKS) was predictive to the reduction in disability scale (RMDS) after 6 weeks	( $\beta = -0.20$ ; $P < 0.05$ ) CI is not reported
	Trinderup et al, 2018 <sup>33</sup>	High fear-avoidance beliefs about work (FABQ-WV) was predictive for disability (RMDS) after 12 months	OR 1.11, 95% CI 1.02–1.20
	Grotle et al, 2007 <sup>30</sup>	High fear Avoidance beliefs work (FABQ-W) was predictive of high pain intensity after 12 months	$\beta = 0.32$ , $P = 0.038$ CI is not reported
<b>Self-efficacy</b>	Evans et al, 2010 <sup>34</sup>	Low Self-efficacy scale (SES) predicts disability (RMDQ) after 6 months	$\beta = -0.21$ ; $P < 0.05$ CI is not reported
	Rasmussen et al, 2012 <sup>35</sup>	Low Self-Efficacy Scale (SES) was predictive of disability measured by Oswestry LBP disability scale (ODI) after 12 months	(OR 9.8, CI 95% 2.1–45.5)
	Woby et al, 2007 <sup>47</sup>	Self-efficacy (CPSS-PF) mediates the relation between pain-related fear (TSK) and disability (RMDQ)	( $\beta = -0.42$ ; $P < 0.05$ ) CI is not reported
	Woby et al, 2008 <sup>32</sup>	High Self-efficacy (CPSS-PF) was predictive to the reduction in disability scale (RMDS) after 6 weeks	( $\beta = -0.27$ ; $P < 0.05$ ) CI is not reported
	Skidmore et al, 2015 <sup>10</sup>	Lower level of pain self-efficacy (PSEQ) predicts a higher score on the pain intensity level (McGill pain questionnaire) at discharge (one month follow up)	$\beta = -0.368$ CI 95% -5.04–1.45; $P = 0.001$
	Sherman et al, 2013 <sup>36</sup>	Reduced Disability (RMDQ) in 12 weeks ( $-2.00$ , 95% CI = $-3.37$ to $-0.72$ ) was 28.3% mediated by self-efficacy score.	( $-0.47$ , 95% CI = $-1.13$ to $-0.02$ )
	Woby et al, 2007 <sup>47</sup>	Self-efficacy (CPSS-PF) mediates the relation between pain-related fear (TSK) and pain intensity (VAS)	( $\beta = -0.46$ ; $P < 0.05$ ) CI is not reported
	Woby et al, 2008 <sup>32</sup>	High Self-efficacy (CPSS-PF) was related to reduction in pain (VAS) after 12 months	( $\beta = -0.23$ ; $P < 0.05$ ) CI is not reported
	Macedo et al, 2014 <sup>37</sup>	High Self-efficacy (CPSS-PF) was related to reduction in pain (VAS) after 12 months	OR = 1.5 (0.13, 2.85), $P = 0.032$
	Evans et al, 2010 <sup>34</sup>	High Self-efficacy scale (SES) predicts pain (VAS) after 6 months	$\beta = -0.56$ ; $P < 0.01$ CI is not reported
<b>Catastrophizing and coping</b>	Grotle et al, 2010 <sup>25</sup>	High level of catastrophizing and coping (CSQ) was predictive of higher disability (RMDS)	$\beta = 0.11$ ; $P < 0.01$ CI is not reported
	Macedo et al, 2014 <sup>37</sup>	Low coping strategies Questionnaire (CSQ) was predictive of change in disability (RMDQ) after 12 months	OR = 1.5 (0.13, 2.85), $P = 0.032$

(Continued)

Table 4 (Continued).

Psychosocial Outcome	Study	Finding	Value
Depression	Van Der Hulst et al, 2008 <sup>38</sup>	Higher depression score (SCL-90) on the baseline was a predictor of poor improvement in disability subscale of SF-36 after three months	( $\beta = 0.17$ , $P=0.07$ ) CI is not reported
	Skidmore et al, 2015 <sup>10</sup>	Higher level depression predicts a higher score on the pain intensity level (McGill pain questionnaire) at discharge.	$\beta = 0.24$ CI 95% -0.02-4.07; $P=0.005$
Work	Verkerk et al, 2015 <sup>39</sup>	Work participation was a prognostic factor of reduction of disability in 5 months	OR 1.34, 95% CI 0.93-1.92
	Niemistö et al, 2004 <sup>40</sup>	More than 25 days missed due to back pain was a predictor for a high disability score(ODI) after 12 months	OR 4.19,95% CI 1.5-11.3
	Verkerk et al, 2015 <sup>39</sup>	Work participation was a prognostic factor of reduction of pain intensity in 5 months	OR 1.27, 95% CI 0.93-1.73
STarT back Tool	Kendell et al, 2018 <sup>23</sup>	Both high and medium risk groups in Start Back screening tool had more than 100% risk of poor recovery in the disability scale compared to low-risk group	RR=2.30 CI 95% (1.28-4.10)
			RR=2.86 CI 95% (1.60-5.11)
	Kendell et al, 2018 <sup>23</sup>	Both high and medium risk groups in Start Back screening tool had 25% risk of poor recovery in pain scale compared to low risk group	RR=1.25 CI 95% (1.04-1.51)
			RR=1.26 CI 95% (1.03-1.52)

**Abbreviations:**  $\beta$ , the beta coefficient; CI, confidence interval; OR, odd ration; RR, relative risk.

Wessels et al<sup>19</sup> suggested that conclusions cannot be drawn from such a limited number of heterogeneous studies. On the other hand, in this systematic review, many psychosocial factors have been identified as being consistent predictors of change to disability level after conservative (non-surgical) interventions have been conducted.

This systematic review established that self-efficacy and fear-avoidance belief had significant weight as predictors of change in disability, following conservative interventions in people with CLBP. These findings are in line with the results published in Wertli et al<sup>14</sup> related to the moderating role of fear-avoidance in the efficacy of treatment of patients with subacute LBP and previously-reported reviews.<sup>12-16</sup> Furthermore, the correlation between fear avoidance and disability level was found to be mediated by two factors in two different studies:<sup>10,34</sup> self-efficacy and depression. However, it should be noted that formal mediation analysis and preferred study design were not applied to one of the studies.<sup>21</sup>

The results of this systematic review also highlighted the influence of catastrophizing and depression when it

comes to any change to disability score after conservative intervention was applied for participants with CLBP.

Psychosocial factors can predict poor treatment outcomes, and this is indeed a challenge for clinicians.<sup>21</sup> Psychosocial factors may play a key role in persistent symptoms, disability, and the development of chronic pain.<sup>21</sup> These types of factors can affect the patient's reaction to the treatment they are given. This aspect of CLBP presents itself clinically in psychological comorbidities such as different forms of anxiety, depressive symptoms, and elevated somatic awareness.

The application of psychosocial based treatment showed disappointing results when studied in RCTs without classifying LBP according to psychosocial risk.<sup>41</sup> Therefore, a screening tool (STarT Back tool) was developed to stratify patients according to the risk of psychosocial factors, allowing them to be assigned the most appropriate treatment for their LBP.<sup>42</sup> The RCT results for LBP showed an improvement in disability scores and a remarkable reduction in the cost of care.<sup>43</sup> Furthermore, the STarT Back tool was predictive for the disability level



of CLBP after a one-year follow-up. However, its ability to predict pain after 12 months was not nearly as effective.<sup>23</sup>

The identification of statistical correlation does not necessarily mean there is any causation.<sup>44,45</sup> Therefore, there is a need for mediation studies that can better explain the extent to which these psychosocial factors explain the changes noticed when it comes to pain and disability. For example, a systematic review involving 12 studies examining what mediates disability in patients with back and neck pain<sup>46</sup> identified that fear, self-efficacy, and psychological distress were mediating towards the relationship between pain and disability. However, one limitation reported by the author is that more than half of the included studies were cross-sectional designs, which means that a definitive conclusion about causality might not be possible.

From the current study, identifying these factors will help further research determine which factors are effective treatment modifiers for people with CLBP undergoing conservative treatment, allowing clinicians to choose appropriate treatment strategies to improve clinical outcomes.

## Limitations

The exclusion of studies not reported in English might mean that this review overlooks certain important contributions to the literature. For example, the previous review by Wessels et al<sup>19</sup> reported studies in English and German. In addition, other comorbidities and factors were not considered in the included studies and may affect the prognostic utility of the psychosocial factors for pain and disability. Finally, the variability in follow-up duration (1 to 36 months) limits the generalizability of this study.

## Conclusion

This systematic review has extended the knowledge available regarding the psychosocial factors associated with pain and disability in CLBP following conservative treatments. The fact that the studies consistently found psychosocial factors, including fear of movement, self-efficacy, catastrophizing, and depression, to predict disability outcomes irrespective of the type of conservative intervention suggests the importance of addressing these factors in the screening of CLBP individuals undergoing conservative intervention treatments. More research is needed to understand to what extent these factors explain the changes in pain levels among CLBP patients.

## Acknowledgment

We are immensely grateful to the Deanship of Scientific Research at Prince Sattam bin Abdulaziz University, Al-Kharj, Saudi Arabia, for their support.

## Disclosure

The authors report no conflicts of interest in this work.

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