SUPPLEMENTAL MATERIAL
APPENDIX

Title: Association between depressive symptoms or depression and health outcomes for low back pain: a systematic review and meta-analysis

Running title: Depression and outcomes for back pain

Authors: Jessica J. Wong, DC, MPH; Andrea C. Tricco, MSc, PhD; Pierre Côté, DC, PhD; Catherine Y. Liang, MPH; Jeremy A. Lewis, BA; Zachary Bouck, MPH; Laura C. Rosella, MHSc, PhD

Corresponding author: Jessica J. Wong, Epidemiology Division, Dalla Lana School of Public Health, University of Toronto, 155 College Street, 6th Floor, Toronto, Ontario M5T 3M7, Canada; email: jes.wong@mail.utoronto.ca

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- **Appendix IXb.** Forest plot: Are depressive symptoms associated with disability in individuals with chronic low back pain? Continuous measure of depressive symptoms, results from 4 studies (n=3,065)
- **Appendix X.** Forest plot: Are depressive symptoms associated with the mental component of health-related quality of life in individuals with chronic low back pain? Continuous measure of depressive symptoms, results from 2 studies (n=637)
- **Appendix XI**. Forest plot: Are depressive symptoms associated with recovery in individuals with chronic low back pain? Dichotomous measure of depressive symptoms, results from 2 studies (n=13,263)
- **Appendix XIIa.** Summary of the domains of the Quality in Prognosis Studies (QUIPS) tool
- **Appendix XIIb.** Risk of bias assessment of studies using the Quality in Prognosis Studies (QUIPS) tool
- **Appendix XIII.** List of possibly relevant articles published in non-English language (6 studies)

Appendix I. Preferred Reporting Items for Systematic reviews and Meta-Analyses (PRISMA) 2020 Checklist

Table 1. PRISMA 2020 item checklist

Section and Topic	Item #	Checklist item	Page #
TITLE			
Title	1	Identify the report as a systematic review.	Title page
ABSTRACT			
Abstract	2	See the PRISMA 2020 for Abstracts checklist (Table 2).	3
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of existing knowledge.	5-6
Objectives	4	Provide an explicit statement of the objective(s) or question(s) the review addresses.	6
METHODS			
Eligibility criteria	5	Specify the inclusion and exclusion criteria for the review and how studies were grouped for the syntheses.	7-8
Information sources	6	Specify all databases, registers, websites, organisations, reference lists and other sources searched or consulted to identify studies. Specify the date when each source was last searched or consulted.	8
Search strategy	7	Present the full search strategies for all databases, registers and websites, including any filters and limits used.	8, Appendix
Selection process	8	Specify the methods used to decide whether a study met the inclusion criteria of the review, including how many reviewers screened each record and each report retrieved, whether they worked independently, and if applicable, details of automation tools used in the process.	9
Data collection process	9	Specify the methods used to collect data from reports, including how many reviewers collected data from each report, whether they worked independently, any processes for obtaining or confirming data from study investigators, and if applicable, details of automation tools used in the process.	9
Data items	10a	List and define all outcomes for which data were sought. Specify whether all results that were compatible with each outcome domain in each study were sought (e.g. for all measures, time points, analyses), and if not, the methods used to decide which results to collect.	9
	10b	List and define all other variables for which data were sought (e.g. participant and intervention characteristics, funding sources). Describe any assumptions made about any missing or unclear information.	9
Study risk of bias assessment	11	Specify the methods used to assess risk of bias in the included studies, including details of the tool(s) used, how many reviewers assessed each study and whether they worked independently, and if applicable, details of automation tools used in the process.	9-10
Effect measures	12	Specify for each outcome the effect measure(s) (e.g. risk ratio, mean difference) used in the synthesis or presentation of results.	10-11
Synthesis methods	13a	Describe the processes used to decide which studies were eligible for each synthesis.	10-11
	13b	Describe any methods required to prepare the data for presentation or synthesis, such as handling of missing summary statistics, or data conversions.	10-11
	13c	Describe any methods used to tabulate or visually display results of individual studies and syntheses.	10-11, Protocol
	13d	Describe any methods used to synthesize results and provide a rationale for the choice(s). If meta-analysis was performed, describe the model(s), method(s) to identify the presence and extent of statistical heterogeneity, and software package(s) used.	10-11
	13e	Describe any methods used to explore possible causes of heterogeneity among study results.	10-11
	13f	Describe any sensitivity analyses conducted to assess robustness of the synthesized results.	11

Section and Topic	Item #	Checklist item	Page #
Reporting bias assessment	14	Describe any methods used to assess risk of bias due to missing results in a synthesis (arising from reporting biases).	10-11
Certainty assessment	15	Describe any methods used to assess certainty (or confidence) in the body of evidence for an outcome.	10-11
RESULTS			
Study selection	16a	Describe the results of the search and selection process, from the number of records identified in the search to the number of studies included in the review, ideally using a flow diagram (see Figure 1).	12, Flow diagram
	16b	Cite studies that met many but not all inclusion criteria ('near-misses') and explain why they were excluded.	Flow diagram
Study characteristics	17	Cite each included study and present its characteristics.	12-13
Risk of bias in studies	18	Present assessments of risk of bias for each included study.	12, Figure
Results of individual studies	19	For all outcomes, present, for each study: (a) summary statistics for each group (where appropriate) and (b) an effect estimate and its precision (e.g. confidence/credible interval), ideally using structured tables or plots.	13-20, Tables
Results of syntheses	20a	For each synthesis, briefly summarise the characteristics and risk of bias among contributing studies.	13-20, Appendix
	20b	Present results of all statistical syntheses conducted. If meta-analysis was done, present for each the summary estimate and its precision (e.g. confidence/credible interval) and measures of statistical heterogeneity. If comparing groups, describe the direction of the effect.	13-20, Appendix
	20c	Present results of all investigations of possible causes of heterogeneity among study results.	13-20, Appendix
	20d	Present results of all sensitivity analyses conducted to assess the robustness of the synthesized results.	13-20, Appendix
Reporting biases	21	Present assessments of risk of bias due to missing results (arising from reporting biases) for each synthesis assessed.	12
Certainty of evidence	22	Present assessments of certainty (or confidence) in the body of evidence for each outcome assessed.	13-20
DISCUSSION			
Discussion	23a	Provide a general interpretation of the results in the context of other evidence.	21-22
	23b	Discuss any limitations of the evidence included in the review.	22
	23c	Discuss any limitations of the review processes used.	22
	23d	Discuss implications of the results for practice, policy, and future research.	22-23
OTHER INFORMATION			
Registration and protocol	24a	Provide registration information for the review, including register name and registration number, or state that the review was not registered.	6
	24b	Indicate where the review protocol can be accessed, or state that a protocol was not prepared.	6
	24c	Describe and explain any amendments to information provided at registration or in the protocol.	6, 9-10
Support	25	Describe sources of financial or non-financial support for the review, and the role of the funders or sponsors in the review.	24-25
Competing interests	26	Declare any competing interests of review authors.	24-25
Availability of data, code and other materials	27	Report which of the following are publicly available and where they can be found: template data collection forms; data extracted from included studies; data used for all analyses; analytic code; any other materials used in the review.	25

Appendix II. Search strategies for MEDLINE, Embase, CINAHL, and PsycINFO

MEDLINE

Ovid MEDLINE(R) ALL <1946 to Present>

#	**Searches**
1	exp Back/
2	exp Back Injuries/
3	exp Back Muscles/
4	exp Back Pain/
5	Coccyx/
6	Discitis/
7	exp Intervertebral Disk/
8	Lumbar Vertebrae/
9	exp Lumbosacral Plexus/
10	Osteoarthritis/
11	Osteoarthritis, Spine/
12	Polyradiculopathy/
13	Radiculopathy/
14	Sacroiliac Joint/
15	Sacrum/
16	exp Sciatic Neuropathy/
17	exp Spinal Diseases/
18	Spine/
19	exp Spondylarthritis/
20	or/1-19
21	(back pain or backache or back ache or low* back pain*).ti,ab,kw,kf.
22	((backache* or back ache*) adj3 (injur* or pain*)).ti,ab,kw,kf.
23	((back or lumb*) adj3 (ache* or injur* or pain*)).ti,ab,kw,kf.
24	coccydynia.ti,ab,kw,kf.
25	((coccyx or coccygeal or (L1 adj4 L5) or lumbarsacr* or lumbosacr* or lumbar or sacral or sacrococcygeal or sacroiliac or sacro iliac or spinal or tailbone* or vertebrogenic) adj3 (ache* or break* or broke* or bruis* or discomfort or fractur* or hurt or injur* or pain* or tender* or trauma)).ti,ab,kw,kf.
26	((disc* or disk*) adj3 (avuls* or bulg* or compress* or extrude* or degenerat* or displac* or herniat* or hurt or injur* or pain* or protrud* or prolaps* or ruptur* or sequester* or slip* or trauma or tear? or torn)).ti,ab,kw,kf.
27	(discitides or discitis or diskitides or diskitis or spondylodiscitides or spondylodiscitis or spondylodiskitides or spondylodiskitis).ti,ab,kw,kf.
28	dorsalgia.ti,ab,kw,kf.
29	lumbago.ti,ab,kw,kf.
30	(lumbar adj (disc* or disk*) adj3 (avuls* or extrude* or degenerat* or displac* or herniat* or prolaps* or sequester* or slip* or injur* or pain*)).ti,ab,kw,kf.
31	(lumbar adj3 (compres* or facet* or nerve root* or osteoarthritis or radicul* or spinal stenos#s or spondylo* or zygapophys*)).ti,ab,kw,kf.
32	lumboischialgia.ti,ab,kw,kf.
33	Piriformis syndrome*.ti,ab,kw,kf.
34	radiculalgia.ti,ab,kw,kf.
35	sciatic*.ti,ab,kw,kf.
36	spondylosis.ti,ab,kw,kf.

37	((stenos#s adj (spine or root or spinal)) or (failed adj3 "back syndrome*")).ti,ab,kw,kf.
38	or/21-37
39	20 or 38
40	Adaptation, Psychological/
41	Affective Symptoms/
42	Anxiety/
43	Anxiety Disorders/
44	Depression/
45	Depressive Disorder/
46	Depressive Disorder, Major/
47	Dysthymic Disorder/
48	Irritable Mood/
49	Mental Health/
50	Mood Disorders/
51	Neurotic Disorders/
52	Sadness/
53	Stress, Psychological/
54	Suicidal Ideation/
55	Resilience, Psychological/
56	or/40-55
57	(depression or depressive or depressed).ti,kf,kw.
58	(depression or depressive or depressed).ab. /freq=2
59	((emotional* or mental* or psycholog*) adj3 (adapt* or affliction* or cope? or coping or distress* or health* or illness* or resilien* or stress* or unhealth* or unwell or well being or wellbeing or wellness)).ti,ab,kw,kf.
60	(anguish* or anxiety or anxious* or dejected or desolat* or despair* or desperat* or desponden* or distress* or dysthymi* or hopeless* or irritability or joyless* or melanchol* or mood* or misery or miserable or morose or sadness or self-despair* or self-pity* or unhap*).ti,kw,kf. or (anguish* or anxiety or anxious* or dejected or desolat* or despair* or desperat* or desponden* or distress* or dysthymi* or hopeless* or irritability or joyless* or melanchol* or mood* or misery or miserable or morose or sadness or self-despair* or self-pity* or unhap*).ab. /freq=2
61	(neuros#s or neurotic).ti,ab,kw,kf.
62	or/57-61
63	56 or 62
64	exp Case-Control Studies/
65	Control Groups/ or Matched-Pair Analysis/ or ((case* adj3 control*) or (case* adj3 comparison*) or control group*).ti,ab,kw.
66	exp Cohort Studies/
67	((cohort or longitudinal or prospective or retrospective) adj4 (study or studies or analy*)).ti,ab.
68	or/64-67
69	39 and 63 and 68
70	(exp Animals/ not Humans/) or ((murin* or mouse or mice or rat or rats or dog or dogs or cat or cats).ti. and ("in data review" or in process or publisher or "pubmed not medline").st.)
71	69 not 70

EMBASE
Ovid Embase <1974 to Present>

#	Searches
1	backache/
2	low back pain/
3	pelvic girdle pain/
4	discogenic pain/
5	cervical disk hernia/
6	diskitis/
7	exp experimental sciatic nerve injury/
8	failed back surgery syndrome/
9	exp intervertebral disk disease/
10	lumbar disk hernia/
11	lumbar plexus block/
12	lumbar spinal stenosis/
13	lumbar sympathectomy/
14	osteoarthritis/
15	exp radiculopathy/
16	sacroiliitis/
17	sciatic neuropathy/
18	exp sciatic nerve injury/
19	sciatica/
20	exp spine disease/
21	exp back/
22	exp pelvic girdle/
23	coccygeal vertebra/
24	coccygeus muscle/
25	coccyx/
26	exp intervertebral disk/
27	lumbar disk/
28	exp lumbar vertebra/
29	lumbar spine/
30	lumbosacral plexus/
31	lumbosacral spine/
32	sacroiliac joint/
33	sciatic nerve/
34	dislocation/
35	exp bone pain/
36	exp chronic pain/
37	exp inflammatory pain/
38	injury/
39	exp limb pain/
40	exp musculoskeletal pain/
41	pain/
42	phantom pain/
43	posttraumatic pain/
44	referred pain/
45	rupture/
46	spinal pain/
47	or/21-33

48 or/34-46
49 47 and 48
50 or/1-20
51 49 or 50
52 (back pain or backache or back ache or low* back pain*).ti,ab,kw.
53 ((backache* or back ache*) adj3 (injur* or pain*)).ti,ab,kw.
54 ((back or lumb*) adj3 (ache* or injur* or pain*)).ti,ab,kw.
55 coccydynia.ti,ab,kw.
56 ((coccyx or coccygeal or (L1 adj4 L5) or lumbarsacr* or lumbosacr* or lumbar or sacral or sacrococcygeal or sacroiliac or sacro iliac or spinal or tailbone* or vertebrogenic) adj3 (ache* or break* or broke* or bruis* or discomfort or fractur* or hurt or injur* or pain* or tender* or trauma)).ti,ab,kw.
57 ((disc* or disk*) adj3 (avuls* or bulg* or compress* or extrude* or degenerat* or displac* or herniat* or hurt or injur* or pain* or protrud* or prolaps* or ruptur* or sequester* or slip* or trauma or tear? or torn)).ti,ab,kw.
58 (discitides or discitis or diskitides or diskitis or spondylodiscitides or spondylodiscitis or spondylodiskitides or spondylodiskitis).ti,ab,kw.
59 lumbago.ti,ab,kw.
60 (lumbar adj (disc* or disk*) adj3 (avuls* or extrude* or degenerat* or displac* or herniat* or prolaps* or sequester* or slip* or injur* or pain*)).ti,ab,kw.
61 (lumbar adj3 (compres* or facet* or nerve root* or osteoarthritis or radicul* or spinal stenos#s or spondylo* or zygapophys*)).ti,ab,kw.
62 lumboischialgia.ti,ab,kw.
63 Piriformis syndrome*.ti,ab,kw.
64 radiculalgia.ti,ab,kw.
65 sciatic*.ti,ab,kw.
66 spondylosis.ti,ab,kw.
67 ((stenos#s adj (spine or root or spinal)) or (failed adj3 "back syndrome*")).ti,ab,kw.
68 or/52-67
69 51 or 68
70 affective neurosis/
71 anxiety/
72 anxiety disorder/
73 anxiety neurosis/
74 exp depression/
75 exp depression assessment/
76 distress syndrome/
77 emotional stress/
78 major affective disorder/
79 minor affective disorder/
80 mental health/
81 "mixed anxiety and depression"/
82 mood change/
83 mood disorder/
84 neurosis/
85 psychological resilience/
86 sadness/
87 suicidal ideation/
88 or/70-87
89 (depression or depressive or depressed).ti,kw.
90 (depression or depressive or depressed).ab. /freq=2

91	((emotional* or mental* or psycholog*) adj3 (adapt* or affliction* or cope? or coping or distress* or health* or illness* or resilien* or stress* or unhealth* or unwell or well being or wellbeing or wellness)).ti,ab,kw.
92	(anguish* or anxiety or anxious* or dejected or desolat* or despair* or desperat* or desponden* or distress* or dysthymi* or hopeless* or irritability or joyless* or melanchol* or mood* or misery or miserable or morose or sadness or self-despair* or self-pity* or unhap*).ti,kw. or (anguish* or anxiety or anxious* or dejected or desolat* or despair* or desperat* or desponden* or distress* or dysthymi* or hopeless* or irritability or joyless* or melanchol* or mood* or misery or miserable or morose or sadness or self-despair* or self-pity* or unhap*).ab. /freq=2
93	(neuros#s or neurotic).ti,ab,kw.
94	or/89-93
95	88 or 94
96	69 and 95
97	exp case control study/
98	controlled study/ or pretest posttest control group design/ or static group comparison/ or ((case* adj3 control*) or (case* adj3 comparison*) or control group*).ti,ab,kw.
99	cohort analysis/
100	((cohort or longitudinal or prospective or retrospective) adj4 (study or studies or analy*)).ti,ab.
101	or/97-100
102	96 and 101
103	(exp animal/ or animal experiment/ or nonhuman/) not exp human/
104	102 not 103

CINAHL

EBSCOhost CINAHL Plus with Full Text

#	Query
S1	(MH "Back")
S2	(MH "Back Injuries+")
S3	(MH "Back Pain+")
S4	(MH "Coccyx")
S5	(MH "Discitis")
S6	(MH "Intervertebral Disk+")
S7	(MH "Lumbar Vertebrae")
S8	(MH "Lumbosacral Plexus+")
S9	(MH "Osteoarthritis, Spine+")
S10	(MH "Piriformis Syndrome")
S11	(MH "Radiculopathy")
S12	(MH "Polyradiculopathy")
S13	(MH "Sacroiliac Joint")
S14	(MH "Sacroiliac Joint Dysfunction")
S15	(MH "Sacrum")
S16	(MH "Sciatic Nerve+")
S17	(MH "Sciatica")
S18	(MH "Spinal Diseases+")
S19	(MH "Spinal Injuries+")
S20	(MH "Spine")
S21	S1 OR S2 OR S3 OR S4 OR S5 OR S6 OR S7 OR S8 OR S9 OR S10 OR S11 OR S12 OR S13 OR S14 OR S15 OR S16 OR S17 OR S18 OR S19 OR S20
S22	TI (("back pain" OR backache OR "back ache" OR "low* back pain")) OR AB (("back pain" OR backache OR "back ache" OR "low* back pain")) OR SU (("back pain" OR backache OR "back ache" OR "low* back pain"))
S23	TI (((backache* OR "back ache*") N3 (injur* OR pain*))) OR AB (((backache* OR "back ache*") N3 (injur* OR pain*))) OR SU (((backache* OR "back ache*") N3 (injur* OR pain*)))
S24	TI (((back OR lumb*) N3 (ache* OR injur* OR pain*))) OR AB (((back OR lumb*) N3 (ache* OR injur* OR pain*))) OR SU (((back OR lumb*) N3 (ache* OR injur* OR pain*)))
S25	TI coccydynia OR AB coccydynia OR SU coccydynia
S26	TI (((coccyx OR coccygeal OR (L1 N4 L5) OR lumbarsacr* OR lumbosacr* OR lumbar OR sacral OR sacrococcygeal OR sacroiliac OR sacro iliac OR spinal OR tailbone* OR vertebrogenic) N3 (ache* OR break* OR broke* OR bruis* OR discomfort OR fractur* OR hurt OR injur* OR pain* OR tender* OR trauma))) OR AB (((coccyx OR coccygeal OR (L1 N4 L5) OR lumbarsacr* OR lumbosacr* OR lumbar OR sacral OR sacrococcygeal OR sacroiliac OR sacro iliac OR spinal OR tailbone* OR vertebrogenic) N3 (ache* OR break* OR broke* OR bruis* OR discomfort OR fractur* OR hurt OR injur* OR pain* OR tender* OR trauma))) OR SU (((coccyx OR coccygeal OR (L1 N4 L5) OR lumbarsacr* OR lumbosacr* OR lumbar OR sacral OR sacrococcygeal OR sacroiliac OR sacro iliac OR spinal OR tailbone* OR vertebrogenic) N3 (ache* OR break* OR broke* OR bruis* OR discomfort OR fractur* OR hurt OR injur* OR pain* OR tender* OR trauma)))
S27	TI (((disc* OR disk*) N3 (avuls* OR bulg* OR compress* OR extrude* OR degenerat* OR displac* OR herniat* OR hurt OR injur* OR pain* OR protrud* OR prolaps* OR ruptur* OR sequester* OR slip* OR trauma OR tear# OR torn))) OR AB (((disc* OR disk*) N3 (avuls* OR bulg* OR compress* OR extrude* OR degenerat* OR displac* OR herniat* OR hurt OR injur* OR pain* OR protrud* OR prolaps* OR ruptur* OR sequester* OR slip* OR trauma OR

	tear# OR torn))) OR SU (((disc* OR disk*) N3 (avuls* OR bulg* OR compress* OR extrude* OR degenerat* OR displac* OR herniat* OR hurt OR injur* OR pain* OR protrud* OR prolaps* OR ruptur* OR sequester* OR slip* OR trauma OR tear# OR torn)))
S28	(discitides OR discitis OR diskitides OR diskitis OR spondylodiscitides OR spondylodiscitis OR spondylodiskitides OR spondylodiskitis)
S29	TI dorsalgia OR AB dorsalgia OR SU dorsalgia
S30	TI lumbago OR AB lumbago OR SU lumbago
S31	TI ((lumbar N1 (disc* OR disk*) N3 (avuls* OR extrude* OR degenerat* OR displac* OR herniat* OR prolaps* OR sequester* OR slip* OR injur* OR pain*))) OR AB ((lumbar N1 (disc* OR disk*) N3 (avuls* OR extrude* OR degenerat* OR displac* OR herniat* OR prolaps* OR sequester* OR slip* OR injur* OR pain*))) OR SU ((lumbar N1 (disc* OR disk*) N3 (avuls* OR extrude* OR degenerat* OR displac* OR herniat* OR prolaps* OR sequester* OR slip* OR injur* OR pain*)))
S32	TI ((lumbar N3 (compres* OR facet* OR nerve root* OR osteoarthritis OR radicul* OR spinal stenos?s OR spondylo* OR zygapophys*))) OR AB ((lumbar N3 (compres* OR facet* OR nerve root* OR osteoarthritis OR radicul* OR spinal stenos?s OR spondylo* OR zygapophys*))) OR SU ((lumbar N3 (compres* OR facet* OR nerve root* OR osteoarthritis OR radicul* OR spinal stenos?s OR spondylo* OR zygapophys*)))
S33	TI lumboischialgia OR AB lumboischialgia OR SU lumboischialgia
S34	TI "Piriformis syndrome*" OR AB "Piriformis syndrome*" OR SU "Piriformis syndrome*"
S35	TI radiculalgia OR AB radiculalgia OR SU radiculalgia
S36	TI sciatic* OR AB sciatic* OR SU sciatic*
S37	TI spondylosis OR AB spondylosis OR SU spondylosis
S38	TI (((stenos?s N1 (spine OR root OR spinal)) OR (failed N3 "back syndrome*"))) OR AB (((stenos?s N1 (spine OR root OR spinal)) OR (failed N3 "back syndrome*"))) OR SU (((stenos?s N1 (spine OR root OR spinal)) OR (failed N3 "back syndrome*")))
S39	S22 OR S23 OR S24 OR S25 OR S26 OR S27 OR S28 OR S29 OR S30 OR S31 OR S32 OR S33 OR S34 OR S35 OR S36 OR S37 OR S38
S40	S21 OR S39
S41	(MH "Adaptation, Psychological")
S42	(MH "Adjustment Disorders")
S43	(MH "Affective Disorders")
S44	(MH "Affective Symptoms")
S45	(MH "Anxiety")
S46	(MH "Anxiety Disorders")
S47	(MH "Depression")
S48	(MH "Depression, Reactive")
S49	(MH "Dysthymic Disorder")
S50	(MH "Hardiness")
S51	(MH "Mental Health")
S52	(MH "Neurotic Disorders")
S53	(MH "Sadness")
S54	(MH "Stress, Psychological")
S55	(MH "Suicidal Ideation")
S56	S41 OR S42 OR S43 OR S44 OR S45 OR S46 OR S47 OR S48 OR S49 OR S50 OR S51 OR S52 OR S53 OR S54 OR S55
S57	TI ((depression OR depressive OR depressed)) OR SU ((depression OR depressive OR depressed))
S58	AB (depression OR depressive OR depressed)
S59	S58 OR S57

S60	TI (((emotional* OR mental* OR psycholog*) N3 (adapt* OR affliction* OR cope# OR coping OR distress* OR health* OR illness* OR resilien* OR stress* OR unhealth* OR unwell OR "well being" OR wellbeing OR wellness))) OR AB (((emotional* OR mental* OR psycholog*) N3 (adapt* OR affliction* OR cope# OR coping OR distress* OR health* OR illness* OR resilien* OR stress* OR unhealth* OR unwell OR "well being" OR wellbeing OR wellness))) OR SU (((emotional* OR mental* OR psycholog*) N3 (adapt* OR affliction* OR cope# OR coping OR distress* OR health* OR illness* OR resilien* OR stress* OR unhealth* OR unwell OR "well being" OR wellbeing OR wellness)))
S61	TI ((anguish* OR anxiety OR anxious* OR dejected OR desolat* OR despair* OR desperat* OR desponden* OR distress* OR dysthymi* OR hopeless* OR irritability OR joyless* OR melanchol* OR mood* OR misery OR miserable OR morose OR sadness OR self-despair* OR self-pity* OR unhap*)) OR SU ((anguish* OR anxiety OR anxious* OR dejected OR desolat* OR despair* OR desperat* OR desponden* OR distress* OR dysthymi* OR hopeless* OR irritability OR joyless* OR melanchol* OR mood* OR misery OR miserable OR morose OR sadness OR self-despair* OR self-pity* OR unhap*))
S62	AB (anguish* OR anxiety OR anxious* OR dejected OR desolat* OR despair* OR desperat* OR desponden* OR distress* OR dysthymi* OR hopeless* OR irritability OR joyless* OR melanchol* OR mood* OR misery OR miserable OR morose OR sadness OR self-despair* OR self-pity* OR unhap*)
S63	S61 OR S62
S64	TI ((neuros?s OR neurotic)) OR AB ((neuros?s OR neurotic)) OR SU ((neuros?s OR neurotic))
S65	S59 OR S60 OR S63 OR S64
S66	S56 OR S65
S67	(MH "Case Control Studies")
S68	(MH "Hospital-Based Case Control")
S69	(MH "Matched Case Control")
S70	(MH "Population-Based Case Control")
S71	(MH "Prospective Studies+")
S72	(MH "Panel Studies+")
S73	(MH "Pseudolongitudinal Studies")
S74	(MH "Retrospective Design")
S75	TI (((case* N3 control*) OR (case* N3 comparison*) OR control group*)) OR SU (((case* N3 control*) OR (case* N3 comparison*) OR control group*))
S76	S67 OR S68 OR S69 OR S70 OR S71 OR S72 OR S73 OR S74 OR S75
S77	S40 AND S66 AND S76
S78	S77 NOT ((MH "Animals+") NOT (MH "Human"))

PSYCINFO
Ovid PsycINFO <1806 to Present>

#	Searches
1	"back (anatomy)"/
2	back pain/
3	lumbar spinal cord/
4	musculoskeletal system/
5	neuropathic pain/
6	spinal column/
7	spinal nerves/
8	or/1-7
9	(back pain or backache or back ache or low* back pain*).ti,ab,id.
10	((backache* or back ache*) adj3 (injur* or pain*)).ti,ab,id.
11	((back or lumb*) adj3 (ache* or injur* or pain*)).ti,ab,id.
12	coccydynia.ti,ab,id.
13	((coccyx or coccygeal or (L1 adj4 L5) or lumbarsacr* or lumbosacr* or lumbar or sacral or sacrococcygeal or sacroiliac or sacro iliac or spinal or tailbone* or vertebrogenic) adj3 (ache* or break* or broke* or bruis* or discomfort or fractur* or hurt or injur* or pain* or tender* or trauma)).ti,ab,id.
14	((disc* or disk*) adj3 (avuls* or bulg* or compress* or extrude* or degenerat* or displac* or herniat* or hurt or injur* or pain* or protrud* or prolaps* or ruptur* or sequester* or slip* or trauma or tear? or torn)).ti,ab,id.
15	(discitides or discitis or diskitides or diskitis or spondylodiscitides or spondylodiscitis or spondylodiskitides or spondylodiskitis).ti,ab,id.
16	dorsalgia.ti,ab,id.
17	lumbago.ti,ab,id.
18	(lumbar adj (disc* or disk*) adj3 (avuls* or extrude* or degenerat* or displac* or herniat* or prolaps* or sequester* or slip* or injur* or pain*)).ti,ab,id.
19	(lumbar adj3 (compres* or facet* or nerve root* or osteoarthritis or radicul* or spinal stenos#s or spondylo* or zygapophys*)).ti,ab,id.
20	lumboischialgia.ti,ab,id.
21	Piriformis syndrome*.ti,ab,id.
22	radiculalgia.ti,ab,id.
23	sciatic*.ti,ab,id.
24	spondylosis.ti,ab,id.
25	((stenos#s adj (spine or root or spinal)) or (failed adj3 "back syndrome*")).ti,ab,id.
26	or/9-25
27	8 or 26
28	adjustment/
29	adjustment disorders/
30	anxiety/
31	anxiety disorders/
32	"depression (emotion)"/
33	dysthymic disorder/
34	emotional adjustment/
35	emotional states/
36	irritability/
37	major depression/
38	mental health/

39	neurosis/
40	psychological endurance/
41	reactive depression/
42	"resilience (psychological)"/
43	sadness/
44	stress reactions/
45	suicidal ideation/
46	or/28-45
47	(depression or depressive or depressed).ti,ab,id.
48	((emotional* or mental* or psycholog*) adj3 (adapt* or affliction* or cope? or coping or distress* or health* or illness* or resilien* or stress* or unhealth* or unwell or well being or wellbeing or wellness)).ti,id. or ((emotional* or mental* or psycholog*) adj3 (adapt* or affliction* or cope? or coping or distress* or health* or illness* or resilien* or stress* or unhealth* or unwell or well being or wellbeing or wellness)).ab. /freq=2
49	(anguish* or anxiety or anxious* or dejected or desolat* or despair* or desperat* or desponden* or distress* or dysthymi* or hopeless* or irritability or joyless* or melanchol* or mood* or misery or miserable or morose or sadness or self-despair* or self-pity* or unhap*).ti,id. or (anguish* or anxiety or anxious* or dejected or desolat* or despair* or desperat* or desponden* or distress* or dysthymi* or hopeless* or irritability or joyless* or melanchol* or mood* or misery or miserable or morose or sadness or self-despair* or self-pity* or unhap*).ab. /freq=2
50	(neuros#s or neurotic).ti,ab,id.
51	or/47-50
52	46 or 51
53	27 and 52
54	case control stud*.mp.
55	experiment controls/
56	longitudinal studies/ or prospective studies/ or retrospective studies/
57	((case* adj3 control*) or (case* adj3 comparison*) or control group*).ti,ab,id.
58	((cohort or longitudinal or prospective or retrospective) adj4 (study or studies or analy*)).ti,ab.
59	cohort analysis/
60	or/54-59
61	53 and 60
62	limit 61 to human

Appendix IIIa. Table outlining population, exposure, outcomes, and eligible study designs for the systematic review assessing the association between depressive symptoms or depression on health outcomes in persons with low back pain

Item	Description
Population	We targeted studies with an inception cohort of individuals aged 16 years and older with LBP with or without radiculopathy. LBP is defined as pain localized between the costal margin and inferior gluteal folds, with or without referred leg pain in the absence of serious or major pathology. Radiculopathy is inflammation, injury, or compression of spinal nerve roots with pain, weakness, or numbness in a myotomal or dermatomal distribution, and may be attributed to spinal stenosis or lumbar disc herniation. We excluded LBP due to major structural or serious pathology (e.g., spinal fractures, spinal dislocations, spinal cord injury, inflammatory arthritis, neoplasms or malignancies) and surgical populations. We included studies involving participants under 16 years of age, as long as those studies reported stratified results for individuals aged 16 years and older.
Exposure	We included studies that assessed depressive symptoms or depression as the exposure or prognostic factor. Depressive symptoms are defined as self-reported characteristic attitudes and symptoms of depression, such as taking little interest or pleasure in doing things or feeling down, depressed, or hopeless. We included depressive symptoms measured on standardized questionnaires[a] (e.g., Center for Epidemiologic Studies Depression Scale, Beck Depression Index). We also included diagnosed depression, including diagnoses captured using standardized codes in administrative data and self-report of diagnosed depression on standardized questionnaires, which has two main categories: 1) major depressive disorder/episode; and 2) dysthymia. Major depressive disorder/episode presents with symptoms such as depressed mood, loss of interest and enjoyment, and decreased energy, and can be categorized as mild, moderate, or severe based on the symptom frequency and severity. Dysthymia is a persistent or chronic form of mild depression with symptoms similar to depressive episodes, but are less intense and persist longer.
Outcomes	We targeted the following health outcomes: 1) pain (e.g., pain intensity); 2) disability (e.g., impairment, activity limitations, participation restriction); 3) overall health status (e.g., health-related quality of life, recovery); 4) satisfaction with care; and 5) health care utilization (e.g., physician visits, emergency department visits, hospitalizations, spinal imaging). These were informed by core outcome domains that are considered important for LBP research among international panels of experts. Only standardized outcome measures (e.g., standardized questionnaires or administrative data) were included. We evaluated the validity and reliability of the standardized questionnaires during the risk of bias assessment. Questionnaires for health outcomes included: 1) Visual Analogue Scale and Numeric Rating Scale for measuring pain intensity; 2) Roland Morris Disability Questionnaire and Oswestry Disability Index for measuring disability; 3) 36-item Short Form Survey (SF-36), 12-item Short Form Survey (SF-12), and Global Perceived Recovery for measuring overall health status; 4) Patient Satisfaction Questionnaire for measuring satisfaction with care; and 5) National Ambulatory Medical Care Survey and 73-item LBP health care utilization questionnaire for measuring health care utilization.
Study Designs	Cohort studies, case-control studies, or secondary analyses of data from randomized trials

LBP – low back pain

[a]Common self-reported questionnaires for depressive symptoms have a recall period ranging from past one week (Center for Epidemiologic Studies Depression Scale, Hospital Anxiety and Depression Scale) to past two weeks (Patient Health Questionnaire-2, Patient Health Questionnaire-9)

Appendix IIIb. Categories to guide the assessment of homogeneity across studies

Category	Description*
1A	Population: type of LBP - LBP OR - LBP with radiculopathy
1B	Population: duration of LBP - Acute/subacute (<12 weeks' duration) OR - Chronic (≥12 weeks' duration)
2A	Exposure: type of condition - Depressive symptoms OR - Depression
2B	Exposure: severity of condition - Mild (e.g., mild depression) OR - Severe (e.g., severe depression)
3	Outcome: type - Pain intensity - LBP-related disability - Health-related quality of life - Type of health care utilization (e.g., family physician visit, specialist visit, or spinal radiograph)

LBP – low back pain

*Describes how studies within the listed categories would be considered homogeneous (e.g., studies targeting the following would be considered homogeneous: 1) chronic LBP without radiculopathy as the population; 2) severe depression as the exposure; 3) pain intensity as the outcome)

Appendix IV. List of all included papers in systematic review (62 studies reported in 66 articles)

1. Lehmann TR, Spratt KF, Lehmann KK. Predicting long-term disability in low back injured workers presenting to a spine consultant. Spine (Phila Pa 1976) 1993;18(8):1103-12.
2. Rainville J, Ahern DK, Phalen L. Altering beliefs about pain and impairment in a functionally oriented treatment program for chronic low back pain. Clin J Pain 1993;9(3):196-201.
3. Gatchel RJ, Polatin PB, Mayer TG. The dominant role of psychosocial risk factors in the development of chronic low back pain disability. Spine (Phila Pa 1976) 1995;20(24):2702-9.
4. Cherkin DC, Deyo RA, Street JH, et al. Predicting poor outcomes for back pain seen in primary care using patients' own criteria. Spine (Phila Pa 1976) 1996;21(24):2900-7.
5. Harkapaa KJ, A; Estlander, A. Health optimism and control beliefs as predictors for treatment outcome of a multimodal back treatment program. Psychology and Health 1996;12:123-34.
6. Dionne CE, Koepsell TD, Von Korff M, et al. Predicting long-term functional limitations among back pain patients in primary care settings. J Clin Epidemiol 1997;50(1):31-43.
7. Epping-Jordan JE, Wahlgren DR, Williams RA, et al. Transition to chronic pain in men with low back pain: predictive relationships among pain intensity, disability, and depressive symptoms. Health Psychol 1998;17(5):421-7.
8. Vendrig AA. Prognostic factors and treatment-related changes associated with return to work in the multimodal treatment of chronic back pain. J Behav Med 1999;22(3):217-32.
9. Fritz JM, George SZ. Identifying psychosocial variables in patients with acute work-related low back pain: the importance of fear-avoidance beliefs. Phys Ther 2002;82(10):973-83.
10. Fransen M, Woodward M, Norton R, et al. Risk factors associated with the transition from acute to chronic occupational back pain. Spine (Phila Pa 1976) 2002;27(1):92-8.
11. Cassidy JD, Carroll L, Côté P, et al. Low back pain after traffic collisions: a population-based cohort study. Spine (Phila Pa 1976) 2003;28(10):1002-9.
12. Michaelson P, Sjölander P, Johansson H. Factors predicting pain reduction in chronic back and neck pain after multimodal treatment. Clin J Pain 2004;20(6):447-54.
13. Tubach F, Beauté J, Leclerc A. Natural history and prognostic indicators of sciatica. J Clin Epidemiol 2004;57(2):174-9.
14. Sieben JM, Vlaeyen JW, Portegijs PJ, et al. A longitudinal study on the predictive validity of the fear-avoidance model in low back pain. Pain 2005;117(1-2):162-70.
15. Truchon M, Côté D. Predictive validity of the Chronic Pain Coping Inventory in subacute low back pain. Pain 2005;116(3):205-12.
16. Campello MA, Weiser SR, Nordin M, et al. Work retention and nonspecific low back pain. Spine (Phila Pa 1976) 2006;31(16):1850-7.
17. Grotle M, Vøllestad NK, Brox JI. Screening for yellow flags in first-time acute low back pain: reliability and validity of a Norwegian version of the Acute Low Back Pain Screening Questionnaire. Clin J Pain 2006;22(5):458-67.
18. Patel SM. Psychosocial predictors of pain chronicity in Navy servicemen: Alliant International University, San Diego; 2006.
19. Ritzwoller DP, Crounse L, Shetterly S, et al. The association of comorbidities, utilization and costs for patients identified with low back pain. BMC Musculoskelet Disord 2006;7:72.
20. Newell D, Field J. Who will get better? Predicting clinical outcomes in a chiropractic practice. Clinical Chiropractic 2007;10(4):179-86.
21. Weidenhammer W, Linde K, Streng A, et al. Acupuncture for chronic low back pain in routine care: a multicenter observational study. Clin J Pain 2007;23(2):128-35.

22. Henschke N, Maher CG, Refshauge KM, et al. Prognosis in patients with recent onset low back pain in Australian primary care: inception cohort study. Bmj 2008;337(7662):a171.
23. van der Hulst M, Vollenbroek-Hutten MM, Groothuis-Oudshoorn KG, et al. Multidisciplinary rehabilitation treatment of patients with chronic low back pain: a prognostic model for its outcome. Clin J Pain 2008;24(5):421-30.
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25. Reme SE, Hagen EM, Eriksen HR. Expectations, perceptions, and physiotherapy predict prolonged sick leave in subacute low back pain. BMC Musculoskelet Disord 2009;10:139.
26. Smeets RJ, Maher CG, Nicholas MK, et al. Do psychological characteristics predict response to exercise and advice for subacute low back pain? Arthritis Rheum 2009;61(9):1202-9.
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28. Shaw WS, Means-Christensen AJ, Slater MA, et al. Psychiatric disorders and risk of transition to chronicity in men with first onset low back pain. Pain Med 2010;11(9):1391-400.
29. Streitberger K, Müller T, Eichenberger U, et al. Factors determining the success of radiofrequency denervation in lumbar facet joint pain: a prospective study. Eur Spine J 2011;20(12):2160-5.
30. Hicks GE, Benvenuti F, Fiaschi V, et al. Adherence to a community-based exercise program is a strong predictor of improved back pain status in older adults: an observational study. Clin J Pain 2012;28(3):195-203.
31. Hiebert R, Campello MA, Weiser S, et al. Predictors of short-term work-related disability among active duty US Navy personnel: a cohort study in patients with acute and subacute low back pain. Spine J 2012;12(9):806-16.
32. Melloh M, Elfering A, Käser A, et al. Depression impacts the course of recovery in patients with acute low-back pain. Behav Med 2013;39(3):80-9.
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34. Melloh M, Elfering A, Chapple CM, et al. Prognostic occupational factors for persistent low back pain in primary care. Int Arch Occup Environ Health 2013;86(3):261-9.
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36. Melloh M, Elfering A, Stanton TR, et al. Who is likely to develop persistent low back pain? A longitudinal analysis of prognostic occupational factors. Work 2013;46(3):297-311.
37. Scheele J, Enthoven WT, Bierma-Zeinstra SM, et al. Course and prognosis of older back pain patients in general practice: a prospective cohort study. Pain 2013;154(6):951-7.
38. Fischer CA, Neubauer E, Adams HS, et al. Effects of multidisciplinary pain treatment can be predicted without elaborate questionnaires. Int Orthop 2014;38(3):617-26.
39. van Hooff ML, Spruit M, O'Dowd JK, et al. Predictive factors for successful clinical outcome 1 year after an intensive combined physical and psychological programme for chronic low back pain. Eur Spine J 2014;23(1):102-12.
40. Scherrer JF, Salas J, Lustman PJ, et al. Change in opioid dose and change in depression in a longitudinal primary care patient cohort. Pain 2015;156(2):348-55.
41. Viniol A, Jegan N, Brugger M, et al. Even Worse - Risk Factors and Protective Factors for Transition from Chronic Localized Low Back Pain to Chronic Widespread Pain in General Practice: A Cohort Study. Spine (Phila Pa 1976) 2015;40(15):E890-9.

42. Cougot B, Petit A, Paget C, et al. Chronic low back pain among French healthcare workers and prognostic factors of return to work (RTW): a non-randomized controlled trial. J Occup Med Toxicol 2015;10:40.
43. Kerr D, Zhao W, Lurie JD. What Are Long-term Predictors of Outcomes for Lumbar Disc Herniation? A Randomized and Observational Study. Clin Orthop Relat Res 2015;473(6):1920-30.
44. Lubelski D, Thompson NR, Agrawal B, et al. Prediction of quality of life improvements in patients with lumbar stenosis following use of membrane stabilizing agents. Clin Neurol Neurosurg 2015;139:234-40.
45. Enthoven WT, Koes BW, Bierma-Zeinstra SM, et al. Defining trajectories in older adults with back pain presenting in general practice. Age Ageing 2016;45(6):878-83.
46. Steenstra IA, Franche RL, Furlan AD, et al. The Added Value of Collecting Information on Pain Experience When Predicting Time on Benefits for Injured Workers with Back Pain. J Occup Rehabil 2016;26(2):117-24.
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60. Klyne DM, Hodges PW. Circulating Adipokines in Predicting the Transition from Acute to Persistent Low Back Pain. Pain Med 2020.
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62. Zackova M, Aspide R, Braghittoni A, et al. Yellow flag on prognostic factors for non-specific chronic low back pain patients subjected to mini-invasive treatment: a cohort study. Eur Spine J 2020;29(8):1879-86.
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65. Demarchi SJ, Oliveira CB, Franco MR, et al. Association of perceived physical overload at work with pain and disability in patients with chronic non-specific low back pain: a 6-month longitudinal study. Eur Spine J 2019;28(7):1586-93.
66. Kim EJ, Chotai S, Stonko DP, et al. Patient-reported outcomes after lumbar epidural steroid injection for degenerative spine disease in depressed versus non-depressed patients. Spine J 2017;17(4):511-7.

Appendix V. Reported associations between depressive symptoms or depression and health outcomes for included studies

Study	Sample Size	Prognostic Factor Measure	Outcome Measure	Key Results
Acute LBP (<3 months' duration)				
Lehmann, 1993[1]	70	Depressive symptoms: Beck Depression Inventory (0-63, higher=worse)	Work status (return to work)	At 6 months: r=0.17, p<0.26 Depressive symptoms did not correlate with return to work status.
Gatchel, 1995[2]	421	Depressive symptoms: Minnesota Multiphasic Personality Inventory MMPI-D (continuous score)	Work status (return to work)	At 1 year: Depressive symptoms were not associated with return to work (depressive symptoms not retained in adjusted analysis; model estimates not reported).
Epping-Jordan, 1998[3]	78	Depressive symptoms: Beck Depression Inventory (0-63, higher=worse)	Pain (Descriptor Differential Scale) Disability (Sickness Impact Profile)	At 6 months: Pain: Adjusted β 0.06 p=0.146 Disability: Adjusted β 0.07 p=0.453 At 12 months: Pain: Adjusted β -0.06 p=0.584 Disability: Adjusted β 0.05 p=0.686 Depressive symptoms were not associated with pain or disability.
Fritz, 2001[4]	78	Depressive symptoms: Center for Epidemiological Studies Depression (0-60; higher=worse)	Restrictions in work status (versus return to work without restrictions)	Mean difference in baseline depressive symptoms between having persistent restrictions versus no restrictions in work status at 4 weeks: 4.4 (95% CI 0.70, 8.0) p=0.02 Depressive symptoms significantly differed between those with persistent restrictions versus no restrictions in work status
Cassidy, 2003[5]	3232	Depressive symptoms: Center for Epidemiological Studies Depression (0-60, higher=worse; >16 as depressive symptoms)	Time to motor vehicle collision claim closure	No fault claimants Unadjusted HR 0.52 (95% CI 0.43, 0.63) Adjusted HR 0.62 (95% CI 0.50, 0.76) Tort claimants Unadjusted HR 0.54 (95% CI 0.43, 0.68) Adjusted HR 0.70 (95% CI 0.53, 0.93) Depressive symptoms were associated with slower claim closure from motor vehicle collision.
Sieben, 2005[6]	222	Depressive symptoms: Beck Depression Inventory ("negative view of self" subscale)	Pain and disability (Graded Chronic Pain Scale)	At 6 months: ρ=.17, p<0.05 At 12 months: ρ=.20, p<0.05 End of study: ρ=.27, p<0.05 Depressive symptoms were associated with pain/disability.
Truchon, 2005[7]	321	Depressive symptoms: Hospital Anxiety and Depression Scale-Depression (0-21; higher=worse)	Work status (returned to work or not)	At 6 months: Unadjusted OR 0.74 (95% CI 0.62, 0.89), p<0.01 Depressive symptoms were associated with non-return to work at 6 months.

Study	Sample Size	Prognostic Factor Measure	Outcome Measure	Key Results
Grotle, 2006[8]	123	Depressive symptoms: Acute Low Back Pain Screening Questionnaire – depression subscale	Pain (Numeric Rating Scale), disability (Roland Morris Disability Questionnaire)	At 12 months: Pain: Adjusted OR 1.4 (95% CI 1.09, 1.67) Disability: Adjusted OR 1.4 (95% CI 1.13, 1.71) Depressive symptoms were associated with pain and disability.
Patel, 2006[9]	107	Depressive symptoms: Hamilton Rating Scale for Depression (0-52, higher=worse)	Pain (Descriptor Differential Scale), disability (Sickness Impact Profile)	Pain: r=0.41, p<0.01 Disability: r=0.52, p<0.01 Chronicity (both pain and disability): r=0.43, p<0.01 Depressive symptoms were associated with pain and disability.
Ritzwoller, 2006[10]	16,567	Depression (ICD-9 codes)	Health care utilization (inpatient admissions)	All inpatient admissions over 24 months Adjusted OR 1.27 (95% CI 1.13, 1.46) MSK-related inpatient admissions over 24 months Adjusted OR 0.96 (95% CI 0.74, 1.27) Depression was associated with all inpatient admissions but not musculoskeletal-related inpatient admissions.
Henschke, 2008[11]	973	Depressive symptoms: Scale for feelings of depression (0-10, higher=worse)	Time to recovery (based on return to previous work status, disability scale 1-5, pain intensity scale 1-6)	Unadjusted HR 0.91 (95% CI 0.89, 0.93) Adjusted HR 0.94 (95% CI 0.91, 0.97) Depressive symptoms were associated with slower recovery
Gurcay, 2009[12]	91	Depressive symptoms: Beck Depression Inventory (0-63, higher=worse)	Recovery based on pain (Visual Analogue Scale) and disability (Roland Morris Disability Questionnaire)	Comparing baseline depressive symptoms in recovered versus non-recovered group (mean, SD) at 2 weeks (p=0.569): Recovered: 13.4 (SD 10.2) Non-recovered: 13.8 (SD 8.5) No significant differences in depressive symptoms when comparing recovered versus non-recovered individuals
Reme, 2009[13]	496	Depressive symptoms: Center for Epidemiological Studies Depression (0-60; higher=worse)	Work status (full-duty return to work)	At 12 weeks: Unadjusted OR=0.96 (95% CI 0.94–0.98) Depressive symptoms were associated with lower odds of full-duty return to work.
Smeets, 2009[14]	259	Depressive symptoms: Depression Anxiety Stress Scales-21 (0-43, higher=worse; for 1 SD of change (SD=8))	Pain (Numeric Rating Scale), function (Patient-specific Functional Scale)	At 1 year (change for a 1 SD increase of DASS-21): Pain: Unadjusted β 0.36 (95% CI 0.17, 0.55), p<0.001 Function: Unadjusted β -0.32 (95% CI -0.51, -0.13), p=0.001 1 SD higher score in depressive symptoms was associated with 0.36 points less reduction in pain and 0.32 points less improvement in function.
Shaw, 2010[15]	140	Major depression (Diagnostic Interview Schedule Version III-R)	Pain (Descriptor Differential Scale)	At 6 months: Major depression (lifetime): Unadjusted OR 4.99 (95%CI 1.49, 16.76) Compared to no lifetime diagnosis: Major depression in past 6 months: Unadjusted OR 2.42 (95% CI 0.51, 11.39) Major depression in >6 months: Unadjusted OR 12.71 (95% CI 1.51, 107.21) Major depression was associated with pain.

Study	Sample Size	Prognostic Factor Measure	Outcome Measure	Key Results
Hiebert, 2012[16]	253	Depressive symptoms: Center for Epidemiological Studies Depression (0-60; higher=worse)	Work status (full duty versus not full duty)	At 4 weeks: Unadjusted OR=1.02 (95% CI 0.99, 1.06) At 12 weeks: Unadjusted OR=1.01 (95% CI 0.95, 1.08) Depressive symptoms were not associated with work status.
Melloh, 2013[17-21]	286	Depressive symptoms: Zung Self-Rating Depression Scale (20-80, higher=worse)	Persistent pain (no decrease on Visual Analogue Scale) Pain (SF-MPQ pain subscale) Sickness absence at work or school Disability (Oswestry Disability Index)	Persistent pain at 6 months Adjusted OR 1.03 (95% CI 0.98, 1.08) Pain (SF-MPQ pain subscale) At 3 weeks: Unadjusted $\beta = 0.23$, $p<0.01$ At 6 weeks: Unadjusted $\beta = 0.17$, $p<0.01$ Varied results for the association between depressive symptoms and pain. Sickness absence at 3 weeks: Unadjusted OR 1.07 (95% CI 1.03, 1.10) Adjusted OR 1.03 (95% CI 0.98-1.08), SE=0.03 Sickness absence at 6 weeks: Unadjusted OR 1.09 (95% CI 1.04, 1.14) Adjusted OR 1.09 (95% CI 1.01, 1.17), SE=0.04 Sickness absence at 12 weeks: Unadjusted OR 1.10 (95% CI 1.03, 1.17) Sickness absence at 6 months: Unadjusted OR 1.10 (95% CI 1.04, 1.17) Depressive symptoms were associated with sickness absence. Disability: At 3 weeks: r=0.23, p<0.01 At 6 weeks: r=0.31, p<0.01 At 12 weeks: r=0.43, p<0.01 At 6 months: r=0.41, p<0.01 Depressive symptoms correlated with disability.
Enthoven, 2016[22]	675	Depressive symptoms: Center for Epidemiological Studies Depression (0-60; higher=worse)	Pain trajectory (Numeric Rating Scale)	At 3 years: Intermediate pain trajectory: Unadjusted OR 1.00 (95% CI 0.95, 1.06) p=0.97 High pain trajectory: Unadjusted OR 1.01 (95% CI 0.95–1.07) p=0.83 Depressive symptoms were not associated with pain trajectory.
Steenstra, 2016[23]	113	Depressive symptoms: Center for Epidemiological Studies Depression (0-60, higher=worse; ≥16 as depressive symptoms)	Time on benefits during workers' compensation claim	Unadjusted HR 0.793 (95% CI 0.54, 1.16), p=0.236 Depressive symptoms were not associated with time on benefits during workers' compensation claim.

Study	Sample Size	Prognostic Factor Measure	Outcome Measure	Key Results
Traeger, 2016[24]	2891	Depressive symptoms: Low Back Pain Screening Questionnaire – depression scale (11-point scale)	LBP-specific health care utilization (number of primary health care visits)	Short-term health care use over 3 months Unadjusted IRR 1.04 (95% CI 1.01, 1.07) Adjusted IRR 1.03 (95% CI 0.99, 1.06) Long-term health care use over 12 months Unadjusted IRR 1.07 (95% CI 1.04, 1.09) Adjusted IRR 1.04 (95% CI 1.02, 1.07) Depressive symptoms were associated with long-term but not short term health care use.
Friedman, 2017[25]	323	Depressive symptoms: Patient Health Questionnaire-2 (dichotomized to "often" or "always" to either question)	Disability (Roland Morris Disability Questionnaire) Pain (ordinal scale "severe to "none")	At 3 months: Any functional impairment: Unadjusted OR 0.6 (95% CI 0.2-2.3) Adjusted OR 0.9 (95% CI 0.2-3.6) Pain: Unadjusted OR 0.8 (95% CI 0.2-2.6) Adjusted OR 1.0 (95% CI 0.3-3.7) Depressive symptoms were not associated with disability or pain.
Klyne, 2020[26]	28	Depressive symptoms: Center for Epidemiological Studies Depression (0-60; higher=worse)	Pain (Numeric Rating Scale; ≥7/10 or increase or no change considered non-recovery)	Unrecovered versus recovered LBP at 6 months: Unadjusted OR 1.11 (95% CI 1.00, 1.24), p=0.046 Adjusted OR 1.14 (95% CI 0.98, 1.33), p=0.091 Individuals with depressive symptoms were more likely to be non-recovered (but not statistically significant).
Acute LBP with radiculopathy				
Bahar-Ozmedir, 2020[27]	161	Depressive symptoms: Hospital Anxiety and Depression Scale-Depression (0-21; ≥11 as depressive symptoms)	Pain (Numeric Rating Scale), disability (Oswestry Disability Index)	Correlation with percent change in pain: At 1 hour: r=-0.066 p=0.403 At 3-weeks: r=-0.182 p=0.022 At 3-months: r=-0.204 p=0.037 Depressive symptoms correlated with less reduction in pain at 3 weeks and 3 months but not 1 hour post-treatment. No significant differences in depressive symptoms between patients who had successful and failed outcomes (i.e., ≥ 50% decrease in pain) (p>0.05). Correlation with percent change in disability: At 3-weeks: r=0.054 p=0.527 At 3-months: r=0.022 p=0.828 Depressive symptoms did not correlate with functional limitations post-treatment.
Chronic LBP (≥3 months' duration)				
Rainville, 1993[28]	72	Depressive symptoms: Beck Depression Inventory (0-63, higher=worse)	Pain and disability (Million Visual Analogue Scale)	Post-treatment Adjusted r^2 change=0.45, F change=47.13 (p<0.001) Depressive symptoms were associated with pain and disability.

Study	Sample Size	Prognostic Factor Measure	Outcome Measure	Key Results
Harkapaa, 1996[29]	175	Depressive symptoms: Index of Depression (5 items from Beck Depression Inventory and Cornell Medical Index)	Work status (at work, on sick-leave or pension, other status)	At 12 months: F=1.17, not significant Mean scores in depressive symptoms (not significant): At work: 7.8 Sick leave pension: 8.1 Other status: 8.4 Depressive symptoms were not associated with work status.
Dionne, 1997[30]	1213	Depressive symptoms: Symptom Checklist-90-R	Disability (Roland Morris Disability Questionnaire)	At 2 years: Unadjusted R^2=0.17, p=0.0001 Adjusted R^2=0.218, p=0.005 Depressive symptoms were associated with disability.
Vendrig, 1999[31]	143	Depressive symptoms: Minnesota Multiphasic Personality Inventory-Depression scale	Work status (return to work)	Mean scores in depressive symptoms comparing return to work status at 6 months (p=0.419): Complete return to work: mean 57.1 (SD 11.3) Incomplete return to work: mean 59.5 (SD 11.7) Depressive symptoms were not associated with return to work.
Michaelson, 2004[32]	167	Depressive symptoms: Beck Depression Inventory (0-63, higher=worse)	Pain (Visual Analogue Scale)	Depressive symptoms demonstrated no predictive value for pain at follow-up (model estimates not reported).
Weidenhammer, 2007[33]	4032	Depressive symptoms: Center for Epidemiological Studies Depression Scale (German version)	Pain (10-point rating scale), health-related quality of life (SF-36 Physical Component Score, Mental Component Score)	Pain before treatment (P<0.001): With depressive symptoms: mean 6.3 (SD 1.9) Without depressive symptoms: mean 5.2 (SD 1.8) Pain post-treatment: With depressive symptoms: mean 4.1 Without depressive symptoms: mean 3.2 Compared to patients with depressive symptoms, patients without depressive symptoms had a significantly higher improvement in health-related QOL physical health component, but not mental health component scores or pain improvement.
Van Der Hulst, 2008[34]	163	Depressive symptoms: Symptom Checklist-90 (16-80, higher=worse)	Disability (Roland Morris Disability Questionnaire), health-related quality of life (Short Form-36 Physical Component Scale, Mental Component Scale)	After discharge RMDQ: Adjusted β 0.04 (SE 0.05), p>0.05 SF-36 PCS: Adjusted β -0.09 (SE 0.08), p>0.05 SF-36 MCS: Adjusted β -0.29 (SE 0.13), p<0.05 4-month follow-up RMDQ: Adjusted β 0.01 (SE 0.05), p>0.05 SF-36 PCS: Adjusted β -0.03 (SE 0.10), p>0.05 SF-36 MCS: Adjusted β -0.35 (SE 0.13), p<0.01 Depressive symptoms were associated with health-related QOL mental component but not physical component or disability.
Streitberger, 2011[35]	41	Depressive symptoms:	Pain (Visual Analogue Scale)	At 1 year: Adjusted HR 2.97 (95% 1.32, 6.65)

Study	Sample Size	Prognostic Factor Measure	Outcome Measure	Key Results
		Beck Depression Inventory (0-63, higher=worse; >16 as depressive symptoms)		Depressive symptoms were associated with shorter duration of pain reduction.
Hicks, 2012[36]	392	Depressive symptoms: Geriatric Depression Scale (0-15; higher=worse; >5 as depressive symptoms)	Pain (Numeric Rating Scale)	At 12 months: Adjusted OR 0.47 (95% CI 0.25, 0.89) Depressive symptoms were associated with lower odds of pain reduction.
van Hooff, 2014[37]	524	Depressive symptoms: Zung Self-Rating Depression Scale (20-80, higher=worse)	Disability (Oswestry Disability Index)	At 1 year: Mean (SD) for depressive symptoms Disability - success: 56.4 (SD 22.2) Disability- failure 63.7 (SD 19.8) Depressive symptoms were associated with disability.
Scherrer, 2015[38]	355	Depressive symptoms: Patient Health Questionnaire-2 (0-6, higher=worse; ≥3 as depressive symptoms)	Health care utilization (morphine equivalent opioid dose; high dose>50 mg/day)	Up to 24 months: Unadjusted OR 2.13 (95% CI 1.36, 3.36) Adjusted OR 1.65 (95% CI 0.97, 2.81) Depressive symptoms were associated with higher odds of opioid use, but this was not statistically significant.
Viniol, 2015[39]	484	Depressive symptoms: Hospital Anxiety and Depression Scale-Depression (0-21, higher=worse)	Chronic widespread pain (body pain drawing)	1 year: Adjusted OR 1.01, p=0.87 Depressive symptoms were not associated with the incidence of chronic widespread pain.
Cougot, 2015[40]	217	Depressive symptoms: Hospital Anxiety and Depression Scale-Depression (0-21, higher=worse)	Work status (keeping job after 2 years)	At 2 years: Unadjusted OR 0.92 (95% CI 0.81, 1.05) Depressive symptoms were not associated with work status.
Yarlas, 2016[41]	541	Depressive symptoms: Short Form-36 Mental Health Domain (0-100, higher=better; ≤52 as depressive symptoms)	Pain (Numeric Rating Scale), pain interference (Brief Pain Inventory), health-related quality of life (SF-36), disability (Oswestry Disability Index)	No statistically significant interactions between treatment arm and depression status were observed. The main effect of depression status was not statistically significant on any outcome based on adjusted results except for the BPI Interference subscale ($P < 0.01$), which showed a deficit for depressed patients.
Jegan, 2017[42]	484	Depressive symptoms: Hospital Anxiety and Depression Scale-Depression (0-21, higher=worse)	Disability (Multidimensional Pain Inventory-Disability)	At 1 year: Adjusted β 0.83 (95% CI 0.01, 1.64) Depressive symptoms were associated with disability.
Nordeman, 2017[43]	130	Depressive symptoms: Hospital Anxiety and Depression Scale-Depression (0-21, higher=worse)	Disability (Roland Morris Disability Questionnaire)	At 2 years: Activity limitation on RMDQ: r=0.37 p=0.000025 Percent change in RMDQ: r=−0.11 p=0.24 Depressive symptoms were correlated with activity limitation but not percent change on RMDQ.
Nordstoga, 2017[44]	7523	Depressive symptoms:	Recovery (no pain or stiffness in muscles or	Women: Unadjusted RR 0.83

Study	Sample Size	Prognostic Factor Measure	Outcome Measure	Key Results
		Hospital Anxiety and Depression Scale-Depression (0-21, higher=worse; ≥8 as depressive symptoms)	joints for ≥3 consecutive months)	Adjusted RR 0.90 (95% CI 0.76, 1.07) Men: Unadjusted RR 0.85 Adjusted RR 0.85 (95% CI 0.73, 0.99) Depressive symptoms were associated with reduced risk of recovery in men and women (not statistically significant in women).
Dengler, 2018[45]	101	Depressive symptoms: Zung Self-Rating Depression Scale (20-80, higher=worse)	Health care utilization (opioid use)	Conservative management group: At 6 months: Adjusted OR 1.00 (95% CI 0.87, 1.20) Depressive symptoms were not associated with opioid use.
Glattacker, 2018[46]	214	Depressive symptoms: Hospital Anxiety and Depression Scale-Depression (0-21, higher=worse)	Health-related quality of life (Short Form-12 Physical Component Score, Mental Component Score)	SF-12 Physical Component Score: Depressive symptoms did not reach threshold of significance (based on unadjusted results). SF-12 Mental Component Score: End of rehab: Adjusted β=-0.703 p=0.002 6-months post-rehab: Adjusted β=-0.989 p=0.007 Depressive symptoms were associated with health-related quality of life mental component but not physical component.
Halonen, 2019[47]	5740	Depressive symptoms: SCL-Core Depression scale (≥17 as major depressive symptoms)	Persistent pain and functional limitations (single question)	Up to 6 years of follow-up: Adjusted RR 1.09 (95% CI 1.05, 1.14) Depressive symptoms were associated with persistent pain and functional limitations.
Demarchi, 2019[48]	92	Depressive symptoms: Beck Depression Inventory (0-63, higher=worse)	Pain (Numeric Rating Scale), disability (Roland Morris Disability Questionnaire)	At 6 months: Pain: Adjusted β 0.09 (95% CI 0.02, 0.16) p=0.01 At 6 months: Functional limitations: Adjusted β 0.13 (95% CI −0.03, 0.29) p=0.10 Depressive symptoms were associated with pain but not disability.
Oliveira, 2019[49]	284	Depressive symptoms: Hospital Anxiety and Depression Scale-Depression (0-21, higher=worse)	Pain (Brief Pain Inventory); pain, disability, and satisfaction (Shortened Treatment Outcomes in Pain Survey)	At 1 year: BPI Severity: Adjusted β 0.05 (95% CI –0.007, 0.11) BPI Interference: Adjusted β 0.31 (95% CI 0.20, 0.43) S-TOPS: Pain symptoms: Adjusted β 0.58 (95% CI –0.04, 1.19) Physical disability–lower body: Adjusted β 2.41 (95% CI 0.65, 4.16) Physical disability–upper body: Adjusted β 0.36 (95% CI –0.08, 0.79) Family/social disability: Adjusted β 1.94 (95% CI 1.27, 2.60) Role emotional disability: Adjusted β 1.75 (95% CI 0.88, 2.63) Patient satisfaction with care: Adjusted β –0.23 (95% CI –0.79, 0.34) Patient satisfaction with outcomes: Adjusted β –0.46 (95% CI –1.07, 0.15) Depressive symptoms were associated with disability, but not satisfaction, and varied with pain measures.
Page, 2019[50]	686	Depressive symptoms:	Pain severity (based on Numeric Rating Scale and 2	At 1 year:

Study	Sample Size	Prognostic Factor Measure	Outcome Measure	Key Results
		Beck Depression Inventory (0-63, higher=worse)	items from Brief Pain Inventory-10: enjoyment of life and general activities)	Adjusted β (intercept) 0.044, SE 0.011, p<0.001; β (slope) –0.002, SE 0.008, p=0.773 Depressive symptoms were not associated with rates of change in pain severity.
Imagama, 2020[51]	474	Depressive symptoms: Center for Epidemiological Studies Depression (0-60, higher=worse)	Health-related quality of life (Short Form-8 Mental Component Score)	At 6 months: Adjusted β 2.64 (95% CI 1.53, 3.75) p<0.001 Depressive symptoms were associated with improved health-related quality of life.
Ranger, 2020[52]	633	Depressive symptoms: Screening Index for Spine Data Registry-depression scale (0-10, higher=worse; ≥7 as depressive symptoms)	Pain (Numeric Rating Scale), disability (Roland Morris Disability Questionnaire)	At 1 year: Pain: Unadjusted RR 2.07 (95% CI 1.68, 2.57) <.001 Adjusted RR 1.47 (95% CI 1.13, 1.94) <.001 Disability: Unadjusted RR 1.89 (95% CI 1.55, 2.30) p<.001 Adjusted RR 1.34 (95% CI 1.04, 1.72) p=0.02 Depressive symptoms were associated with pain and disability.
Zackova, 2020[53]	413	Depressive symptoms: Beck Depression Inventory [0-63, higher=worse; 0–9 (normal); 10–18 (mild); 19–29 (moderate); 30–63 (severe)]	Pain (Numeric Rating Scale), health-related quality of life (Short Form-36 Physical Component Scale, Mental Component Scale)	At 6 months: PCS improvement (yes vs no) BDI Moderate versus mild: Adjusted OR 0.85 (95% CI 0.32, 2.22), p=0.74 BDI Severe versus mild: Adjusted OR 1.37 (95% CI 0.35, 5.31), p=0.65 MCS improvement (yes vs no) BDI Moderate versus mild: Adjusted OR 0.14 (95% CI 0.03, 0.57), p=0.01 BDI Severe versus mild: Adjusted OR 0.04 (95% CI 0.01, 0.27), p=0.001 Improvement based on decrease in NRS (p=0.13) BDI Mild n (%): improved 5 (55.6) vs not improved 61 (35.5) BDI Moderate n (%): improved 2 (22.2) vs not improved 69 (40.1), BDI Severe n (%): improved 2 (22.2) vs not improved 42 (24.4) Depressive symptoms were associated with lower odds of improvement in health-related quality of life mental component but not physical component or pain reduction.
Chronic LBP with radiculopathy				
Lubelski, 2015[54]	1346	Depressive symptoms: Patient Health Questionnaire-9 (0-27, higher=worse)	Quality of life (EuroQol-5D), health care utilization (surgery)	At 4 months: Quality of life (any improvement): Adjusted OR 0.95 (95% CI 0.90, 1.00) Quality of life (≥0.1 point improvement): Adjusted OR 0.92 (95% CI 0.87, 0.98) Surgery: Adjusted OR 1.03 (95% CI 0.98, 1.08) Time to surgery: Adjusted HR 1.02 (95% CI 0.98, 1.06)

Study	Sample Size	Prognostic Factor Measure	Outcome Measure	Key Results
				Depressive symptoms were associated with reduced quality of life but not surgery.
Mixed duration				
Newell, 2007[55]	788	Depressive symptoms: Bournemouth Questionnaire	Recovery (Global Impression of Change)	Acute LBP <4 weeks' duration n=241: At 4 weeks: Unadjusted OR 0.31 (95% CI 0.14, 0.69) At 12 weeks: not significant Acute LBP <4 weeks' duration, recurring At 4 weeks: not significant At 12 weeks: Unadjusted OR 0.35 (95% CI 0.14, 0.90) LBP >4 weeks' duration: At 4 week: not significant At 12 weeks: not significant Varied results for the association between depressive symptoms and recovery.
Grotle, 2010[56]	926	Depressive symptoms: Hospital Anxiety and Depression Scale-Depression (0-21, higher=worse)	Disability (Roland Morris Disability Questionnaire)	1 year: Acute/subacute LBP (<3 months' duration) n=258: Unadjusted β 0.55 (95% CI 0.42, 0.69), p<0.001 Adjusted β 0.20 (95% CI 0.04, 0.36), p<0.05 Chronic LBP (≥3 months' duration) n=668: Unadjusted β 0.69 (95% CI 0.59, 0.80), p<0.001 Adjusted β 0.15 (95% CI 0.05, 0.26), p<0.05 Depressive symptoms were associated with disability at 1 year for acute/subacute and chronic LBP.
Adnan, 2017[57]	565	Depressive symptoms: Beck Depression Inventory (0-63, higher=worse)	Favourable outcome: 30% reduction in both disability (Oswestry Disability Index) and pain (Numeric Rating Scale)	Post-treatment: Acute LBP (<14 weeks' duration) n=153: Unadjusted OR 0.98 (95% CI 0.943, 1.017) Depressive symptoms were not associated with a favourable outcome in pain and disability for acute LBP Chronic LBP (>14 weeks' duration) n=412: Unadjusted OR 0.95 (95% CI 0.922, 0.978) Adjusted OR 0.96 (95% CI 0.929, 0.996) Depressive symptoms were associated with lower odds of a favourable outcome in pain and disability for chronic LBP.
Other[a]				
Cherkin, 1996[58]	219	Depressive symptoms: Symptom Checklist-90 (reference: <moderately depressed)	Tolerability of symptom severity (poor outcome: mostly dissatisfied, unhappy, or terrible)	In participants with index visit for low back pain: 7 weeks: Adjusted OR 2.1 (95% CI 1.4, 3.4) 1 year: Adjusted OR 2.3 (95% CI 1.4, 3.6) Depressive symptoms were associated with poor symptom satisfaction.
Fransen, 2002[59]	854	Depressive symptoms: General Health Questionnaire (severe depression)	Compensation claim status (payments) for low back pain	New occupational claim for LBP: At 12 weeks: Adjusted OR=2.47 (95% CI 1.66, 3.67)

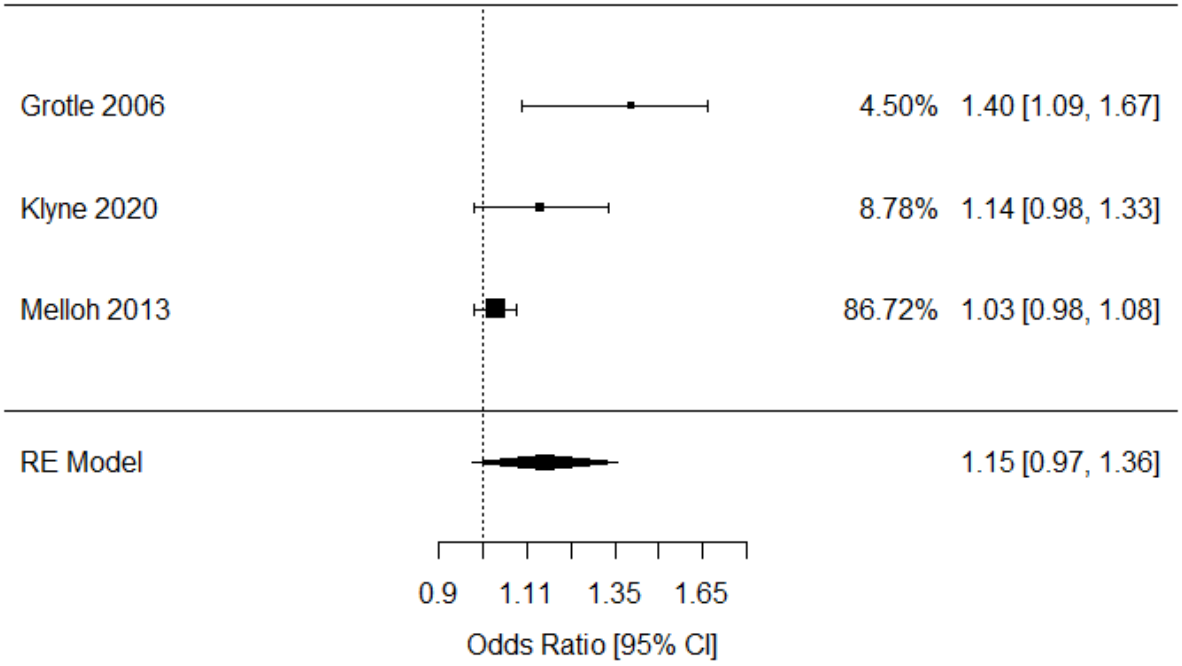
Study	Sample Size	Prognostic Factor Measure	Outcome Measure	Key Results
				Depressive symptoms were associated with compensation claims for low back pain.
Tubach, 2004[60]	622	Depressive symptoms: Langner's Screening Questionnaire (depression score; score dichotomized to high versus low)	Persistence of sciatica (single question)	LBP with radiculopathy ≥1 day during previous year: At 2 years: Adjusted OR 0.87 (95% CI 0.55, 1.37) Depressive symptoms were not associated with persistence of sciatica.
Campello, 2006[61]	67	Depressive symptoms: Symptom Checklist-90-R	Work status: time to work retention	Off/restricted duty >8 weeks; At 2 years: Unadjusted HR 0.72 (95% CI 0.22, 2.44) Multivariate analysis: not statistically associated with work retention Depressive symptoms were not associated with work status.
Scheele, 2013[62]	675	Depressive symptoms: Center for Epidemiological Studies Depression (0-60; higher=worse)	Non-recovery (Global Perceived Effect)	In participants with index visit for low back pain: At 3 months: Unadjusted OR 1.1, p<0.01 Depressive symptoms were associated with non-recovery.
Fischer, 2014[63]	395	Depressive symptoms: Zung Self-Rating Depression Scale (20-80, higher=worse)	Quality of life (Freiburger Persönlichkeitsinventar subjective well-being), pain (Visual Analogue Scale), work status (return to work)	LBP with sick leave: At 6 months: Lower quality of life: Adjusted OR 1.48 p<0.0001 Pain reduction: Adjusted OR 0.93 (not significant) Return to work: Adjusted OR 0.86 (not significant) Depressive symptoms were associated with quality of life, but not return-to-work or pain outcomes.
Kerr, 2015[64]	392	Depression (history of depression)	Disability (Roland Morris Disability Questionnaire)	Among participants with lumbar radiculopathy ≥6 weeks' duration: Mean change scores from baseline (non-operative treatment group) at 8 years follow-up: Without depressive symptoms: -25.4 (SE 0.7) With depressive symptoms: -21.6 (SE 1.8) Depressive symptoms were associated with disability.
Kim, 2017[65]	161	Depressive symptoms: Zung Self-Rating Depression Scale (20-80, higher=worse)	Disability (Oswestry Disability Index)	LBP with radiculopathy with non-response to care: At 12 months: Adjusted Beta 0.465 (95% CI 0.146, 0.784) p=0.005 Depressive symptoms were associated with disability.
Hartvigsen, 2020 –[66]	947	Depressive symptoms: Major Depression Inventory (0-50, higher=worse; > 19 as depressive symptoms)	Pain (Numeric Rating Scale), disability (Roland Morris Disability Questionnaire)	Index health care visit for LBP (chiropractic patients): Pain: At 2 weeks: Unadjusted OR 2.71 (95% CI 1.65, 4.43) At 3 months: Unadjusted OR 3.06 (95% CI 1.91, 4.91) At 1 year: Unadjusted OR 2.32 (95% CI 1.41, 3.81) Disability: At 2 weeks: Unadjusted OR 3.44 (95% CI 2.07, 5.70) At 3 months: Unadjusted OR 2.57 (95% CI 1.64, 4.05) At 1 year: Unadjusted OR 1.59 (95% CI 0.96, 2.64)

Study	Sample Size	Prognostic Factor Measure	Outcome Measure	Key Results
				Pain as a categorical variable at 3 months: Medium: Unadjusted RR 1.96 (95% CI 1.04-3.71) High: Unadjusted RR 5.22 (95% CI 2.62-10.4) Disability as a categorical variable at 3 months (reference=low): Medium: Unadjusted RR 1.92 (95% CI 1.03-3.59) High: Unadjusted RR 3.50 (95% CI 1.92-6.38) Depressive symptoms were associated with pain and disability.

CI – confidence interval; HR – hazard ratio; LBP – low back pain; OR – odds ratio; RR – relative risk; RMDQ – Roland Morris Disability Questionnaire; SD – standard deviation; SE – standard error; VAS – visual analogue scale

[a]Other LBP populations as described under the key results column

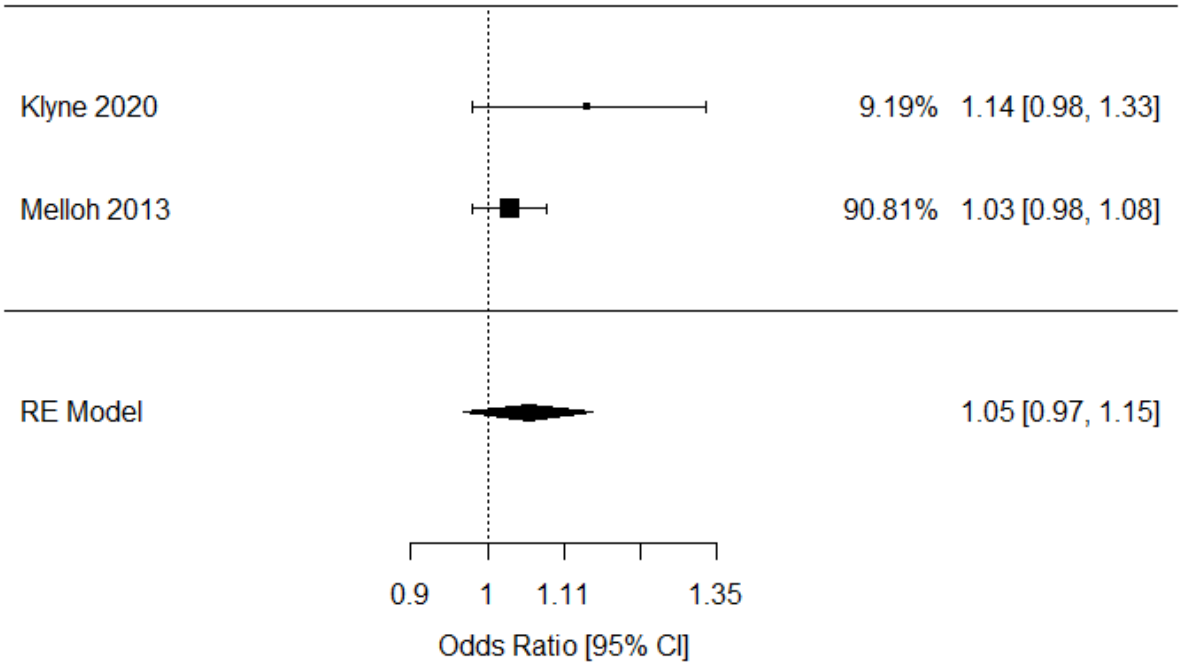
Appendix VIa. Forest plot: Are depressive symptoms associated with pain in individuals with acute low back pain? Continuous measure of depressive symptoms, results from 3 studies (n=487)



RE – random effects meta-analysis; tau^2=0.02, I^2=78.67%*

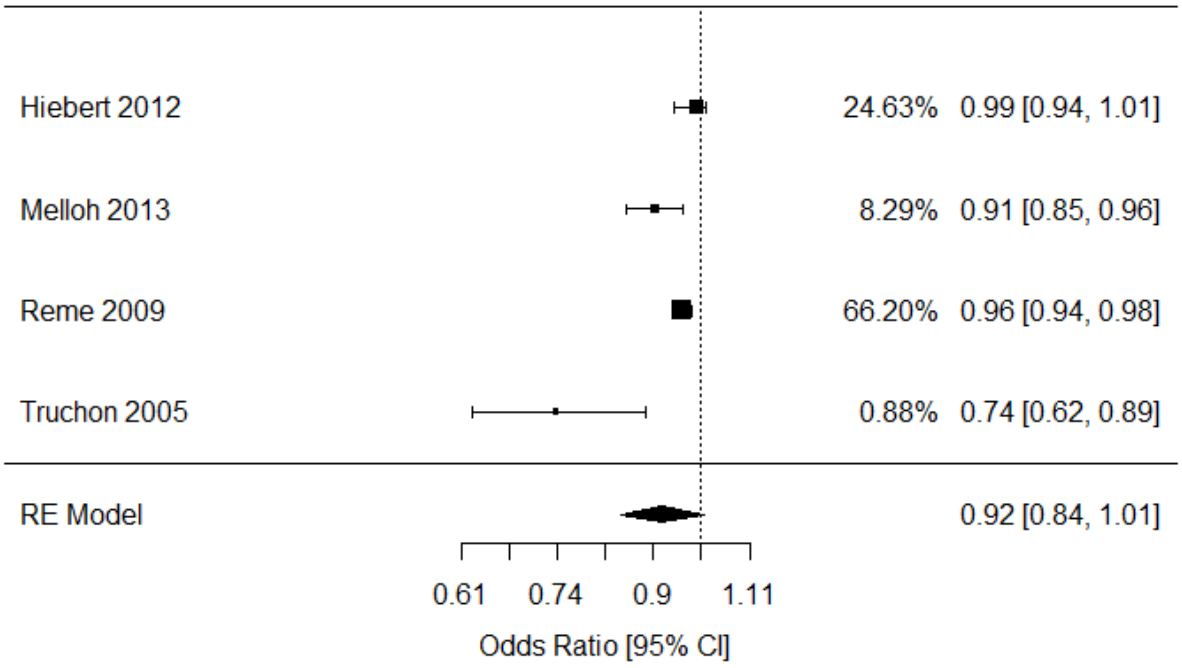
* I^2 <75% when excluding one high risk of bias study (Grotle 2006; see Appendix VIb)

Appendix VIb. Forest plot: Are depressive symptoms associated with pain in individuals with acute low back pain? Continuous measure of depressive symptoms, results from 2 studies (n=314)



RE – random effects meta-analysis; tau^2<0.01, I^2=35.09%

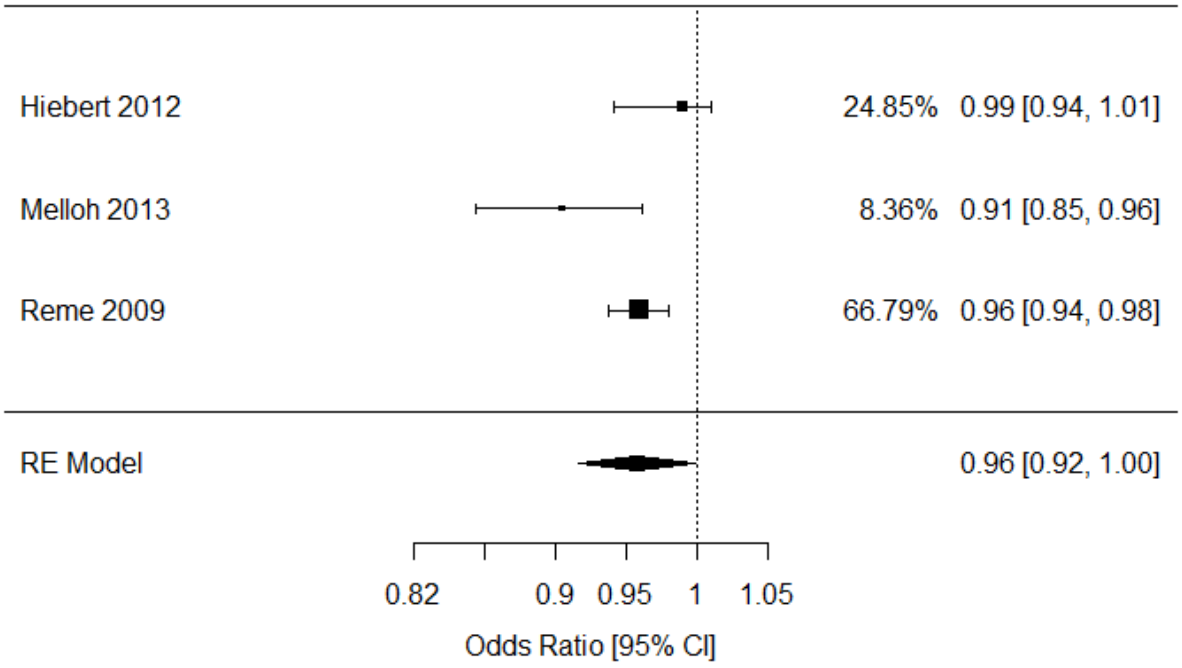
Appendix VIIa. Forest plot: Are depressive symptoms associated with work participation in individuals with acute low back pain? Continuous measure of depressive symptoms, results from 4 studies (n=1,356)



RE – random effects meta-analysis; tau^2=0.01, I^2=93.46%

* I^2 decreased when excluding one high risk of bias studies (Truchon 2005; see Appendix VIIb)

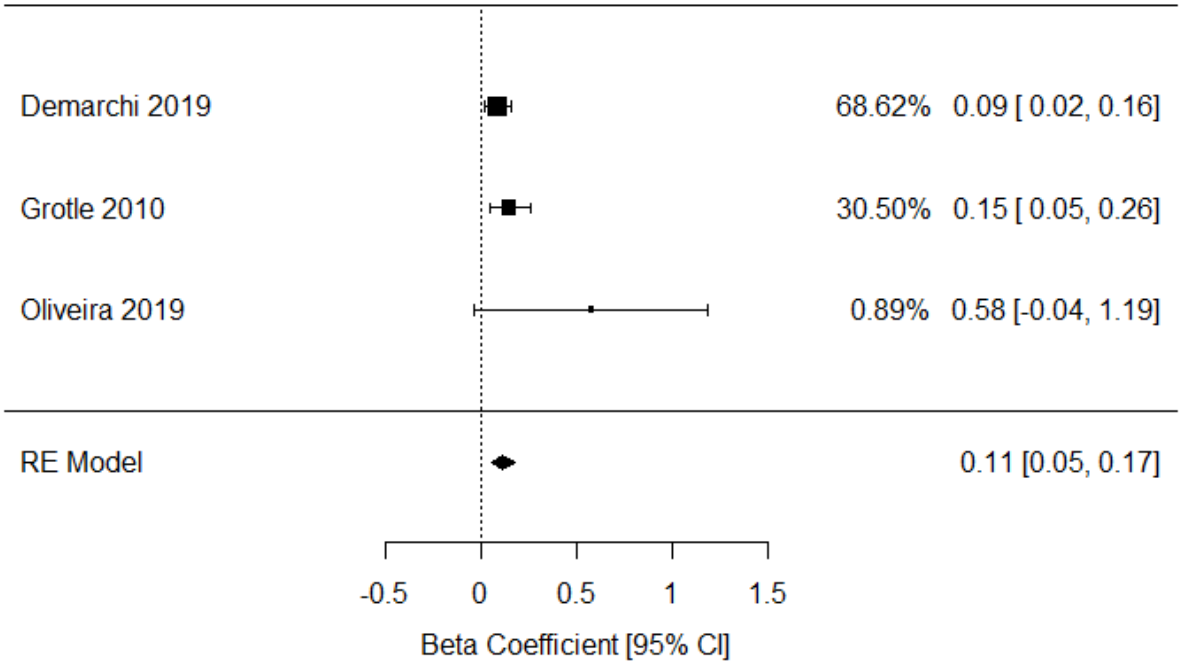
Appendix VIIb. Forest plot: Are depressive symptoms associated with work participation in individuals with acute low back pain? Continuous measure for depressive symptoms, results from 3 studies (n=1,035)



RE – random effects meta-analysis; tau^2<0.01, I^2=75.70%*

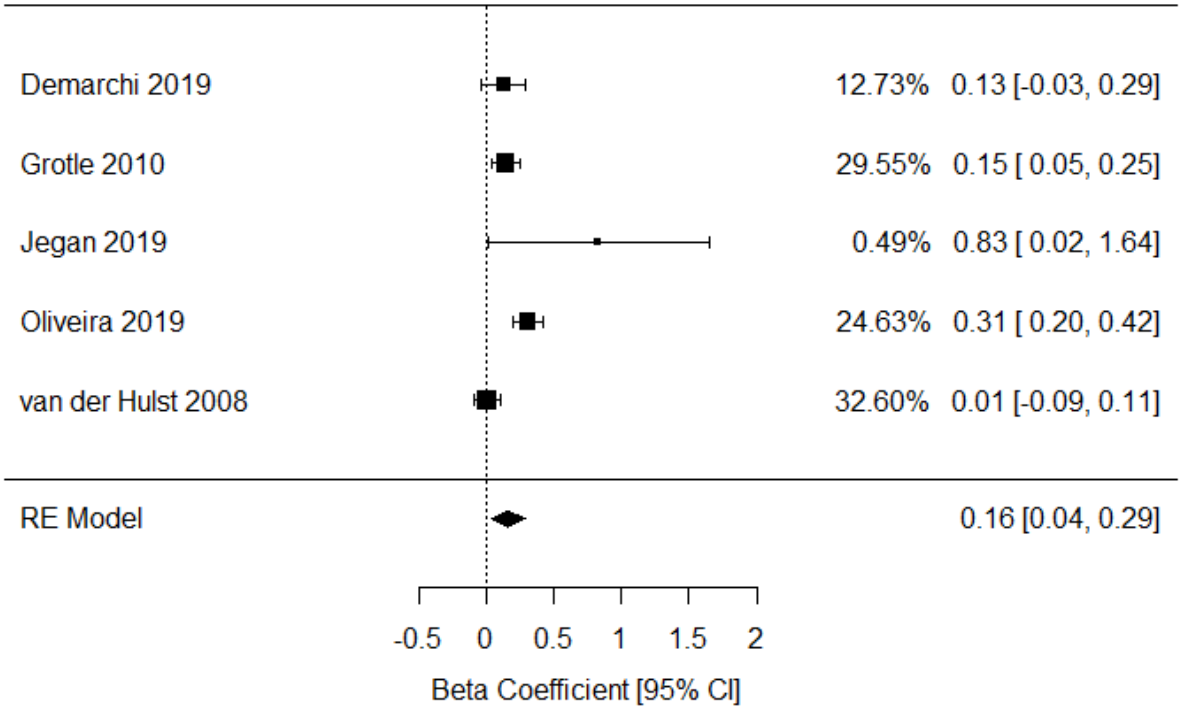
*To explore potential sources of heterogeneity, we further excluded one moderate risk of bias study from the meta-analysis, which produced similar results (2 studies, 749 participants, OR=0.97, 95% CI 0.94-1.00, I^2=56.27%)

Appendix VIII. Forest plot: Are depressive symptoms associated with pain in individuals with chronic low back pain? Continuous measure of depressive symptoms, results from 3 studies (n=2,902)



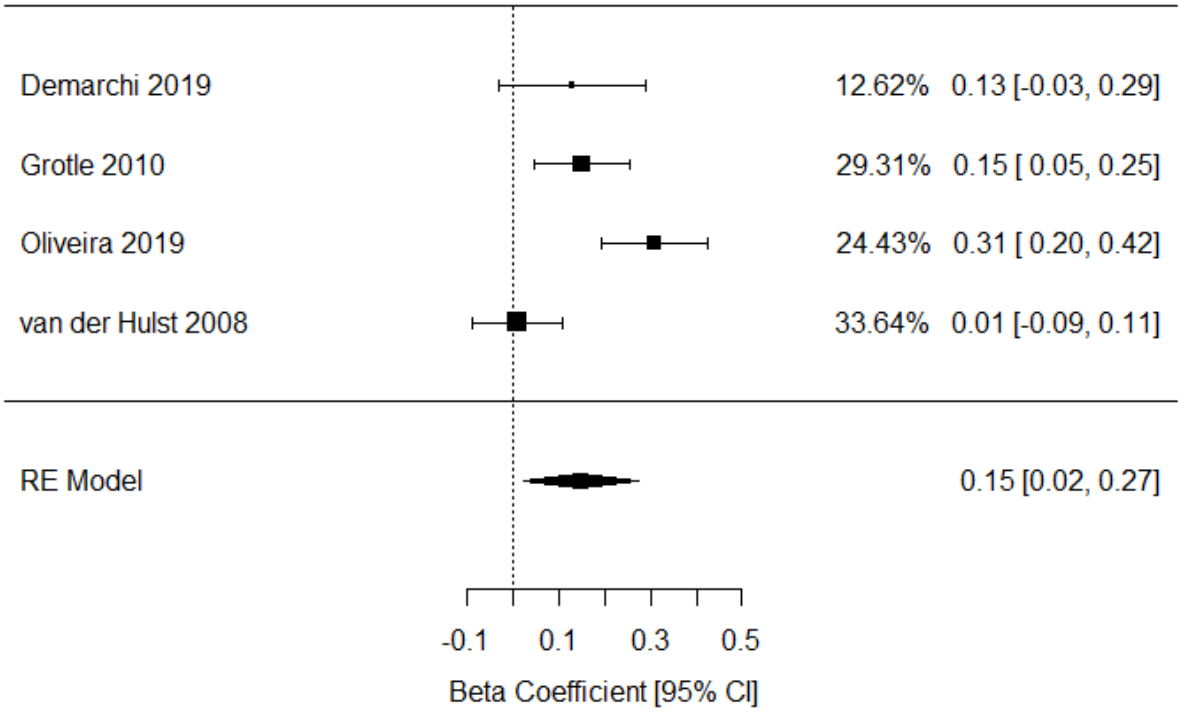
RE – random effects meta-analysis; tau^2=0, I^2=1.04%

Appendix IXa. Forest plot: Are depressive symptoms associated with disability in individuals with chronic low back pain? Continuous measure of depressive symptoms, results from 5 studies (n=3,549)



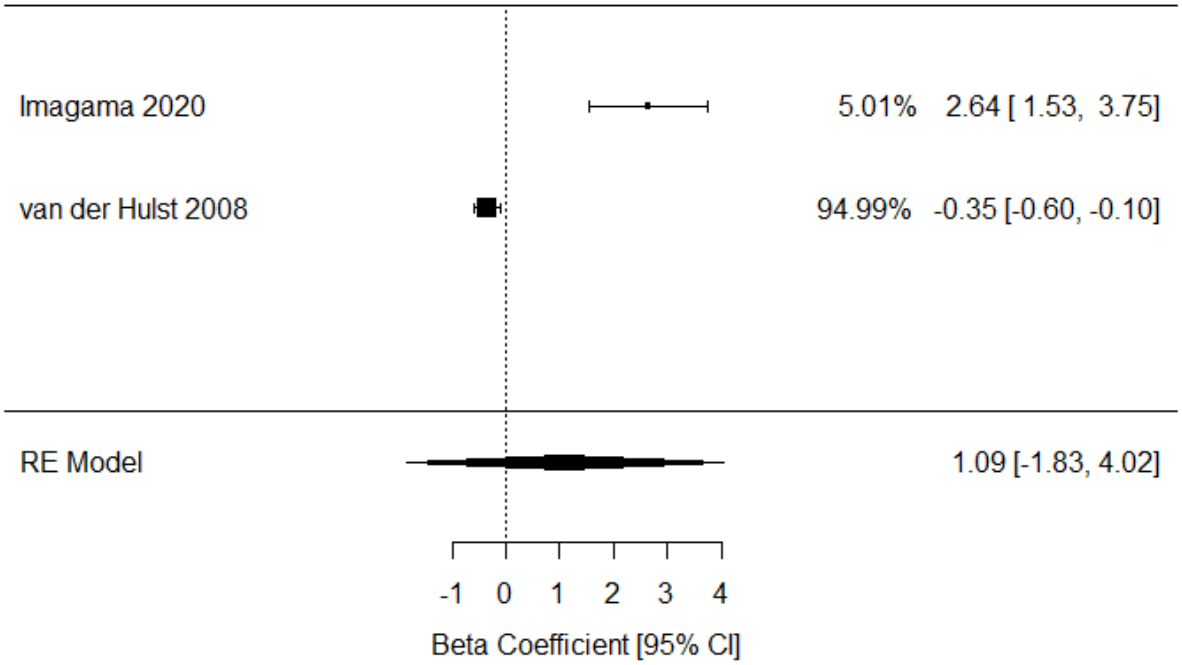
RE – random effects meta-analysis; tau^2=0.01, I^2=74.69%

Appendix IXb. Forest plot: Are depressive symptoms associated with disability in individuals with chronic low back pain? Continuous measure of depressive symptoms, results from 4 studies (n=3,065)



RE – random effects meta-analysis; tau^2=0.01, I^2= 78.70%

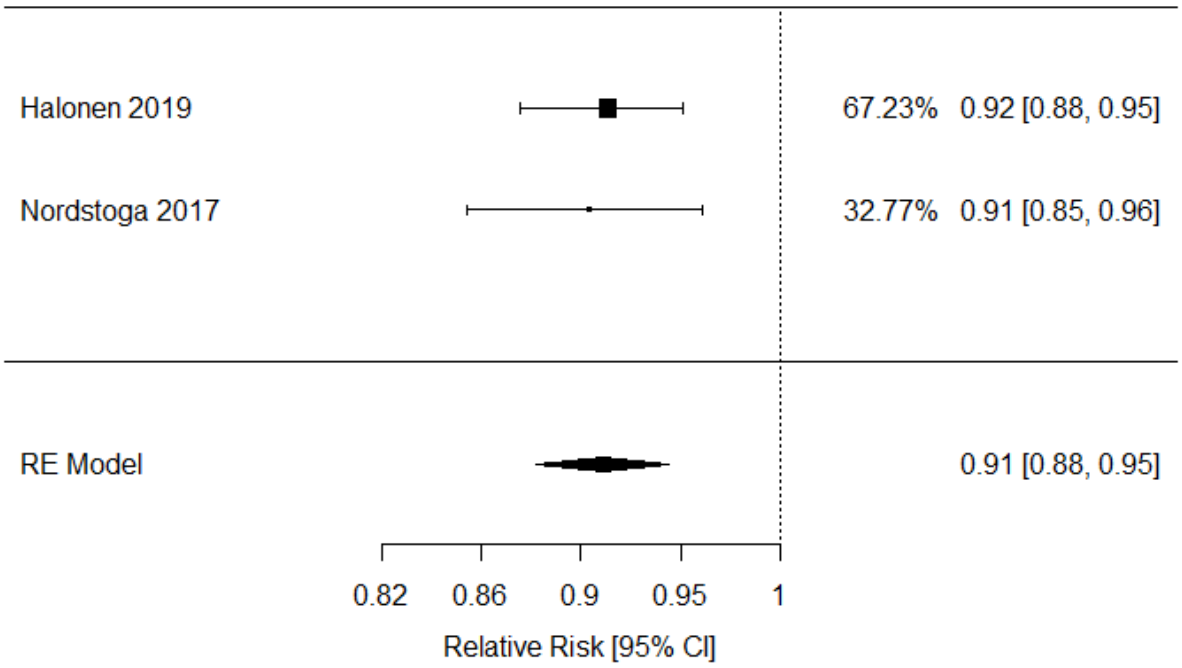
Appendix X. Forest plot: Are depressive symptoms associated with the mental component of health-related quality of life in individuals with chronic low back pain? Continuous measure of depressive symptoms, results from 2 studies (n=637)



RE – random effects meta-analysis; tau^2=4.30, I^2=96.22%*

*Could not adequately explore sources of heterogeneity due to a limited number of studies

Appendix XI. Forest plot: Are depressive symptoms associated with recovery in individuals with chronic low back pain? Dichotomous measure of depressive symptoms, results from 2 studies (n=13,263)



RE – random effects meta-analysis; $tau^2=0$, $I^2=0\%$

Appendix XIIa. Summary of the domains of the Quality in Prognosis Studies (QUIPS) tool*

Biases	**Issues to consider for judging overall rating of "Risk of bias"**
1. Study Participation	**Goal: To judge the risk of selection bias (likelihood that relationship between *PF* and *outcome* is different for participants and eligible non-participants).**
Source of target population	The source population or population of interest is adequately described for key characteristics.
Method used to identify population	The sampling frame and recruitment are adequately described, including methods to identify the sample sufficient to limit potential bias (number and type used, e.g., referral patterns in health care)
Recruitment period	Period of recruitment is adequately described
Place of recruitment	Place of recruitment (setting and geographic location) are adequately described
Inclusion and exclusion criteria	Inclusion and exclusion criteria are adequately described (e.g., including explicit diagnostic criteria or "zero time" description).
Adequate study participation	There is adequate participation in the study by eligible individuals
Baseline characteristics	The baseline study sample (i.e., individuals entering the study) is adequately described for key characteristics.
Summary Study participation	**The study sample represents the population of interest on key characteristics, sufficient to limit potential bias of the observed relationship between PF and outcome.**
2. Study Attrition	**Goal: To judge the risk of attrition bias (likelihood that relationship between *PF* and *outcome* are different for completing and non-completing participants).**
Proportion of baseline sample available for analysis	Response rate (i.e., proportion of study sample completing the study and providing outcome data) is adequate.
Attempts to collect information on participants who dropped out	Attempts to collect information on participants who dropped out of the study are described.
Reasons and potential impact of subjects lost to follow-up	Reasons for loss to follow-up are provided.
Outcome and prognostic factor information on those lost to follow-up	Participants lost to follow-up are adequately described for key characteristics.
	There are no important differences between key characteristics and outcomes in participants who completed the study and those who did not.

Study Attrition Summary	**Loss to follow-up (from baseline sample to study population analyzed) is not associated with key characteristics (i.e., the study data adequately represent the sample) sufficient to limit potential bias to the observed relationship between PF and outcome.**
3. Prognostic Factor Measurement	**Goal: To judge the risk of measurement bias related to how PF was measured (differential measurement of PF related to the level of outcome).**
Definition of the PF	A clear definition or description of 'PF' is provided (e.g., including dose, level, duration of exposure, and clear specification of the method of measurement).
Valid and Reliable Measurement of PF	Method of PF measurement is adequately valid and reliable to limit misclassification bias (e.g., may include relevant outside sources of information on measurement properties, also characteristics, such as blind measurement and limited reliance on recall).
	Continuous variables are reported or appropriate cut-points (i.e., not data-dependent) are used.
Method and Setting of PF Measurement	The method and setting of measurement of PF is the same for all study participants.
Proportion of data on PF available for analysis	Adequate proportion of the study sample has complete data for PF variable.
Method used for missing data	Appropriate methods of imputation are used for missing 'PF' data.
PF Measurement Summary	***PF* is adequately measured in study participants to sufficiently limit potential bias.**
4. Outcome Measurement	**Goal: To judge the risk of bias related to the measurement of outcome (differential measurement of outcome related to the baseline level of PF).**
Definition of the Outcome	A clear definition of outcome is provided, including duration of follow-up and level and extent of the outcome construct.
Valid and Reliable Measurement of Outcome	The method of outcome measurement used is adequately valid and reliable to limit misclassification bias (e.g., may include relevant outside sources of information on measurement properties, also characteristics, such as blind measurement and confirmation of outcome with valid and reliable test).
Method and Setting of Outcome Measurement	The method and setting of outcome measurement is the same for all study participants.
Outcome Measurement Summary	***Outcome of interest* is adequately measured in study participants to sufficiently limit potential bias.**
5. Study Confounding	**Goal: To judge the risk of bias due to confounding (i.e. the effect of PF is distorted by another factor that is related to PF and outcome).**

Important Confounders Measured	All important confounders, including treatments, are measured.
Definition of the confounding factor	Clear definitions of the important confounders measured are provided (e.g., including dose, level, and duration of exposures).
Valid and Reliable Measurement of Confounders	Measurement of all important confounders is adequately valid and reliable (e.g., may include relevant outside sources of information on measurement properties, also characteristics, such as blind measurement and limited reliance on recall).
Method and Setting of Confounding Measurement	The method and setting of confounding measurement are the same for all study participants.
Method used for missing data	Appropriate methods are used if imputation is used for missing confounder data.
Appropriate Accounting for Confounding	Important potential confounders are accounted for in the study design (e.g., matching for key variables, stratification, or initial assembly of comparable groups).
	Important potential confounders are accounted for in the analysis (i.e., appropriate adjustment).
Study Confounding Summary	**Important potential confounders are appropriately accounted for, limiting potential bias with respect to the relationship between *PF* and *outcome*.**
6. Statistical Analysis and Reporting	**Goal: To judge the risk of bias related to the statistical analysis and presentation of results.**
Presentation of analytical strategy	There is sufficient presentation of data to assess the adequacy of the analysis.
Model development strategy	The strategy for model building (i.e., inclusion of variables in the statistical model) is appropriate and is based on a conceptual framework or model.
	The selected statistical model is adequate for the design of the study.
Reporting of results	There is no selective reporting of results.
Statistical Analysis and Presentation Summary	**The statistical analysis is appropriate for the design of the study, limiting potential for presentation of invalid or spurious results.**

PF - prognostic factor

*Each domain is rated as high, moderate, or low risk of bias considering the prompting items.

Appendix XIIb. Risk of bias assessment of studies using the Quality in Prognosis Studies (QUIPS) tool

Study	Domain 1 – Study Participation	Domain 2 – Study Attrition	Domain 3 – Prognostic Factor Measurement	Domain 4 – Outcome Measurement	Domain 5 – Study Confounding[b]	Domain 6 – Statistical Analysis and Reporting
Lehmann, 1993[1]	Moderate	Low	Low	Moderate	High	Low
Rainville, 1993[28]	Low	Moderate	Low	Moderate	High	Low
Gatchel, 1995[2]	High	Low	Low	Moderate	High	Moderate
Cherkin, 1996[58]	Moderate	Low	Low	Moderate	Moderate	Low
Harkapaa, 1996[29]	High	Moderate	Moderate	Low	Low	Low
Dionne, 1997[30]	Moderate	Low	Low	Low	High	Low
Epping-Jordan, 1998[3]	Low	Moderate	Low	Low	Moderate	Low
Vendrig, 1999[31]	Low	Low	Low	Moderate	High	Moderate
Fritz, 2001[4]	Moderate	Low	Low	Moderate	High	Low
Fransen, 2002[59]	High	Low	Low	Low	Moderate	Low
Cassidy, 2003[5]	Low	Moderate	Low	Low	Low	Low
Michaelson, 2004[32]	Low	Low	Low	Low	Moderate	Moderate
Tubach, 2004[60]	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate
Sieben, 2005[6]	Moderate	Moderate	Low	Low	High	Low
Truchon, 2005[7]	High	Moderate	Low	Moderate	High	Low
Campello, 2006[61]	Moderate	Low	Low	Moderate	Moderate	Low
Grotle, 2006[8]	High	Moderate	Moderate	Low	Moderate	Low
Patel, 2006[9]	High	Moderate	Low	Moderate	High	Moderate
Ritzwoller, 2006[10]	Moderate	Moderate	Moderate	Moderate	Low	Low
Newell, 2007[55]	Moderate	High	Low	Low	High	Moderate
Weidenhammer, 2007[33]	Low	Moderate	Low	Low	High	Moderate
Henschke, 2008[11]	Low	Low	Moderate	Low	Low	Moderate
Van Der Hulst, 2008[34]	Moderate	Moderate	Low	Low	Moderate	Low
Gurcay, 2009[12]	Moderate	Low	Low	Low	High	Low

Study	Domain 1 – Study Participation	Domain 2 – Study Attrition	Domain 3 – Prognostic Factor Measurement	Domain 4 – Outcome Measurement	Domain 5 – Study Confounding[b]	Domain 6 – Statistical Analysis and Reporting
Reme, 2009[13]	Moderate	Low	Moderate	Low	Low	Moderate
Smeets, 2009[14]	Moderate	Low	Low	Low	High	Low
Grotle, 2010[56]	Moderate	Moderate	Low	Low	Moderate	Low
Shaw, 2010[15]	Low	Moderate	Low	Moderate	High	Moderate
Streitberger, 2011[35]	Low	Moderate	Low	Low	Moderate	Moderate
Hicks, 2012[36]	Moderate	Moderate	Low	Low	Moderate	Moderate
Hiebert, 2012[16]	Low	Low	Low	Moderate	High	Low
Melloh, 2013[17-21]	Moderate	Moderate	Low	Low	Moderate	Low
Scheele, 2013[62]	Moderate	Low	Low	Low	High	Moderate
Fischer, 2014[63]	Moderate	Moderate	Low	Moderate	Moderate	Moderate
van Hooff, 2014[37]	Moderate	Low	Low	Low	High	Moderate
Scherrer, 2015[38]	Moderate	Moderate	Low	Moderate	Low	Low
Viniol, 2015[39]	Moderate	Moderate	Low	Low	Low	Low
Cougot, 2015[40]	Moderate	Moderate	Low	Moderate	High	Low
Kerr, 2015[64]	Moderate	Moderate	Low	Low	Low	Moderate
Lubelski, 2015[54]	Moderate	High	Low	Moderate	Low	Low
Enthoven, 2016[22]	Moderate	Low	Low	Low	High	Moderate
Steenstra, 2016[23]	Low	Low	Low	Low	High	Low
Traeger, 2016[24]	Moderate	Low	Low	Moderate	Low	Low
Yarlas, 2016[41]	High	High	Low	Low	High	Moderate
Adnan, 2017[57]	Moderate	Low	Low	Moderate	Moderate	Moderate
Friedman, 2017[25]	Moderate	Low	Low	Moderate	Low	Low
Jegan, 2017[42]	Moderate	High	Low	Moderate	Low	Low
Nordeman, 2017[43]	Moderate	Low	Low	Low	High	Moderate
Nordstoga, 2017[44]	Moderate	Moderate	Low	Moderate	Low	Low
Dengler, 2018[45]	Moderate	Low	Low	Moderate	Moderate	Low

Study	Domain 1 – Study Participation	Domain 2 – Study Attrition	Domain 3 – Prognostic Factor Measurement	Domain 4 – Outcome Measurement	Domain 5 – Study Confounding[b]	Domain 6 – Statistical Analysis and Reporting
Oliveira, 2019[49]	Moderate	Moderate	Low	Low	Low	Low
Page, 2019[50]	Moderate	Low	Low	Low	Low	Low
Bahar-Ozmedir, 2020[27]	Moderate	High	Low	Moderate	High	Low
Hartvigsen, 2020[66]	Low	Moderate	Low	Low	Low	Low
Imagama, 2020[51]	Moderate	Moderate	Low	Low	Low	Low
Klyne, 2020[26]	Moderate	Low	Low	Low	Moderate	Low
Ranger, 2020[52]	Low	Moderate	Low	Low	Low	Low
Zackova, 2020[53]	Low	Moderate	Low	Moderate	Moderate	Low

[a]Domains were assessed based on associations between prognostic factor (depressive symptoms or depression) and health outcomes relevant to this systematic review

[b]High refers to univariate associations between prognostic factor (depressive symptoms or depression) and health outcomes relevant to this systematic review

Appendix XIII. List of possibly relevant articles published in non-English language (6 studies)

1. Heinrich M, Hafenbrack K, Michel C, Monstadt D, Marnitz U, Klinger R. Measures of success in treatment of chronic back pain: pain intensity, disability and functional capacity: determinants of treatment success in multimodal day clinic setting. Schmerz (Berlin, Germany). 2011 Jun 1;25(3):282-9.

- Sample size n=681

2. Mohr B, Graef T, Forster M, Krohn-Grimberghe B, Kurzeja R, Mantel F, Thomsen M, Hampel P. Influence of depressive symptoms and gender in chronic low back pain rehabilitation outcome: a pilot study. Die Rehabilitation. 2008 Oct 20;47(5):284-98.

- Sample size n=116

3. Pfingsten M, Hildebrandt J, Saur P, Franz C, Seeger D. Multidisciplinary treatment program on chronic low back pain, part 4. Prognosis of treatment outcome and final conclusions. Schmerz (Berlin, Germany). 1997 Feb 1;11(1):30-41.

- Sample size n=90

4. Roth KE, Kremer M, Maier GS, Sariyar M, Rompe JD, Kappis B. Epidural injection shows no advantages over oral medication and physiotherapy in the treatment of sciatica, irrespective of the duration of symptoms. Zeitschrift fur Orthopadie und Unfallchirurgie. 2014 Feb 27;152(1):46-52.

- Sample size n=106

5. Salvetti MD, Pimenta CA, Braga PE, Corrêa CF. Disability related to chronic low back pain: prevalence and associated factors. Revista da Escola de Enfermagem da USP. 2012 Oct;46(SPE):16-23.

- Sample size n=177

6. Wu HF, Hsu TL, Hung SH, Tseng YL, Liu CL, Wang TJ. Preoperative disability and its influencing factors in patients with lumbar spondylolisthesis. Hu li za zhi The Journal of Nursing. 2018 Feb 1;65(1):33-41.

- Sample size n=86

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4. Fritz JM, George SZ. Identifying psychosocial variables in patients with acute work-related low back pain: the importance of fear-avoidance beliefs. *Phys Ther* 2002;82(10):973-83.
5. Cassidy JD, Carroll L, Côté P, Berglund A, Nygren A. Low back pain after traffic collisions: a population-based cohort study. *Spine (Phila Pa 1976)* 2003;28(10):1002-9.
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7. Truchon M, Côté D. Predictive validity of the Chronic Pain Coping Inventory in subacute low back pain. *Pain* 2005;116(3):205-12.
8. Grotle M, Vøllestad NK, Brox JI. Screening for yellow flags in first-time acute low back pain: reliability and validity of a Norwegian version of the Acute Low Back Pain Screening Questionnaire. *Clin J Pain* 2006;22(5):458-67.
9. Patel SM. Psychosocial predictors of pain chronicity in Navy servicemen: Alliant International University, San Diego; 2006.
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11. Henschke N, Maher CG, Refshauge KM, Herbert RD, Cumming RG, Bleasel J, et al. Prognosis in patients with recent onset low back pain in Australian primary care: inception cohort study. *Bmj* 2008;337(7662):a171.
12. Gurcay E, Bal A, Eksioglu E, Hasturk AE, Gurcay AG, Cakci A. Acute low back pain: clinical course and prognostic factors. *Disabil Rehabil* 2009;31(10):840-5.
13. Reme SE, Hagen EM, Eriksen HR. Expectations, perceptions, and physiotherapy predict prolonged sick leave in subacute low back pain. *BMC Musculoskelet Disord* 2009;10:139.
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