

Listening to injured workers: how recovery expectations predict outcomes — a prospective study

Donald C. Cole,^{*†} Michael V. Mondloch,^{*} Sheilah Hogg-Johnson,^{*†}
for the Early Claimant Cohort Prognostic Modelling Group[‡]

Abstract

Background: Rigorous evidence on factors affecting the prognosis of work-related soft-tissue injuries remains limited. Although shown to be important for a wide variety of clinical conditions, recovery expectations have rarely been assessed as prognostic factors for workers with soft-tissue injuries. We examined the predictive role of various measures of recovery expectations among workers with injuries resulting in time off work.

Methods: We identified a prospective cohort of 1566 injured workers shortly after they filed a claim for their injury with the Ontario Workers' Compensation Board (OWCB). They had soft-tissue injuries to the back or upper or lower extremities, had new, lost-time claims from May to November 1993 and were still off work at the time of the first interview. We interviewed participants by telephone within 3 weeks after the injury and measured their recovery expectations (perceptions regarding progress, expected change in condition, expected time until return to usual activities and expectations regarding return to usual job) along with other, potentially important prognostic factors. The primary outcome was total time receiving 100% wage-replacement benefits during the year following injury, obtained from OWCB administrative files. Self-reported measures of pain, health-related quality of life and functional status, obtained up to 4 times during the year following injury, were both independent predictors and secondary outcomes.

Results: The 4 measures of recovery expectations together explained one-sixth of the variation in time receiving benefits. All but expectations regarding return to usual job were individually predictive of time receiving benefits. Judging one's recovery as much better than expected resulted in a 30% (95% confidence interval [CI] 9%–46%) faster rate of stopping receiving benefits (and likely returning to work) compared with judging one's recovery as much worse than expected. Similarly, participants who expected to return to usual activities within 3 weeks had a 37% (95% CI 26%–47%) faster rate of stopping receiving benefits than those who responded "Don't know" to this question, and participants who stated that they were fully recovered or would get better soon had a 25% (CI 5%–40%) faster rate than those who thought they would never get or stay better. Positive recovery expectations were also associated with reductions in pain grade and improvement in functional status outcomes.

Interpretation: Expectations regarding recovery may provide useful information on the complex process of recovering from work-related soft-tissue injuries. For clinicians, patients' negative or uncertain expectations may indicate the need for further probing and intervention on psychosocial factors to facilitate recovery.

Injuries that do not result in fractures or dislocations, often called soft-tissue injuries, may have a highly variable clinical course, from rapid resolution to chronic persistence. When the soft-tissue injuries are judged to be work-related, this variability can become stressful for the patient, the physician and workers' compensation authorities. Since soft-tissue injuries account for the vast majority of lost-time workers' compensation claims in Canada,¹ better evidence for important prog-

Research

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From ^{*}the Institute for Work & Health, Toronto, Ont., and [†]the Department of Public Health Sciences, Faculty of Medicine, University of Toronto, Toronto, Ont.

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‡A list of members of the group appears at the end of the article.

nostic factors is sorely needed.^{2,3} Whereas job demands and severity of injury, pain and functional impairment may be obvious prognostic factors for most clinicians, psychosocial factors may be more difficult to grapple with.⁴

Among psychosocial factors, patients' concerns about "ability to manage at work" were found to be independently predictive of work status at 1 year among patients with chronic low-back pain.⁵ Yet little other high-quality scientific evidence on the prognostic significance of recovery expectations exists for patients with soft-tissue injuries, as documented in a recent systematic review of the prognostic role of patients' recovery expectations across a wide variety of clinical conditions.⁶ Hence, we examined the predictive role of various measures of recovery expectations in a prospective cohort of workers with injuries resulting in time lost from work. We hypothesized that injured workers with more positive expectations would stop receiving wage-replacement benefits (i.e., return to work) sooner and report better health-related outcomes (e.g., reduced pain) than workers with less positive expectations.

Methods

The Ontario-wide cohort of injured workers with lost-time claims for soft-tissue disorders was part of a larger program evaluation,⁷ conducted in conjunction with the Ontario Workers' Compensation Board (OWCB) (now the Workplace Safety & Insurance Board). Since the OWCB has the statutory authority to ask claimants about relevant issues in order to inform program and policy development, the study protocol did not undergo external ethical review. However, all respondents were free to decline participation and were assured that participation status would not affect their access to OWCB services. Furthermore, confidentiality of their individual responses was guaranteed, with only aggregate data from analyses provided to the OWCB. The sampling strategy, eligibility criteria and participation rates are described in detail elsewhere.⁸

Potential participants were identified shortly after claim registration with the OWCB ($n = 12\ 182$). They were screened for eligibility through review of their claim file. To be eligible, participants had to have a soft-tissue injury to the back or upper or lower extremity, have a new, lost-time workers' compensation claim from May to November 1993 and still be off work at the time of the first interview. A total of 5866 claimants were ineligible. The remaining 6316 workers were telephoned within 21 days after the injury to explain the study and obtain informed consent; 3381 people could not be contacted, and 1102 people refused to participate. Refusers were more likely to be male, to earn more, to be employed by a large, self-insured employer and to have shorter duration of benefits than participants. Subsequently excluded were 259 people who had already returned to work or whose claim was a reopening of one registered within the previous 30 days, and 8 people with very incomplete baseline information. Thus, included in the present analysis were 1566 people with new claims who were still off work at the time of first interview. Most of the participants (62.4%) had demographic, employment and claim characteristics that were remarkably similar to those of all OWCB claimants with soft-tissue injuries.⁸ Intentional undersampling of men resulted in relatively equal numbers of women and

men in the cohort. Repeated telephone contacts were made 4, 16 and 52 weeks after the injury.

We measured the participants' recovery expectations using several questions adapted from previously published questions^{9,10} or developed de novo based on concepts arising out of qualitative work.¹¹ Questions were designed to be relatively neutral with respect to the determinants of recovery expectations in order to allow injured workers to take "all things into consideration." Two questions addressed clinical course. The first focused on whether the patient was progressing as he or she expected,⁹ and the second focused on expected change in the injury or condition.¹⁰ Two questions addressed future functioning. The first asked the expected time until return to usual activities,¹⁰ and the second, whether the patient expected to return to his or her usual job.¹¹

We examined 4 key outcomes. The cumulative number of calendar days during which the worker received 100% benefits within the year after the injury came from the OWCB benefits database and was therefore available for all participants. Pain was measured with the use of the Chronic Pain Grade,¹² modified to a suitable time frame. Generic health-related quality of life was measured with the use of the 36-item Short Form Medical Outcomes Survey (SF-36).^{13,14} Injury-specific or body-area-specific functional status was measured with the use of the modified American Shoulder and Elbow Surgeons instrument for upper extremity injuries,¹⁵ the Western Ontario McMaster instrument for lower extremity injuries¹⁶ and the Roland instrument for back problems.¹⁷

A wide variety of clinical, demographic, work-related and other variables may hypothetically affect both injured workers' expectations of recovery and outcomes.¹⁸ Among clinical factors we included pain grade, health-related quality of life, functional status and the presence of serious coexisting conditions (measured on the baseline interview). Demographic factors included sex, income, marital status and age. Work-related factors included industrial sector, job heaviness/demands according to the National Occupation Classification^{19,20} and offers of workplace accommodation to facilitate return to work.

We conducted analyses in 3 stages. First, to refine the recovery expectation information, we used descriptive statistics and tests of association across measures, including χ^2 tests and Cramer's V, a measure of association for nominal level data. There were significant statistical associations among the 4 questions (χ^2 tests, all p values < 0.001). However, because the associations were weak (Cramer's V range 0.09–0.24) we included all the questions in the multivariable analyses.

Second, to estimate the relation between recovery expectations and total time receiving benefits, we included the recovery expectation questions as explanatory variables in a Cox regression analysis and adjusted for the potential confounding effects of clinical, demographic and work-related variables ($n = 1332$ with complete information). Adjustment resulted in loss of significance of the "Don't know" category in the question regarding expectations to return to one's usual job. Results are reported with hazard rate ratios or the ratio of the instantaneous conditional rate of stopping receiving benefits at any particular time. To gauge the relative importance of the 4 recovery expectation variables, as measured by percentage of explained variation in time receiving benefits, we carried out calculations using the method described by Schemper.²¹ Marginal effects describe the percentage of variation explained in separate regressions for each prognostic factor. Partial effects describe the increase in the percentage of variation explained by including the factor in a regression model that already includes the other prognostic factors. Variation explained

by marginal and partial effects were as follows: perceptions regarding progress: 8.1% marginal effects, 3.0% partial effects; expected change in condition: 6.1% and 1.2% respectively; expected time until return to usual activities: 9.2% and 3.4% respectively; and expectations regarding return to usual job: 2.5% and 0.7% respectively. Expectations regarding return to usual job accounted for significantly less variation than perceptions regarding progress

or expected time to return to usual activities ($t > 2.56$, $p < 0.05$). When we analyzed each of the 4 variables individually, expectations regarding return to usual job explained less variation than the other variables ($t > 2.76$, $p < 0.05$). None of the other differences was statistically significant.

Third, among the participants with complete data, we examined the relations between initial expectations regarding recovery

Table 1: Characteristics of 1566 workers with soft-tissue injuries and associated time receiving benefits

Characteristic	No. (and %) of workers	Median time receiving benefits, d	Characteristic	No. (and %) of workers	Median time receiving benefits, d
DEMOGRAPHIC			Offers of workplace accommodation		
Age, yr			Yes	250 (16.0)	47
≤ 29	359 (22.9)	46	No	1313 (83.8)	57
30–39	509 (32.5)	55	Missing data	3 (0.2)	–
40–49	396 (25.3)	61	CLINICAL		
≥ 50	301 (19.2)	60	Serious coexisting condition		
Missing data	1 (0.1)	–	Yes	183 (11.7)	55
Sex			No	1382 (88.2)	55
Male	794 (50.7)	50	Missing data	1 (0.1)	–
Female	772 (49.3)	61	Recurrence		
Marital status			Yes	389 (24.8)	65
Married/common-law	1019 (65.1)	56	No	1157 (73.9)	53
Single (never married)	330 (21.1)	47	Missing data	20 (1.3)	–
Widowed/divorced	204 (13.0)	68	Pain grade at baseline*		
Missing data	13 (0.8)	–	1st quartile (0–16.7)	439 (28.0)	84
Education			2nd quartile (16.7–26.6)	290 (18.5)	59
No high school diploma	580 (37.0)	61	3rd quartile (26.6–33.4)	438 (28.0)	54
No advanced degree	676 (43.2)	54	4th quartile (33.4–100)	374 (23.9)	38
Advanced degree	290 (18.5)	54	Missing data	25 (1.6)	–
Missing data	20 (1.3)	–	Functional status by body area at baseline		
Household income, \$			<i>Western Ontario McMaster instrument (lower extremity injuries)* n = 261</i>		
< 20 000	162 (10.3)	61	1st quartile (0–25.9)	61 (23.4)	85
20 000–40 000	504 (32.2)	58	2nd quartile (25.9–39.1)	62 (23.8)	55
40 001–60 000	344 (22.0)	53	3rd quartile (39.1–53.7)	60 (23.0)	41
> 60 000	222 (14.2)	53	4th quartile (53.7–100)	61 (23.4)	41
Missing data	334 (21.3)	–	Missing data	17 (6.5)	–
WORK-RELATED			<i>American Shoulder and Elbow Surgeons instrument (upper extremity injuries)* n = 420</i>		
Industry sector			1st quartile (0–25.9)	103 (24.5)	73
Agriculture, forestry, mining	13 (0.8)	82	2nd quartile (25.9–40.7)	97 (23.1)	56
Construction	75 (4.8)	70	3rd quartile (40.7–59.3)	114 (27.1)	57
Public administration, defence	126 (8.0)	45	4th quartile (59.3–100)	103 (24.5)	40
Transportation, communications	139 (8.9)	47	Missing data	3 (0.7)	–
Trade, finance, insurance	304 (19.4)	52	<i>Roland instrument (back problems)* n = 885</i>		
Manufacturing	386 (24.6)	61	1st quartile (0–8.7)	279 (31.5)	86
Community, business, service	474 (30.3)	61	2nd quartile (8.7–17.4)	206 (23.3)	64
Missing data	49 (3.1)	–	3rd quartile (17.4–30.0)	179 (20.2)	53
Job heaviness			4th quartile (30.0–100)	220 (24.8)	35
Limited	201 (12.8)	58	Missing data	1 (0.1)	–
Light	414 (26.4)	56			
Medium	536 (34.2)	58			
Heavy	325 (20.8)	48			
Missing data	90 (5.7)	–			

*Scaling such that the higher the score, the lower the pain or disability.

ery and changes in pain grade ($n = 704$), SF-36 scores ($n = 706$) and functional status ($n = 701$). Loss to follow-up varied across baseline response categories of expected change in condition, with greater loss of patients who responded that they did not know the future course of their condition and less loss of patients who expected to not get better ($p < 0.05$). Loss to follow-up was not associated with responses to the other baseline measures of recovery expectations (all p values > 0.05). We evaluated relations between initial recovery expectations and changes in health outcomes using the interaction terms between time and baseline recovery expectations from multivariable repeated-measures analysis of variance, with separate analyses of variance for each outcome.

Results

The personal, work-related and clinical characteristics of the cohort are presented in Table 1. The injury was a new one for the vast majority of participants. The median time receiving wage-replacement benefits, and therefore off work, was 55 days. The participants lost to telephone follow-up at 52 weeks ($n = 611$ [39%]) had a lower mean duration receiving benefits and a higher mean baseline score on the physical dimensions of the SF-36 than those not lost to follow-up, which indicates a selection bias toward inclusion of those worse off in the analyses of changes in pain grade and functional status.

Table 2: Responses at the initial interview to questions regarding recovery expectations and role of the responses as predictors of stopping receiving 100% wage-replacement benefits*

Question	No. of workers	Adjusted hazard rate ratio (and 95% CI)†
Overall, is your injury better or worse than you expected it to be at this point? [Clarified as to somewhat better/worse or much better/worse than expected]		
Much better	134	1.00
Somewhat better	471	0.95 (0.77–1.18)
As expected	146	0.66 (0.50–0.86)
Somewhat worse	518	0.74 (0.59–0.93)
Much worse	247	0.70 (0.54–0.91)
Missing data	50	
Do you think you will recover enough to return to your usual job?		
Yes	1304	1.00
No	85	1.05 (0.81–1.35)
Don't know	163	0.84 (0.70–1.01)
Missing data	14	
Taking into account what you have been told about your injury, do you think that it will get better soon, get better slowly, never get better, get worse, or would you say that you have fully recovered?		
Better soon/fully recovered	324	1.00
Better slowly	825	0.85 (0.73–0.99)
Don't know future course	275	0.74 (0.61–0.90)
Never get/stay better	133	0.75 (0.60–0.95)
Missing data	9	
How long do you think it will take for you to return to your usual activities? [Options: __days, __weeks, __months, __years, never, already returned to usual activities]		
< 3 wk	301	1.00
≥ 3 wk	211	0.71 (0.58–0.86)
Don't know	1049	0.63 (0.53–0.74)
Missing data	5	

*Cox proportional hazards model.

†Adjusted for variables other than those regarding recovery expectations: current level of pain, health-related quality of life, functional status, presence of serious coexisting conditions, sex, income, marital status, age, workplace accommodation and job heaviness. Decreasing value indicates less likelihood of stopping receiving benefits and returning to work. For example, compared with workers who reported that their recovery was much better than expected (hazard rate ratio arbitrarily set at 1), those who reported much worse progress had a hazard rate ratio of 0.70, indicating that they stopped receiving benefits (and likely returned to work) $1.00 - 0.70 = 30\%$ (95% confidence interval 9%–46%) slower than those who reported much better progress. Conversely, those who reported much better than expected recovery stopped receiving benefits (and likely returned to work) 30% faster than those who reported much worse progress.

At the first telephone interview, more participants thought they were progressing worse than expected ($n = 765$) than better than expected ($n = 605$), and most participants ($n = 825$) thought they would get better slowly (Table 2). About two-thirds of the participants responded "Don't know" to the question regarding expected time until return to usual activities. Despite such uncertainty over the duration of their problems, over three-quarters of the participants thought they would recover enough to return to their usual job.

Together, the 4 recovery expectation variables explained 15.5% of the variation in time receiving benefits. In other words, knowing a worker's expectations would reduce a clinician's prognostic uncertainty by about one-sixth. Expectations regarding return to usual job accounted for the least variation. Three of the 4 variables (perceptions regarding progress, expected change in condition and expected time until return to usual activities) were significant predictors of time receiving benefits, even after variables other than those regarding recovery expectations were adjusted for (Table 2). In general, workers' expectations of slower recovery or greater uncertainty were consistently associated with longer periods off work and receiving wage-replacement benefits.

Injured workers started with relatively similar levels of pain across different recovery expectation categories. Nevertheless, over time, those who expected to return to their usual activities in less than 3 weeks showed the greatest reduction in pain severity by 4 weeks, and their pain levels remained lower at the end of the year than those of the participants who responded that they did not know when they would be able to return to usual activities ($p = 0.007$) (Fig. 1). Positive recovery expectations, as indicated by the response "Much better" on the question regarding progress ($p = 0.012$) and "Get better soon" on the question regarding expected change in condition ($p < 0.001$), were also associated with reductions in reported pain levels over time. More rapid and greater improvement among participants with more positive expectations regarding progress, return to usual job and change in condition than among those with more negative expectations was also noted for injury-specific functional status measures and the physical component of the SF-36 score but not the mental component of the SF-36 score.

Interpretation

For 3 of 4 measures of injured workers' recovery expectations, workers with more positive expectations spent less time off work and receiving workers' compensation benefits than those with more negative expectations, even when we controlled for other suspected prognostic factors.¹⁸ These findings suggest that recovery expectations are not simply an indirect measure of other factors but that they have a direct influence on the recovery process. Our study provides strong evidence regarding this relation according

to quality criteria for prognostic studies.²² Our results are consistent with the 1 other prospective study of adequate methodologic quality.⁵

Despite these strengths, some caveats remain. Stopping receiving 100% wage-replacement benefits may not always be associated with return to work, as other administrative reasons may arise (e.g., noncooperation with medical treatment or with return to work plans). With respect to self-reported outcomes (pain grade, functional status and the physical component of the SF-36 score), loss to follow-up was substantial. For one of the recovery expectation questions, loss to follow-up was associated with baseline values, which indicated a selection bias. Potential differences in the "administrative" (i.e., the OWCB view) and "clinical" course of compensable soft-tissue injuries may not be fully documented here, although the similar role of injured workers' expectations in predicting recovery for both sets of outcomes is reassuring. Furthermore, an important number of injured workers were uncertain about their recovery. Future research into how recovery expectations are established would be useful. The limited associations between the various measures of recovery expectations and their independent explanation of various health outcomes suggest that the questions were not equivalent and did not represent a single construct. Some of these differences may be due to how the responses were scaled. For example, the lack of prediction by the variable "expectations regarding return to usual job" may have been due to the limited range of responses possible (3 versus 5 for progressing as expected [Table 2]). Alternatively, such a question may be more useful later on in the recovery process, when recovering workers are more open

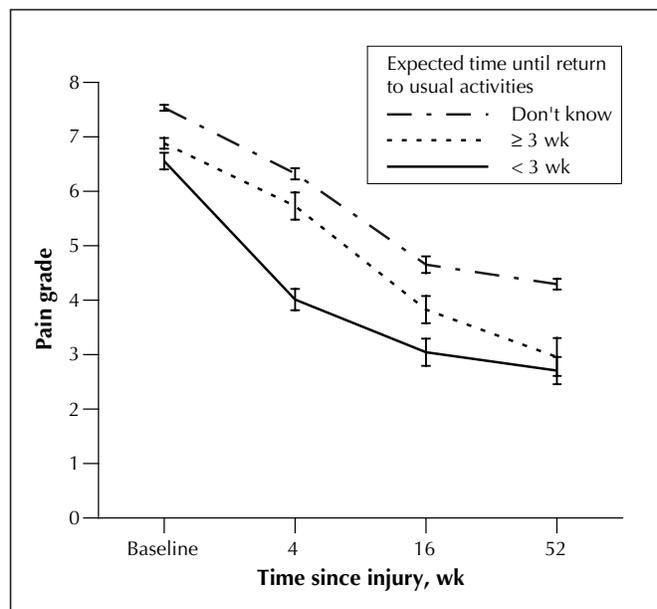


Fig. 1: Mean pain grade at baseline and during the year following injury for workers with soft-tissue injuries, as a function of expected time until return to usual activities (measured at baseline). Error bars represent 95% confidence intervals.

to returning to work. Reliability testing of the questions has not been done and may be difficult given the time-varying nature of recovery expectations. Nor has validity testing been carried out to assess overlap with other constructs in the recovery expectations literature¹ or with fear-avoidance beliefs.²³ Hence, further refinements of the questions to include comparable scaling and reliability and validity testing are warranted. Trials of assessment and counselling interventions to modify expectations and improve outcomes could then be conducted to test experimentally the role of changed recovery expectations.

Although injured workers may largely be reflecting prognostic information that their treating clinician has shared with them, they may also be providing their judgement of a variety of relevant factors. In the clinical setting, patients' recovery expectations may indicate the need for further probing of the unique constellation of factors — personal, social and work-related — that contribute to a person's recovery. Clinicians should thus explore potential barriers to recovery among injured patients who expect that recovery will be slow, who feel they are not doing as well as they had expected or who are uncertain regarding their eventual return to work. Listening to injured workers' expectations may not only be therapeutic in the clinician–patient encounter but also uncover barriers to return to work that the patient and the physician could deal with together.²⁴

Competing interests: None declared.

Contributors: Drs. Cole and Mondloch were responsible for conceiving the study, collecting, analyzing and interpreting the data, and writing and revising the manuscript. Dr. Hogg-Johnson was responsible for conceiving and designing the study, interpreting the data and revising the manuscript.

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Correspondence to: Dr. Donald C. Cole, Institute for Work & Health, 800-481 University Ave., Toronto ON M5G 2E9; dcole@iwh.on.ca

Members of the Early Claimant Cohort Prognostic Modelling Group: Dorcas E. Beaton, St. Michael's Hospital and Institute for Work & Health, Toronto, Ont.; Claire Bombardier, Institute for Work & Health; Ann-Sylvia Brooker, Institute for Work & Health; Judy Clarke, Institute for Work & Health; John W. Frank, Department of Public Health Sciences, University of Toronto, and Institute for Work & Health; Hassan Haidar, Celestica, Toronto, Ont.; Robert Marx, Hospital for Special Surgery, New York, NY; Harry S. Shannon, McMaster University, Hamilton, Ont., and Institute for Work & Health; Susanne Shields, Health Canada, Ottawa, Ont.; Sandra Sinclair, Institute for Work & Health; and Jonathan Smith, Health Canada, Ottawa, Ont.