



Psychosocial predictors of failure to return to work in non-chronic non-specific low back pain: a systematic review

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ABSTRACT

Objectives: To identify psychosocial predictors of failure to return to work in non-chronic (lasting less than 3 months) non-specific low back pain (NSLBP).

Methods: A systematic review of prognostic studies was carried out. Medline, Embase, PsychINFO, CINAHL and PEDro electronic bibliographic databases up to April 2006 were searched. Included studies took baseline measures in the non-chronic phase of NSLBP (ie, within 3 months of onset), included at least one psychosocial variable and studied a sample in which at least 75% of participants had NSLBP. Baseline measures had to be used to predict at least one work-specific outcome.

Results: The search identified 24 studies meeting the inclusion criteria. From these studies there is strong evidence that recovery expectation is predictive of work outcome and that depression, job satisfaction and stress/psychological strain are not predictive of work outcome. There is moderate evidence that fear avoidance beliefs are predictive of work outcome and that anxiety is not predictive of work outcome. There is insufficient evidence to determine whether compensation or locus of control are predictive of work outcome.

Conclusions: To predict work outcome in non-chronic NSLBP, psychosocial assessment should focus on recovery expectation and fear avoidance. More research is needed to determine the best method of measuring these constructs and to determine how to intervene when a worker has low recovery expectations.

Non-specific low back pain (NSLBP) is common, with up to 90% of adults experiencing low back pain at some stage in their lives.¹⁻³ Typically episodes of NSLBP are resolved within weeks,^{1,4,5} but when NSLBP prevents a person from working there are personal, social and economic consequences. Work absence due to NSLBP costs millions of dollars worldwide due to decreased productivity, treatment costs and ongoing compensation payments.^{1,4,5} A small proportion of people experiencing ongoing disability due to NSLBP consume the majority of resources devoted to NSLBP^{4,6} and, as a result, emphasis on early identification of these individuals has increased. One premise behind the idea of early, accurate prognosis is that intervention at an appropriate phase of NSLBP will prevent the development of chronic work disability.

Previous reviews have included studies examining chronic NSLBP,^{3,7} have examined outcomes other than work-specific outcomes,^{4,8-11} have included a mixture of participants with NSLBP and other musculoskeletal conditions^{3,4,12} or have focused on methodological issues in the existing

prognosis literature.^{13,14} The review by Steenstra *et al*¹⁵ included only studies of acute NSLBP and focused on work outcomes but included retrospective studies and did not focus on psychosocial predictors of failure to return to work. Therefore, the aim of the current review was to identify psychosocial predictors of failure to return to work in non-chronic (lasting less than 3 months) NSLBP.

METHODS

Search strategy

Guidelines of the Cochrane Back Review Group¹⁶ were used to develop a search strategy that would identify studies relevant to the research question. The search strategy had four elements: low back pain, psychosocial predictor variables, return to work outcomes and a filter to identify prognostic publication types. Search terms were mapped to subject headings or MeSH terms wherever possible and to capture all relevant studies, synonymous terms were grouped together with the OR operator. Where no prognosis filter was available for a specific database, one was developed using the content of filters from other databases.¹⁷ The search strategy was applied in the Medline, Embase, PsychINFO, CINAHL and PEDro electronic bibliographic databases up to April 2006. The search strategy used in the Medline database is given in the appendix. Reference lists of relevant studies and systematic reviews were examined to identify additional publications.

Inclusion criteria

The review was limited to studies published in English in peer-reviewed journals. Retrospective studies were not included due to the potential bias in this type of study.¹⁸ Two reviewers (RI and NT) independently applied the exclusion criteria and the following inclusion criteria to the titles and abstracts:

- ▶ baseline measures applied for >75% of inception cohort within 3 months of onset or recurrence of NSLBP (ie, sample was in the non-chronic phase of NSLBP),
- ▶ baseline measures included at least one psychosocial variable,
- ▶ baseline measures were used to predict at least one work-specific outcome.

Where it was not clear from the title and abstract whether the study met inclusion criteria, the full text of the article was examined. Consensus was used to resolve any disagreements between reviewers and if consensus was not achieved, a third reviewer was consulted (MD).

Quality assessment

In the current review the quality of the included studies was rated on 17 criteria (table 1) which were derived from two systematic reviews on the prognosis of NSLB^{13 14} and addressed six major sources of bias in prognostic reviews.¹⁹

In particular the quality criteria addressed bias in the form of study participation (S1–S6), prognostic factor measurement (PI1–PI4) and outcome measurement (FU1 and FU4). Each criterion was answered “yes”, “no” or “can’t tell”. Two independent reviewers (RI and MD) assessed the quality of each included study and disagreements were resolved by discussion. Full details of the quality assessment criteria are available from the corresponding author on request. No studies were excluded on the basis of quality, but the results of quality assessment were taken into account when drawing conclusions using a method similar to those used in previous reviews.^{8 15 20} Studies with a total score of 12 or more criteria answered yes were considered high quality, those with 10 or 11 criteria moderate quality, and with nine or less low quality.

Levels of evidence

The evidence that commonly measured constructs did or did not predict work outcome was considered to be strong, moderate or insufficient in a manner similar to previous reviews.^{8 15 20} In order for the level of evidence to be strong, findings had to be consistent in multiple high quality studies. Moderate evidence required either consistent findings in one high quality study and one or more moderate quality studies or consistent findings across multiple moderate and lower quality studies. When there were findings from only one study or inconsistent findings across multiple studies, the evidence was considered to be insufficient.

Table 1 Quality criteria

Sample	
S1	Study provided clearly defined inclusion and exclusion criteria
S2	The stage when initial measures were applied was clearly stated
S3	Measures were applied at an appropriate stage to investigate the research question
S4	The study used representative sampling techniques
S5	Important characteristics of the sample were described
S6	The setting and study site were clearly described
Prognostic indicators	
PI1	Clearly defined constructs of what is measured were provided
PI2	Justification of the measures used was given
PI3	The selection of prognostic indicators recognises the multifactorial nature of RTW
PI4	The study used standardised, psychometrically sound instruments for all measures taken
Analysis	
A1	Multivariate techniques were used to adjust for potential confounding variables
A2	The analysis avoided over-fitting the data
A3	Prospective validation in another cohort was performed
Follow-up	
FU1	RTW outcome was defined in detail, or measure was of sick leave duration
FU2	The duration of follow-up was greater than or equal to 6 months
FU3	The data were complete for at least 80% of the sample measured at baseline
FU4	Outcome measurements were blinded

Requirements to satisfy quality criteria are available from the corresponding author on request. RTW, return to work.

Data extraction

Psychosocial variables and how they were measured were extracted from each study. Results were listed under three headings: univariate results, multivariate results and predictive models. Univariate results list the variables that were found to be significantly different between groups experiencing a positive or negative outcome when tested by a simple univariate test (such as a t test or χ^2 analysis). Multivariate results were variables found to be significantly different between groups experiencing a particular outcome when tested by more complex multivariate analysis, such as multiple regression or hazard ratios. When the accuracy, sensitivity or specificity of a model was presented in a study, the predictive model was considered to have been tested. In this case the factors making up the model were listed as part of a predictive model.

RESULTS

The search strategy resulted in an initial yield of 997 references. The full texts of 50 studies were retrieved and examined and 31 did not meet inclusion criteria (17 did not apply baseline measures in the non-chronic phase of NSLB^P, four did not examine prognosis, three examined a cohort consisting of less than 75% NSLB^P, two were retrospective studies, two did not include a work-specific outcome, two did not measure any psychosocial variables and one was a comment on a previous study and not applicable to this review).

Examination of reference lists of relevant systematic reviews and studies meeting inclusion criteria identified five studies not identified by the electronic search^{21–25} that met inclusion criteria. Two separate publications^{26 27} were derived from the same sample and were therefore considered a single study. The final number of studies included in the review was 24. A summary of the included studies is presented in table 2.

The quality assessment revealed major shortcomings in the over-fitting of multivariate models and the failure to validate models in a new sample. Blinded outcome assessors and representative sampling techniques were infrequently used, descriptions of the study setting were often absent and the majority of studies failed to define their major outcome. These limitations are similar those described in previous reviews of prognostic studies.^{7 8 13 14} The majority of studies (13) were of low quality, with seven moderate quality studies and four high quality studies (table 3). Full details of quality analysis can be obtained on request from the author.

Table 3 lists the seven most frequently measured psychosocial constructs, how the construct was measured and the outcome that was predicted. Also shown is whether each variable was found to be a significant predictor in univariate or multivariate analysis and whether the construct formed part of a model tested for its predictive accuracy. The level of evidence for each construct as a predictor of work outcome in non-chronic NSLB^P is summarised in table 4.

DISCUSSION

Recovery expectation

There is strong evidence that recovery expectation regarding return to work is predictive of work outcome (table 4). This finding is supported by all nine studies that measured it, including all four high quality studies^{30 32 36 44} and one moderate quality study.²³ A review by Mondloch *et al*⁴⁸ identified that 15 out of 16 moderate or better methodological quality studies measuring recovery expectation found positive expectations were associated with better health outcomes across a range of clinical

Table 2 Characteristics of the included studies

Study	Country	n	Outcomes	Time between onset and baseline	Follow-up (weeks)	Sample
Boersma and Linton ²⁸	SWE	185	>15 Days sick leave	<3 Months	52	Seeking care for non-chronic neck or back pain
Cats-Baril and Frymoyer ²¹	USA	232	Employed or not at 6 months	<3 Months	26	New episodes attending two secondary-care clinics
Coste <i>et al</i> ²²	FRA	75	RTW or not at 15, 30, 60 and 90 days	<72 h	12	Self-referring to primary care, no radiation below gluteal fold
Deyo and Diehl ²⁹	USA	61	Employed or not at 3 months	78% <1 month	12	Clinical trial of bed-rest strategies at outpatient clinic of public hospital. Seeking compensation at baseline excluded.
Dionne <i>et al</i> ⁶⁰	CAN	860	RTW in good health (4 categories)	Mean 70.8 (SD 490) days	104	First time, recurrent and persistent LBP in primary care setting
Fritz <i>et al</i> ^{26, 27}	USA	77	RTW with or without restrictions at 4 weeks	Mean 5.5 (SD 4.6) days	4	Clinical trial comparing different PT approaches for acute, work-related LBP. Recruited from occupational care providers
Gatchel <i>et al</i> ⁶¹	USA	227	Disabled or not disabled at 1 year	<6 Weeks	52	Seeking care at orthopaedic or industrial medicine clinic
Hagen <i>et al</i> ⁶²	NOR	457	RTW (full duties) or not at 3 and 12 months	8–12 Weeks of sick leave	52	Sick-listed for 8–12 weeks identified from database
Haldorsen <i>et al</i> ⁶³	NOR	260	RTW or not at 3, 6 and 12 months	8–12 Weeks	52	Sick leave for 8–12 weeks referred by national insurance office
Hazard <i>et al</i> ⁶⁴	USA	163	Working or not due to LBP at 3 months	<15 Days	12	Work-related injuries identified by Department of Labour and Industry database
Infante-Rivard and Lortie ³⁵	CAN	291	RTW or not, duration of time off work	81% <30 days	>104	Referrals to rehabilitation centre
Karjalainen <i>et al</i> ⁶⁵	FIN	156	Duration of sick leave (0, 1–30, >30 days) at 12 months	4–12 Weeks	52	RCT comparing interventions for subacute LBP, recruited from primary care clinics
Klenerman <i>et al</i> ²⁵	ENG	123	Pain preventing work attendance or not at 12 months	<1 Week	52	Seeking care at general practice for first or new episode
Lanier and Stockton ³⁷	USA	104	Number of lost working days at 6 and 12 weeks	<28 Days	12	Seeking care at family practice
Lehmann <i>et al</i> ²⁴	USA	55	Able to RTW or not at 6 months, time to RTW	Mean 27.5 days work absence	26	Referred by occupational physician if between 2 and 6 weeks work absence
Nordin <i>et al</i> ³⁸	USA	162	>28 days lost work time or not	<1 Week	4	Employees of New York City Transit Authority, first episode
Ohlund <i>et al</i> ⁶⁹	SWE	103	Duration of sick leave up to 2 years after inclusion. Return to same job at least half time or not.	<7 Weeks of absence	104	Employees of car manufacturer identified on database
Schultz <i>et al</i> (2004) ⁶⁰	CAN	159	RTW or not at 3 months. Number of days lost in 18 months	4–6 Weeks	78	Identified on workers' compensation database
Schultz <i>et al</i> (2005) ⁶⁶	CAN	100	RTW or not at 3 months	4–6 Weeks	12	Identified on workers' compensation database
Shaw <i>et al</i> ⁶²	USA	291	Return to work (modified, alternate or full duty) or not at 1 month	<14 Days	4	Referral to occupational health clinic by employer or hospital
Steenstra <i>et al</i> ²³	NL	596	Duration of work absence	<2 Days	26	Identified on occupational health service database at a university hospital
Truchon and Cote ⁶³	CAN	321	RTW or not at 6 months	3–12 Weeks	26	Identified on workers' compensation database
Turner <i>et al</i> ⁶⁴	USA	1068	Number of days of wage replacement at 6 months	Mean 21 (SD 9.7) days	26	Identified on workers' compensation database
Van der Weide <i>et al</i> ⁶⁵	NL	116	Time to return to same number of hours over 1 year	Mean 18 (SD 6.3) days sick leave	52	Occupational health services for health care and university workers

LBP, low back pain; PT, physiotherapy; RCT, randomised controlled trial; RTW, return to work.

conditions, including work outcomes in low back pain and myocardial infarction. Others have found positive recovery expectations associated with positive health outcomes in chronic NSLBP,^{7, 49} total knee replacement surgery,⁵⁰ cardiac surgery⁵¹ and return to work after acute soft tissue injury.^{52, 53} It is likely recovery expectation combines variables across multiple constructs that would be too numerous or too difficult to measure individually via questionnaire, physical examination or interview. This information is likely filtered through the experiences, beliefs and attitudes of the individual, resulting in a realistic prediction of when return to work will occur. Qualitative investigation of workers with occupational NSLBP has revealed that outcome expectancies span four major domains of outcome (job/financial security, re-injury, workplace support and self-image).⁴⁷ Recovery expectation is a complex construct that appears to be a robust predictor of return to work.

Less clear is how strong a predictor recovery expectation is. Across the studies, little information was provided regarding the prevalence or predictive accuracy of poor recovery expectations. Turner *et al*⁴⁴ provided detailed information regarding recovery expectations and subsequent outcomes of participants. Of 1018 participants who answered the item, 96 (9%) rated their certainty of working in 6 months as less than 5 out of 10. This increased the chances of developing long term disability by around 30%. However, recovery expectation had limited value in determining who would return to work within 6 months. This suggests that while recovery expectation is a significant predictor of work disability, it may not hold enough predictive strength to be used as a predictor on its own.

The best method of measuring work-related recovery expectation remains unclear. The majority of studies used single items to measure recovery expectation, except for Schultz *et al*,^{40, 46} but

Table 3 Common psychosocial constructs measured and significance in predicting outcome

Psycho-social construct	Studies measuring construct	Quality score/17	How construct measured	Tested and significant in prognosis		Part of predictive model‡	Outcome
				Uni-variate*	Multi-variate**		
Recovery expectation	Turner <i>et al</i> ⁴⁴	16 (H)	Certainty will be working in 6 months (0–10)	✓	✓	–	Work disability at 6 months
	Dionne <i>et al</i> ²⁰	13 (H)	Do you think you will be back to normal work in 3 months? (yes/no)	–	–	✓	RTW success Partial success (RTW with limitations) Failure
	Hagen <i>et al</i> ²²	12 (H)	Don't believe BP will disappear (yes/no)	✓	✓	–	RTW at 3 months RTW at 12 months
	Karjalainen <i>et al</i> ³⁶	12 (H)	Perceived risk of not recovering (0–10)	✓	✓	–	Pain interfering with daily life or work
				X	X	–	Sick leave (0, 1–30, >30 days)
	Steenstra <i>et al</i> ²³	11 (M)	Expected duration of sick leave (1–10 days, >10 days)	✓	✓	✓	Duration absent until RTW
				✓	✓	✓	Duration absent until RTW for 4 weeks
				✓	✓	✓	Total duration of sick leave
	Hazard <i>et al</i> ²⁴	9 (L)	How certain are you that you will be working in 6 months? (0–10)	✓	–	–	RTW at 3 months
	Schultz <i>et al</i> (2005) ⁴⁶	9 (L)	Expectation of recovery scale (7 items)	✓	✓	✓	RTW at 3 months
Schultz <i>et al</i> (2004) ⁴⁰	9 (L)	Expectation of recovery scale (8 items)	✓	✓	✓	RTW at 3 months	
			–	✓	✓	Number of days lost from work	
	Shaw <i>et al</i> ²	9 (L)	Will you be able to do your regular job without restrictions 4 weeks from now? (5-point scale)	–	✓	✓	RTW at 1 month
			Physician estimated days until RTW	–	✓	✓	
Fear avoidance beliefs/behaviours	Turner <i>et al</i> ⁴⁴	16 (H)	Average of two items from Fear Avoidance Beliefs Questionnaire (FABQ) work subscales	✓	✓	–	Work disability at 6 months
	Dionne <i>et al</i> ²⁰	13 (H)	FABQ activity subscale (4 items) FABQ work subscale (7 items)	–	–	X	RTW success Partial success Failure
	Hagen <i>et al</i> ²²	12 (H)	Believe work will aggravate condition (yes/no)	✓	✓	–	RTW at 3 months
				✓	✓	–	RTW at 12 months
	Fritz <i>et al</i> ^{26, 27}	10 (M)	FABQ activity subscale (4 items)	✓	X	X	RTW with or without restrictions at 4 weeks
				✓	✓	✓	
	Haldorsen <i>et al</i> ³³	9 (L)	If you continue working, what effect will that have on your complaints? (5-point scale)	X	X	X	RTW at 12 months
	Klenerman <i>et al</i> ²⁵	9 (L)	Combination of Holmes and Rahe stressful life events scale (43 items), Modified Somatic Perception Questionnaire (MSPQ) (13 items), previous pain history (3 items) and pain coping strategies (8 items)	X	✓	✓	RTW at 12 months
	Shaw <i>et al</i> ⁷	9 (L)	Worried physical activity will increase pain or cause re-injury? (5-point scale)	–	X	X	RTW at 1 month
	Boersma and Linton ²⁸	6 (L)	Average of two items from Orebro Musculoskeletal Pain Questionnaire	–	–	✓	Long term sick leave (>15 days)
Depression	Dionne <i>et al</i> ²⁰	13 (H)	Symptoms of depression (Symptom Checklist-90 Revised – 90 items)	–	–	X	RTW: success, partial success, failure
	Fritz <i>et al</i> ^{26, 27}	10 (M)	Centre for Epidemiological Studies Depression Scale (CES-D) (20 items)	✓	X	X	RTW with or without restrictions at 4 weeks
	Gatchel <i>et al</i> ³¹	10 (M)	Clinical DSM-III-R diagnosis of depression Minnesota Multiphasic Personality Inventory (MMPI) scale 2 (60 items)	X	X	X	Currently working at 1 year
	Truchon and Cote ⁴³	10 (M)	Hospital Anxiety and Depression Scale (HADS) (14 items)	✓	X	X	RTW at 6 months
	Haldorsen <i>et al</i> ³³	9 (L)	Ursin's Health Inventory (29 items)	X	X	X	RTW at 12 months
	Klenerman <i>et al</i> ²⁵	9 (L)	Modified Zung depression inventory (20 items)	–	X	X	Work status at 12 months
Lehmann <i>et al</i> ²⁴	9 (L)	Beck Depression Inventory (BDI)	X	–	–	Time to RTW	

Continued

Table 3 Continued

Psycho-social construct	Studies measuring construct	Quality score/17	How construct measured	Tested and significant in prognosis		Part of predictive model†	Outcome
				Uni-variate*	Multi-variate**		
Stress/psychological strain	Schultz <i>et al</i> (2004) ⁴⁰	9 (L)	Centre for Epidemiological Studies Depression Scale (CES-D) (20 items)	X	X	X	RTW at 3 months Number of days lost from work
	Schultz <i>et al</i> (2005) ⁴⁶	9 (L)	Distress scale: gross screen for psychological distress, including depression (11 items)	✓	X	X	RTW at 3 months
	Shaw <i>et al</i> ²²	9 (L)	How much of the time felt downhearted and blue in past week? (6-point scale)	–	X	X	RTW at 1 month
	Coste <i>et al</i> ²²	8 (L)	Clinician assessed evidence of depression (yes/no)	X	–	–	RTW at 3 months
	Lanier and Stockton ³⁷	8 (L)	Clinician assessment of history of depression	X	✓	–	Number of lost working days
	Boersma and Linton ²⁸	6 (L)	How much have you been bothered by feeling depressed in the past week? (0–10)	–	–	✓	Long term sick leave (>15 days)
	Dionne <i>et al</i> ²⁰	13 (H)	Exposure to stressful events in last 12 months (1 item)	–	–	X	RTW success
			Psychological demands of work (1 item)	–	–	X	Partial success
							Failure
	Hagen <i>et al</i> ²²	12 (H)	High psychological workload (yes/no)	X	X	–	RTW at 3 and 12 months
	Steenstra <i>et al</i> ²³	11 (M)	Complaints related to job stress (yes/no)	✓	✓	X	Duration absent until RTW for 4 weeks
			Complaints related to stressful life events (yes/no)	X	X	X	
	Van der Weide <i>et al</i> ¹⁵	10 (M)	Emotional effort (0–100)	X	X	–	RTW at 12 months
			Mentally demanding work (yes/no)	X	X	–	
	Deyo and Diehl ²⁹	9 (L)	Worried about serious illness (yes/no)	–	X	–	RTW at 3 months
Haldorsen <i>et al</i> ³³	9 (L)	Eysenck Personality Inventory: neuroticism-stability (lability to breakdown under stress) (57 items)	X	X	X	RTW at 12 months	
Klenerman <i>et al</i> ²⁵	9 (L)	Holmes and Rahe scale of stressful life events (43 items)	–	X	X	Work status at 12 months	
Lehmann <i>et al</i> ⁴	9 (L)	Job stress (0–9)	X	–	–	Time to RTW	
		Severe emotional discomfort: Low Back Classification Scale (LCBS) (0–9)	X	–	–		
		Psychological disturbance: Low Back Classification Scale (LBCS) (0–9)	X	–	–		
Schultz <i>et al</i> (2004) ⁴⁰	9 (L)	Karasek Job Content Questionnaire (27 items): psychological demand subscale	X	X	X	RTW at 3 months Number of days lost from work	
Schultz <i>et al</i> (2005) ⁴⁶	9 (L)	Current psychological distress (11 items)	✓	X	X	RTW at 3 months	
Shaw <i>et al</i> ²²	9 (L)	Feel under stress (1–5)	–	X	X		
Hagen <i>et al</i> ²²	12 (H)	State-Trait Anxiety Index (STAI) (20 items): State anxiety subscale	X	X	–		
		Trait anxiety subscale	✓	X	–	RTW at 12 months	
Fritz <i>et al</i> ^{26, 27}	10 (M)	Beck Anxiety Index (BAI) (21 items)	✓	X	X	RTW with or without restrictions at 4 weeks	
Gatchel <i>et al</i> ³¹	10 (M)	Clinical DSM-III-R diagnosis of presence of depression, anxiety and substance abuse disorders	X	X	–	Currently working at 1 year	
Haldorsen <i>et al</i> ³³	9 (L)	State-Trait Anxiety Index (STAI) (20 items): State anxiety subscale	X	X	–	RTW at 12 months	
		Trait anxiety subscale	X	X	–		
		Ursin's Health Inventory (scale included depression, anxiety, sleep problems, hot spells and chest pain) (29 items)	X	X	–		
Schultz <i>et al</i> ⁴⁰ (2004)	9 (L)	State-Trait Anxiety Index (STAI) (20 items): State anxiety subscale	✓	X	X	RTW at 3 months	
Coste <i>et al</i> ²²	8 (L)	DSM-III-R diagnosis of generalised anxiety	X	X	X	RTW at 3 months	
Lanier and Stockton ³⁷	8 (L)	Clinician assessment of history of anxiety	X	✓	–	Number of lost working days	
Job satisfaction	Dionne <i>et al</i> ²⁰	13 (H)	Satisfaction concerning possibilities of work adaptation†	–	–	X	RTW success
			Job satisfaction†	–	–	X	Partial success
			Satisfaction with health services†	–	–	X	Failure

Continued

Table 3 Continued

Psycho-social construct	Studies measuring construct	Quality score/17	How construct measured	Tested and significant in prognosis		Part of predictive model‡	Outcome		
				Uni-variate*	Multi-variate**				
Compensation	Karjalainen <i>et al</i> ⁹⁶	12 (H)	Satisfaction with work (0–10)	X	X	–	Sick leave (0, 1–30, >30 days)		
	Nordin <i>et al</i> ⁹⁸	11 (M)	Satisfaction with medical care (0–10)	X	X	–	>28 days off work		
			Quinn and Shepard: job satisfaction scale (7.2–27.8)	X	X	–			
			Quinn and Shepard: negative feelings about work (4–20)	X	X	–			
	Van der Weide <i>et al</i> ⁴⁵	10 (M)	Not enjoying work (0–100)	X	X	–	RTW at 12 months		
	Lehmann <i>et al</i> ²⁴	9 (L)	Price and Meuller job satisfaction scale (6 items)	X	–	–	Time to RTW		
	Shaw <i>et al</i> ²	9 (L)	Job satisfaction (1–10)	–	X	X	RTW at 1 month		
	Coste <i>et al</i> ²²	8 (L)	Poor job satisfaction†	✓	X	–	Longer recovery		
	Cats-Baril and Frymoyer ²¹	5 (L)	Job satisfaction†	–	–	✓	RTW at 6 months		
	Dionne <i>et al</i> ⁹⁰	13 (H)	Satisfaction with retirement policies and benefits†	–	–	X	RTW success Partial success Failure		
			Current financial problems due to BP (yes/no)	–	–	X			
			Current compensation for BP (yes/no)	–	–	X			
			Likelihood of losing job†	–	–	X			
			Previous compensation for BP†	–	–	X			
Gatchel <i>et al</i> ⁹¹			10 (M)	Workers compensation/personal injury insurance case (yes/no)	✓	✓		–	Currently working at 1 year
Infante-Rivard and Lortie ³⁵			10 (M)	Salary insurance (yes/no)	✓	X		–	RTW
Schultz <i>et al</i> (2004) ⁴⁰			9 (L)	WCB/Employer Response to Claim Scale (4 items)	X	✓		X	RTW at 3 months
Schultz <i>et al</i> (2005) ⁴⁶			9 (L)	WCB/Employer Response to Claim Scale (4 items)	✓	✓		X	RTW at 3 months
Shaw <i>et al</i> ²			9 (L)	Supervisor questioned whether you were really hurt (yes/no)	–	–		X	RTW at 1 month
Coste <i>et al</i> ²²	8 (L)	Supervisor discouraged you from filing injury claim (yes/no)	–	X	X	Longer recovery Lost work time RTW at 6 months			
		Compensation status (yes/no)	✓	X	–				
		Perception of injury was source of compensation (yes/no)	X	✓	–				
Cats-Baril and Frymoyer ²¹	5 (L)	Lawyer had been contacted (yes/no)	–	–	X				

*Significant ($p < 0.05$) in univariate test comparing groups, such as t test or χ^2 analysis.

**Significant ($p < 0.05$) in multivariate test comparing groups, such as multiple regression or Cox hazard ratios.

†No further information presented in study.

‡Prognostic model tested to determine sensitivity, specificity or accuracy of predicting outcomes.

✓, tested and found significant, or used as part of tested predictive model; –, not assessed in this category (univariate testing not carried out, multivariate testing not carried out, predictive model not tested); X, tested and not found significant in predicting outcome, or not included in tested prognostic model.

Studies are listed in each section with highest methodological quality first. H, high quality study with quality score of 12 or greater out of 17; L, low quality study with quality score of 9 or less out of 17; M, medium quality study with quality score of 10 or 11 out of 17.

BP, back pain; DSM-III-R, Diagnostic and Statistical Manual of Mental Disorders, Third Edition, Revised; FABQ, Fear Avoidance Beliefs Questionnaire; RTW, return to work; WCB, Workers' Compensation Board.

detailed contents of the multiple item scales were not provided. A three-item scale measuring work-related recovery expectation has been examined and applied in a chronic NSLBP setting,^{49, 54} but further research is needed to determine the validity and reliability of single measures and scales measuring recovery expectations in non-chronic NSLBP.

While the best method of measuring recovery expectation requires further investigation, recovery expectation can provide an indication of whether psychosocial factors need to be addressed in the treatment of NSLBP. When a person indicates low expectations for recovery, it is likely they have synthesised a myriad of variables (personal, psychosocial and environmental) and have identified factors that may hinder their recovery and return to work. Low recovery expectations do not indicate which intervention is appropriate, but do invite a practitioner to investigate further the reasons why the person believes their recovery may be delayed.

Fear avoidance beliefs/behaviours

There is moderate evidence that fear avoidance beliefs are predictive of work outcome (table 4). Five out of eight studies found fear avoidance beliefs and behaviours to be a significant predictor of work-related outcome, two of which were of high methodological quality.^{32, 44} However, one high quality study³⁰ did not find fear avoidance beliefs significant when developing a clinical algorithm to predict work outcome.

Pain is a strong aversive stimulus, and fear of pain can result in avoidance of situations where pain may be induced.⁵⁵ Fear avoidance beliefs and behaviours are mediated by a worker's anticipation of how much pain a particular activity will produce, which tends to be greater than levels that are actually experienced.^{55–60} As a result, pain-related fear can lead to greater perceived disability, deconditioning and decreased functional performance.^{57, 59–61} The presence of fear avoidance beliefs and behaviours has been identified as a possible method of

Table 4 Levels of evidence for constructs as prognostic indicators for work outcome

Construct	Evidence level
Recovery expectation	++
Fear avoidance	+
Job satisfaction	--
Depression	--
Stress/psychological strain	--
Anxiety	-
Compensation	0
Locus of control	0

++, Strong evidence is predictor of work outcome; +, moderate evidence is a predictor of work outcome; 0, insufficient evidence is a predictor of work outcome; -, moderate evidence is not a predictor of work outcome; --, strong evidence is not a predictor of work outcome.

identifying people at risk of ongoing problems in the acute stages of injury.^{59 60 62 63}

The role of fear avoidance behaviours in chronic pain and in the transition from acute to chronic pain has been established in the literature,^{12 64 65} however the predictive role of fear avoidance is not clear in the acute stage. The review by Pincus *et al*⁶⁶ of prospective cohorts with acute low back pain found little evidence to link fear of pain with poor outcome. However, only two of the nine studies included by those authors measured work-specific outcomes and this may explain the contrast in findings to the current review. During the acute phase of NSLBP fear avoidance behaviours are a natural response to sensory information delivered to the central nervous system, and the presence of avoidant beliefs and behaviours could be considered a normal, protective response. However, poor prognosis could be related to an exaggerated level of pain-related fear in the acute stage, or the persistence of avoidant behaviours beyond an acute timeframe. The results of the present review indicate that assessing fear avoidance beliefs and behaviours may be useful in determining work prognosis in people with non-chronic NSLBP.

Similar to recovery expectations, the best method of measuring fear avoidance beliefs is not clear. The Fear Avoidance Beliefs Questionnaire (FABQ)⁵⁵ was the most commonly used measurement tool, but this method combines a mixture of psychosocial constructs. For example, the work subscale includes constructs of fear avoidance, injury compensation and recovery expectation. Psychosocial constructs are often difficult to isolate using questionnaires as many constructs have some overlap, underlining the importance of using appropriate tools to limit potential bias when measuring prognostic factors.¹⁹

Depression

There is strong evidence that depression is not predictive of work outcome in non-chronic NSLBP (table 4). While an association between depression and chronic pain has been established, it remains unclear whether depression can be considered a cause of long term disability or a consequence of it.⁶⁷ Depression can directly impact the outcome of rehabilitation programmes⁶⁸ and has been identified as contributing to work-related disability.⁶⁹⁻⁷¹ The review by Pincus *et al*¹¹ found distress (encompassing depressive symptoms, depressive mood and psychological distress) was a significant predictor of progression from acute to chronic low back pain, however none of the studies included by Pincus *et al* studied return to work as the outcome. The reviews by Steenstra *et al*¹⁵ and Truchon and Fillion⁴ both focused on work outcomes and found depression was not a useful indicator of longer absence. It is possible

depression is more likely to be a consequence of work disability rather than a cause and while depression may have a role in the development of chronic low back pain, depression does not predict ongoing work disability.

Stress and anxiety

There is strong and moderate evidence, respectively, that stress and anxiety are not predictive of work outcome in people with non-chronic NSLBP (table 4). Anxiety and stress have been closely linked to depression,^{57 58 72-74} and the increase in time pressure and job intensification in today's workforce has been shown to have an impact on the mental health of workers.^{57 72 73} High levels of stress and anxiety could further delay return to work as increased fatigue and high work demands may impact negatively on the worker's self-assessed ability to perform work tasks effectively,^{57 72} a major motivator when returning to work.^{75 76} Despite the potential for stress and anxiety to predispose a worker to longer work disability, stress and anxiety are not predictive of a poor work outcome in the non-chronic phase of NSLBP. The review by Linton *et al*¹³ found strong evidence to suggest stress increased the risk of future back pain, but reviews including a return to work outcome found little evidence for the predictive value of stress or anxiety,^{3 4 8 15} supporting the findings of the current review.

Job satisfaction

There is strong evidence that job satisfaction is not predictive of work outcome in non-chronic NSLBP (table 4). It may be postulated that low job satisfaction may predispose a worker to longer work absence by impacting on motivation to return to work. Other workplace factors, such as structure, work content and relationships with work colleagues, have also been identified as impacting on return to work. Social support, interaction with colleagues and the perception that work tasks are important appear to be particularly relevant.⁷⁵⁻⁷⁹ These aspects may have a greater positive effect on motivation to return to work than any negative influence of overall low job satisfaction. As a result, the level of job satisfaction does not appear to delay the return to work process.⁸⁰ The review by Truchon and Fillion,⁴ which included seven of the studies included in the current review, found mixed evidence that job satisfaction could predict functional outcome. The review by Linton,⁹ which included studies of acute and chronic NSLBP cohorts, found job satisfaction to be predictive of poorer outcome in all included studies except one examining return to work as the outcome, supporting the findings of the current review that job satisfaction is not predictive of work outcome in non-chronic NSLBP.

Compensation

There is insufficient evidence to conclude that compensation status is predictive of work outcome (table 4). Various compensation systems operate worldwide, and their effects on the return to work process are likely to be highly contextual. The current review includes studies from seven different countries and, given that systems of compensation can vary across regions within a country, more than seven systems are represented. The information provided in the included studies regarding the compensation systems in place was generally poor, making it difficult to compare studies on this variable. Regardless of the system in place, compensation can have therapeutic and anti-therapeutic impacts on return to work.⁸¹ While attempts have been made in different systems to remove

adversarial aspects of the compensation process, the legal contesting of claims still exists in some form or another across different systems.^{81 82} The consequences of compensation are complex and almost certainly have a psychosocial impact on a worker returning to work after injury,^{81 83} but the extent to which compensation affects return to work is likely to be specific to the system in place. Previous reviews of the literature have failed to find compensation status to be predictive of outcome,^{3 4 8-11 14 15} supporting the finding of the current review that there is insufficient evidence to determine whether compensation is predictive of work outcome in non-chronic NSLBP.

The aim of prognosis in NSLBP is to identify individuals at risk of poor outcomes early in the course of NSLBP in order to provide appropriate intervention and improve the outcome. A range of psychosocial constructs have been investigated, but according to the evidence from the current review only recovery expectation and fear avoidance beliefs are consistently predictive of poor work outcome. These two constructs should be measured early in the course of NSLBP to identify a worker at risk, however the best method of measuring these constructs cannot be determined from this review. Whatever method is chosen, simply measuring recovery expectations can alert the treating practitioner that the individual may be at risk of ongoing work disability. Early assessment provides the treating practitioner with an indication of whether any adjustment to the treatment plan is necessary. Whether this involves referral to another professional or simply allowing greater time to discuss the impact of NSLBP for the individual, earlier intervention means the risk of poor work outcome can at least be addressed.

Chronic NSLBP requires a different treatment approach to acute NSLBP, which has led to biopsychosocial and behavioural approaches to the treatment of back pain.^{84 85} One of the reasons a different approach is needed is that psychosocial factors become associated with ongoing disability. Since psychosocial factors can have a large impact on return to work after a back injury, examining psychosocial factors appears to be an important part of prognosis. Psychosocial factors, however, are not the only constructs to consider when determining which individuals are at risk of poor work outcome. Factors such as initial pain intensity,^{3 4 9 15} initial level of functional disability^{3 15} and work factors^{3 9 15} must also be considered. Examining recovery expectation and fear avoidance beliefs for prognosis of work outcome must be considered in light of these other factors.

Rationale for this review

More than 10 previous reviews on prognosis and NSLBP currently exist. The current review captures information from participants across the whole non-chronic phase of NSLBP, incorporates quality assessment when making decisions regarding the importance of each construct and contains minimal overlap from previous reviews, with only seven of the 24 included studies represented in previous reviews. As a result, the current review is a summary of new information in the arena of NSLBP prognosis regarding the predictive ability of commonly measured psychosocial constructs. Several of the previous reviews assessed the quality of included studies but did not incorporate quality assessment when drawing conclusions regarding the level of evidence for predictors of outcome,^{3 4 9} and others excluded studies from review according to quality criteria.^{7 10} The current review incorporated quality assessment when determining the level of evidence for each predictor in a

Main messages

- ▶ Recovery expectation and fear avoidance beliefs are predictive of work outcome in the non-chronic phase of NSLBP.
- ▶ Depression, job satisfaction, stress/psychological strain and anxiety are not predictive of work outcome in the non-chronic phase of NSLBP.
- ▶ Psychosocial assessment in the non-chronic phase of NSLBP to identify workers at risk of developing ongoing work disability should focus on recovery expectation and fear avoidance beliefs/behaviours.

Policy implications

- ▶ Measurement of psychosocial predictors of poor work outcome should focus on recovery expectations and fear avoidance beliefs in the non-chronic phase of non-specific low back pain (NSLBP). Other psychosocial constructs have little predictive value in the non-chronic phase.
- ▶ Recovery expectation can easily be included as part of routine early assessment of non-chronic NSLBP. Low expectations of recovery increase the risk of poor work outcome and flag the need for further assessment of psychosocial factors that may impact recovery.

manner similar to that of Steenstra *et al*¹⁵ and Hartvigsen *et al*,⁸ however Hartvigsen *et al* examined only psychosocial factors in the workplace. Steenstra *et al* examined any predictor of failure to return to work but only included studies with participants within 6 weeks of NSLBP onset.

Limitations of the current review

The strength of the current review is that the methodology closely follows the QUORUM guidelines for meta-analyses and systematic reviews.⁸⁶ The findings of the current review are limited to psychosocial predictors of work outcome in non-chronic NSLBP and do not address physical or environmental factors that may impact work outcome. The current review required baseline measures to be applied within 12 weeks of injury onset and therefore assumes all workers over this period have a similar chance of return to work. However, length of time off work itself is a potential confounder as a worker who has missed 1 week of work due to their injury has a better prognosis than a worker who has missed 12 weeks of work.^{4 5 12} The current review also assumes prognostic indicators are stable over the non-chronic phase of NSLBP, meaning a psychosocial construct has the same prognostic value at 1 week after injury as it does 12 weeks after injury. Again, this may not be the case.¹² However, the timing of the baseline measures of studies included in this review span the period described as non-chronic with no particular bias towards earlier or later prognostic indicators. Therefore the results of the review are likely to be generalisable across the non-chronic phase of NSLBP.

CONCLUSION

Strong evidence exists that recovery expectation is a predictor of work outcome and moderate evidence that fear avoidance beliefs are a predictor of work outcome in the non-chronic phase of NSLBP. Anxiety, depression, job satisfaction and

stress/psychological strain are not predictive of work outcome in non-chronic NSLBP. There is insufficient evidence that the effect of compensation is predictive of work outcome.

Recovery expectation is a construct that takes into account a myriad of variables that would otherwise be too difficult or time-consuming to measure, and filters them through the person's own beliefs and experiences. The importance of fear avoidance beliefs in chronic pain has been established and it appears these beliefs and behaviours also play an important role in the non-chronic phase of NSLBP and can assist in predicting work outcome. Recovery expectation and fear avoidance beliefs/behaviours are the psychosocial constructs of most value in guiding early intervention to prevent work disability due to NSLBP.

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- 8 health locus of control.mp. (277)
- 9 Personality/ (4269)
- 10 Personal Satisfaction/ (2389)
- 11 Psychological Tests/ (3909)
- 12 Anxiety/ (11 408)
- 13 Depression/ (16 941)
- 14 Avoidance Learning/ (3975)
- 15 fear avoidance.mp. (105)
- 16 FABQ.mp. (16)
- 17 fear avoidance beliefs questionnaire.mp. (15)
- 18 fear avoidance beliefs.mp. (59)
- 19 yellow flags.mp. (11)
- 20 (psychosocial and risk factors).mp. [mp = title, original title, abstract, name of substance word, subject heading word] (3161)
- 21 (SOPA and questionnaires).mp. [mp = title, original title, abstract, name of substance word, subject heading word] (1)
- 22 (orebro and questionnaires).mp. [mp = title, original title, abstract, name of substance word, subject heading word] (28)
- 23 tampa scale of kinesiophobia.mp. (8)
- 24 (tampa and questionnaires).mp. [mp = title, original title, abstract, name of substance word, subject heading word] (23)
- 25 kinesiophobia.mp. (37)
- 26 (pain vigilance and awareness questionnaire).mp. [mp = title, original title, abstract, name of substance word, subject heading word] (2)
- 27 pain catastrophizing scale.mp. (26)
- 28 pain catastrophizing scale.mp. (2)
- 29 pain anxiety symptoms scale.mp. (17)
- 30 pain coping questionnaire.mp. (5)
- 31 Coping strategies questionnaire.mp. (82)
- 32 (CSQ and questionnaires).mp. [mp = title, original title, abstract, name of substance word, subject heading word] (57)
- 33 ways of coping questionnaire.mp. (46)
- 34 (DRAM and questionnaires).mp. [mp = title, original title, abstract, name of substance word, subject heading word] (4)
- 35 zung depression.mp. (74)
- 36 (zung and questionnaires).mp. [mp = title, original title, abstract, name of substance word, subject heading word] (91)
- 37 (depression and questionnaires).mp. [mp = title, original title, abstract, name of substance word, subject heading word] (7336)
- 38 somatisation.mp. (136)
- 39 somatization.mp. (1090)
- 40 MSPQ.mp. (7)
- 41 pain catastrophizing scale.mp. (2)
- 42 pain catastrophizing scale.mp. (26)
- 43 "distress and risk assessment method".mp. (8)
- 44 pain catastrophizing scale.mp. (26)
- 45 McGill pain questionnaire.mp. (423)
- 46 (MPQ and questionnaires).mp. [mp = title, original title, abstract, name of substance word, subject heading word] (65)
- 47 "pain stages of change questionnaire".mp. (15)
- 48 (PSOCQ and questionnaires).mp. [mp = title, original title, abstract, name of substance word, subject heading word] (9)
- 49 "pain vigilance and awareness questionnaire".mp. (2)
- 50 (nonorganic sign\$ or waddel\$ sign\$).mp. (31)
- 51 pain drawing.mp. (61)
- 52 symptom distress.mp. (322)
- 53 symptom distress scale.mp. (60)
- 54 MMPI/ (881)
- 55 guarding.mp. (361)
- 56 Self Efficacy/ (3225)
- 57 (self efficacy and questionnaires).mp. [mp = title, original title, abstract, name of substance word, subject heading word] (1770)
- 58 work APGAR.mp. (4)
- 59 or/1–58 (132 409)
- 60 back pain.mp. or exp back pain/ (11 447)
- 61 low back pain.mp. or exp low back pain/ (6960)
- 62 back injuries.mp. or exp back injuries/ (5159)
- 63 exp Spinal Stenosis/ (1133)
- 64 exp Sciatica/ (798)
- 65 exp Intervertebral Disk Displacement/ (3075)
- 66 exp Spondylolisthesis/or exp Spinal Diseases/or exp Spinal Injuries/or exp Spondylolysis/ (23 350)
- 67 or/60–66 (32 702)
- 68 exp Employment/ (15 597)

APPENDIX

Medline search strategy

- 1 biopsychosocial.mp. (916)
- 2 psychosocial.mp. [mp = title, original title, abstract, name of substance word, subject heading word] (17 625)
- 3 Psychological Techniques/or Feedback, Psychological/or Adaptation, Psychological/or Stress, Psychological/or Psychological Tests/ (42 367)

- 69 work status.mp. (385)
 70 return to work.mp. (1725)
 71 exp Sick Leave/ (1286)
 72 sick list\$.mp. (153)
 73 exp absenteeism/ (1597)
 74 time off work.mp. (205)
 75 or/68–74 (19 438)
 76 59 and 67 and 75 (189)
 77 exp Social Problems/or exp Social Perception/or exp Social Values/or exp Social Adjustment/or exp Social Change/or exp Social Conditions/or exp Social Environment/or social.mp. or exp Social Class/or exp Psychology, Social/or exp Social Alienation/or exp Social Facilitation/or exp Hierarchy, Social/or exp Social Medicine/or exp Social Behavior/ (313 057)
 78 59 or 77 (384 247)
 79 78 and 67 and 75 (290)
 80 limit 79 to “prognosis (sensitivity)” (129)
 81 exp Job Satisfaction/or exp Workplace/or work environment.mp. (11 313)
 82 78 or 81 (389 923)
 83 82 and 67 and 75 (356)
 84 limit 83 to “prognosis (sensitivity)” (143)

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