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Beliefs about back pain predict the recovery rate over 52 consecutive weeks

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Objectives This study examined the course of low-back pain over 52 weeks following current pain at baseline. Initial beliefs about the inevitability of the pain's negative consequences and fear avoidance beliefs were examined as potential risk factors for persistent low-back pain.

Methods On a weekly basis over a period of one year, 264 participants reported both the intensity and frequency of their low-back pain and the degree to which it impaired their work performance. In a multilevel regression analysis, predictor variables included initial low-back pain intensity, age, gender, body mass index, anxiety/depression, participation in sport, heavy workload, time (1–52 weeks), and scores on the “back beliefs” and “fear-avoidance beliefs” questionnaires.

Results The group mean values for both the intensity and frequency of weekly low-back pain, and the impairment of work performance due to such pain showed a recovery within the first 12 weeks. In a multilevel regression of 9497 weekly measurements, greater weekly low-back pain and impairment were predicted by higher levels of work-related fear avoidance beliefs. A significant interaction between time and the scores on both the work-related fear-avoidance and back beliefs questionnaires indicated faster recovery and pain relief over time in those who reported less fear-avoidance and fewer negative beliefs.

Conclusions Negative beliefs about the inevitability of adverse consequences of low-back pain and work-related fear-avoidance beliefs are independent risk factors for poor recovery from low-back pain.

Key terms low-back pain; back pain belief; multilevel model; work performance.

Patients with non-specific, low-back pain often believe that certain negative consequences of the pain are inevitable and that work, activity, and exercise may cause pain (1, 2). The belief that normal daily activities are likely to cause intense back pain facilitates avoidance of these activities. Consequently, fear-avoidance behavior may result in immobility that then leads to disability (2). Such negative beliefs may, therefore, represent risk factors for the transition from acute to persistent low-back pain (3, 4).

Three important reviews examining the scientific evidence for the fear-avoidance model of low-back pain have delivered contradictory conclusions concerning the role of pain-related fear as a risk factor for the transition from acute to chronic low-back pain. The first review

by Vlaeyen & Linton (5) was positive about the model, while a later review by Pincus et al concluded that there was insufficient evidence for its support (6); the most recent review by Leeuw et al (7) revealed that there is now a stronger evidence base in favor of the model. By following recovery after an episode of low-back pain in greater depth, our study attempts to shed light on the factors influencing the transition from current to chronic pain. Recently, a review on psychosocial predictors of return to work in non-chronic, non-specific low-back pain indicated that fear-avoidance beliefs had moderate prognostic value, and that expectations about recovery were strongly predictive (8). Recovery expectations represent one aspect of beliefs about the persistence and recurrence of low-back pain [ie, about the inevitability

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of the consequences of the pain, which itself was shown to be an important predictor of low-back pain in an earlier study (1)]. In this study, we examine whether both fear-avoidance beliefs and beliefs regarding the inevitability of the future as a consequence of having low-back pain (“back beliefs”) are able to predict the speed of recovery from low-back pain in a population-based sample.

The process of recovery from low-back pain is often only studied using one or two follow-up measurements; recovery is estimated as an interpolated process that is not really described in terms of important features such as continuity and time to reach baseline pain values. Therefore, this study included weekly measures across one year.

We sought to examine whether beliefs independently predicted persistent or recurrent pain in individuals who were not hospitalized for low-back pain but who were suffering from an episode of such pain at the start of the study. The expectation was that negative beliefs at baseline would correspond to more intense pain and impairment throughout the study (hypothesis 1), and that recovery over the 52 week period would be delayed or fail to occur at all in those who reported more negative beliefs (hypothesis 2).

Study population and methods

Sample

Participants of this study were randomly selected individuals taking part in a population-based, cross-sectional study of musculoskeletal health in Switzerland (9). Of 23 673 individuals selected for participation between November 2002 and June 2003, complete datasets were acquired for 16 634 subjects (70% participation rate). From January to April 2005, 2860 randomly selected individuals were contacted by telephone to request their consent to be sent a follow-up questionnaire. The first 400 consecutive individuals who reported having current, low-back pain and agreed to participate in the main questionnaire study were also invited to participate in a year-long, in-depth study of the course of low-back pain.

Figure 1 shows the detailed flow of participants through the study. The final sample consisted of 264 participants. The duration of the baseline low-back pain episode was <4 weeks (acute low-back pain) in 63.1% of participants, and <3 months (sub-acute) in 15.5% of participants. In 21.6% of the cases, the baseline low-back pain had lasted >3 months, fulfilling the time-bound

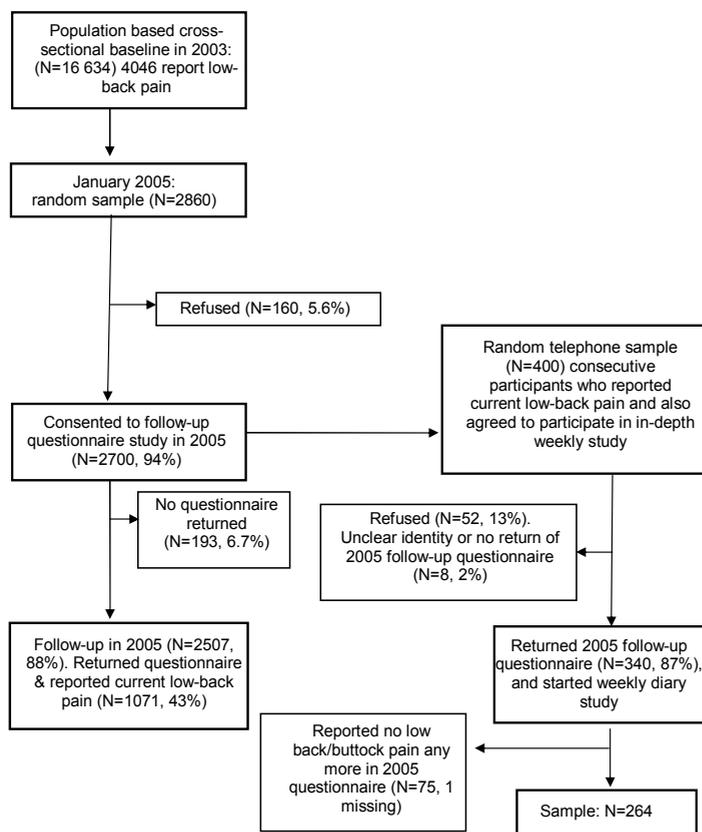


Figure 1. Study participants sample flow.

criterion of chronic pain (10). Table 1 gives an overview of the characteristics of the study sample.

Data collection

In week one, all participants were sent a comprehensive questionnaire inquiring about demographics, low-back pain in the last four weeks (ie, baseline low-back pain), participation in sport, heavy workload, anxiety/depression, beliefs about the inevitability of negative consequences of low-back pain [the back beliefs questionnaire (1)], and fear-avoidance beliefs [fear-avoidance beliefs questionnaire (2)]. See below for further details on the beliefs questionnaires. Each week of the following year, the participants completed a one-page diary, documenting both the intensity and frequency of their back pain, and whether it impaired work performance. Back pain intensity in the last week was measured with one item on a seven-point adjectival scale (0 = none; 6 = very severe). The item on frequency of pain in the last week was measured on a five-point scale (“never”, “once a week”, “2-3 times a week”, “daily”, and “always”). The item on impaired work performance enquired: “how severe was the impairment of your work performance (including work in the home) because of your back pain?” Responses were marked on an 11-point scale (0 = 0%; 10 = 100%).

Baseline low-back pain was assessed with a single item: “how much pain have you experienced in the following body regions [lower back and buttock region from Müller et al (9)] during the last four weeks? Participants responded on a 7-point scale (0 = no pain; 6 = intolerable pain). Anxiety/depression was assessed by an item from the EuroQol (EQ-5D) questionnaire (11). The item is a self-classifier with respect to anxiety/depression: 0 = “I am not anxious or depressed”, 1 = “I am moderately anxious or depressed”, or 2 = “I am extremely anxious or depressed”. Participation in sport was also assessed with a single item question: “do you do any sports?” with two response options (0 = no, 1 = yes). Heavy workload was assessed using a single item from the physical demands scale of Rossignol (12): “does your work include frequent handling of heavy loads like lifting or carrying persons or heavy objects such as furniture?” (0 = no, 1 = yes).

Symonds et al developed the validated, self-report back beliefs questionnaire, which measures an individual’s beliefs regarding the inevitability of the future as a consequence of experiencing low-back pain (1). Respondents are asked to indicate on a 7-point scale (1 = completely disagree; 7 = completely agree) whether they agree or disagree with each of the nine statements regarding the inevitability of the future as a consequence of having back pain. The total score, ranging from 9–63, was adjusted to a scale ranging from 0–100 by applying

Table 1. Sample characteristics as recorded in 2005. (BMI = body mass index)

Characteristic	N	%	Mean	SD	Percentile		
					25 th	50 th	75 th
Females	142	53.8	.	.	.	.	.
Swiss citizenship	248	93.9	.	.	.	.	.
Age (years)	.	.	51.6	15.2	.	.	.
BMI (kg/m ²)	.	.	24.9	4.6	.	.	.
Underweight (BMI <18.5 kg/m ²)	7	2.7	.	.	.	.	.
Overweight (BMI >25 kg/m ²)	110	41.6	.	.	.	.	.
Education							
Compulsory education	39	14.8	.	.	.	.	.
Apprenticeship	129	48.9	.	.	.	.	.
Apprenticeship and further education	23	8.7	.	.	.	.	.
Advanced technical education	43	16.3	.	.	.	.	.
University	30	11.4	.	.	.	.	.
Work status							
Full- or part-time	187	70.8	.	.	.	.	.
Retired	49	18.6	.	.	.	.	.
Other	28	10.6	.	.	.	.	.
Baseline low-back/buttock pain							
0=No pain	–	–	.	.	.	.	.
1	38	14.4	.	.	.	.	.
2	65	24.6	.	.	.	.	.
3	76	28.8	.	.	.	.	.
4	57	21.6	.	.	.	.	.
5	23	8.7	.	.	.	.	.
6=Unbearable pain	5	1.9	.	.	.	.	.
Visit to general practitioner because of back pain in last 4 weeks	34	12.9	.	.	.	.	.
Back beliefs	.	.	31.0	10.9	.	.	.
Fear-avoidance beliefs							
Work	.	.	18.1	11.1	.	.	.
Physical activity	.	.	14.5	5.8	.	.	.
EuroQol anxiety/depression	.	.	0.3	0.5	.	.	.
Involvement in sport (0 = no, 1 = yes)	229	86.7	.	.	.	.	.
Heavy workload (0 = no, 1 = yes)	46	17.4	.	.	.	.	.
Weekly measures							
Intensity of low-back pain	.	.	2.2	1.6	1	2	3
Frequency of low-back pain	.	.	2.1	1.1	1	2	3
Impairment of work performance	.	.	1.3	2.2	0	0	1.75

linear transformation as was done in the original study (1). The item scores however were not reversed like in the original study; consequently, a higher score indicated more negative beliefs about back pain in our study. The back beliefs questionnaire showed adequate internal consistency (Cronbach’s α was 0.82).

Waddell and colleagues (2) developed the fear-avoidance beliefs questionnaire, a self-report mechanism

with 11 items in two domains: (i) fear-avoidance beliefs about work (7 items) and (ii) fear-avoidance beliefs about physical activity (4 items). Staerkle et al (13) validated the German version. For all items, the response format was on a 7-point scale (1 = completely disagree, 7 = completely agree). The total scores for the fear-avoidance beliefs questionnaire ranged from 7–49 and 4–28 for work and physical activity, respectively. We adjusted both scales to a 0–100 range by applying linear transformation. Internal consistency of both scales was satisfactory (Cronbach's α was 0.92 and 0.70 for work and physical activity, respectively).

Data analysis

The data contained information on the individual and week level, with weeks nested within the individual data. This led to a number of statistical problems. On the one hand, a simple aggregation of week-related information at the individual level would have led to a great loss of information and power. On the other hand, analyses on the week-level (disaggregated data) would have led to a “blown up” dataset regarding the higher-level units (individuals), and spurious significances would have resulted (14). To deal with this problem, we employed a multilevel, linear growth model approach that enabled the testing of the influence of week-related variables and individual-related measures, as well as cross-level interactions of week- and individual-related variables (for example, the different impact of time for different participants as indicated in random effects). The three dependent variables in multilevel regression analysis were both the intensity and frequency of weekly low-back pain, and the weekly impairment of work (including in the home) performance because of low-back pain. The distributions of weekly low-back pain intensity and frequency were uni-modal but deviated from the normal distribution. Therefore, we “normalized” the scores using MLwiN's NSCO command (Darlington R. Transforming a variable to a normal distribution or other specified shape. Available from internet: <http://comp9.psych.cornell.edu/Darlington/transfrm.htm>). In order to increase the readability of small regression coefficients, we transformed normalized weekly low-back pain intensity and frequency by a constant factor of 1000. Weekly impairment of work performance due to low-back pain was highly skewed, with most values indicating zero impairment. Hence, for the impairment data, we conducted a Poisson distribution-based multilevel regression analysis. If 264 participants give a rating every week for one year, the maximum expected number of cases should be 13 728. Missing week values ranged from 14 in the first week (5.3%) to 65 in week 42 (24.6%), resulting in a total number of 12 031 weekly measurements. Both the intensity and frequency of weekly low-back pain,

and the weekly impairment of work were regressed on week number as the variable representing time (level 1) and all other predictor variables on the individual level (level 2). In order to test the hypothesis that recovery is delayed or fails to occur in those who report more unfavorable beliefs, we included in the model the two-way interaction terms between (i) the fear-avoidance beliefs questionnaire scales and week, and (ii) the back beliefs questionnaire and week. We used the MLwiN software package (15) and one-tailed all P-values in multilevel regression analysis with α set to 5%.

Results

Baseline level of low-back pain

All participants reported current pain in the low-back region at the beginning of the study. For 32 participants, the pain disappeared in the first week of the study, while there was much more variability in the pattern of recurrent and persistent episodes for the remaining participants. Figure 2 shows the mean trends of both the intensity and frequency of weekly low-back pain, and the weekly impairment of work performance over the 52 weeks. The weekly data show that speed of recovery differed somewhat among outcome variables and recovery for many participants lasted longer than four weeks. The largest reduction in these reported mean levels occurred within the first study week. The mean values of weekly low-back pain intensity and frequency, and the weekly impairment of work performance due to low-back pain tended to decrease within the first 12–20 weeks. After this, all mean levels remained relatively stable over the rest of the year of observation (figure 2).

Correlations

Table 2 shows the Pearson correlation coefficients for pairs of study variables. In week one, low-back pain intensity was correlated with low-back pain frequency ($r=0.63$) and impairment in work performance ($r=0.55$), and low-back pain frequency was correlated with impairment of work performance ($r=0.41$). Female gender, older age, higher body mass index, greater anxiety/depression, and low involvement in sport were significantly related with higher low-back pain intensity and greater weekly impairment in work performance in week one. Older age was significantly linked with more frequent low-back pain in week one. Both questionnaires on back and fear-avoidance beliefs (including work and physical activity scores) each showed positive significant associations with the intensity and frequency of low-back pain as well as the impairment of work performance in week one.

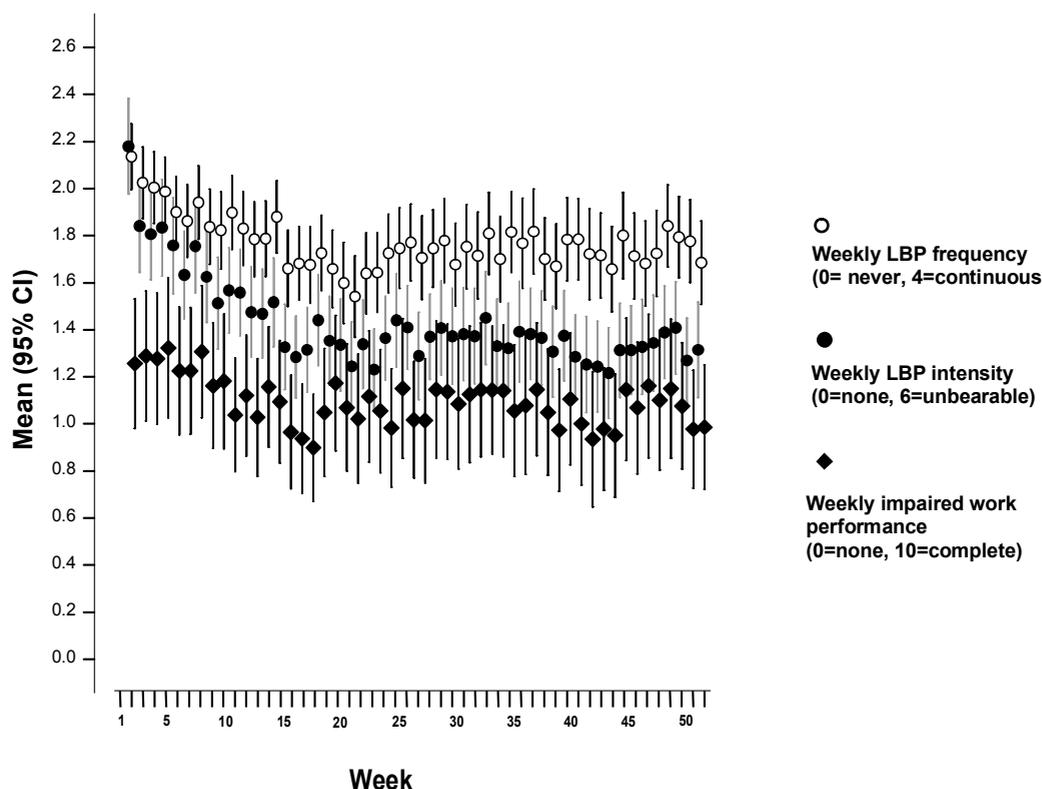


Figure 2. Mean levels of both weekly low-back pain (LBP) intensity and frequency, and weekly impairment of work performance over one year. (95% CI = 95% confidence interval).

Table 2. Pearson correlation coefficients. 219 <N <265, pairwise deletion. (BMI = body mass index; Sport = involvement in sport; Freq = frequency)

	Gender (0=female, 1=male)	Age	BMI	Baseline low-back pain	Anxiety/ depres- sion	Sport	Heavy work- load	Back beliefs	Fear-avoidance beliefs		Week 1 low-back pain	
									Work	Physical activity	Intensity	Freq
Age		0.12 ^a										
BMI		0.24 ^b	0.34 ^b									
Baseline low-back pain		-0.03	0.11 ^a	0.07								
Anxiety/depression		-0.11 ^a	0.08	0.05	0.05							
Involvement in sport (0 = no, 1 = yes)		-0.02	-0.31 ^b	-0.26 ^b	-0.08	-0.04						
Heavy workload: (0 = no, 1 = yes)		-0.01	-0.16 ^c	0.01	-0.02	-0.11 ^a	0.08					
Back beliefs		0.06	0.32 ^b	0.13 ^a	0.15 ^a	0.13 ^a	-0.28 ^b	-0.10				
Fear avoidance beliefs												
Work		0.12 ^c	0.20 ^b	0.14 ^c	0.27 ^b	0.06	-0.19 ^c	0.06	0.53 ^b			
Physical activity		0.05	0.21 ^c	0.13 ^a	0.24 ^b	0.11 ^a	-0.20 ^c	-0.08	0.49 ^b	0.56 ^b		
Week 1 (low-back pain)												
Intensity		-0.13 ^a	0.23 ^b	0.11 ^a	0.38 ^b	0.13 ^a	-0.15 ^c	0.01	0.27 ^b	0.38 ^b	0.40 ^b	
Frequency		-0.02	0.29 ^b	0.07	0.26 ^b	0.12 ^a	-0.14 ^a	0.04	0.22 ^b	0.25 ^b	0.37 ^b	0.63 ^b
Impairment		-0.15 ^c	0.32 ^b	0.22 ^b	0.28 ^b	0.19 ^c	-0.30 ^b	-0.07	0.33 ^b	0.43 ^b	0.38 ^b	0.55 ^b 0.41 ^b

^a P<0.05 level (1-tailed).

^b P<0.001 level (1-tailed)

^c P<0.01 level (1-tailed).

Multilevel regression analyses

Multilevel analyses started with the calculation of a variance components model in order to decompose the amounts of variance in the dependent variable explained by the week level and the person level (ie, estimation of the intra-class correlation or ICC). In the two-level, multilevel regression model, the ICC represents the proportion of the variance in the dependent variable explained by the individual level (14). The ICC was 0.60 for weekly low-back pain intensity, 0.61 for weekly low-back pain frequency, and 0.72 for weekly impairment of work performance. Thus, between 60–72% of the total variance was located at the individual level, indicating that both individual differences and situational factors caused variation in weekly low-back pain reports.

Table 3 shows the results of the multilevel regression analyses. Regression of both the intensity and frequency of weekly low-back pain, and the weekly impairment of work performance on demographics disclosed that

age was always a significant predictor, while gender predicted weekly low-back pain intensity and impaired work performance. Body mass index significantly predicted impaired work performance. Baseline low-back pain was always a significant predictor. Anxiety/depression was a significant predictor of impaired work performance while involvement in sport and having a heavy workload were not significant predictors in multilevel regression analyses.

Our first hypothesis stated that beliefs about the inevitability of the negative consequences of low-back pain (the back beliefs questionnaire) and fear-avoidance beliefs would predict higher levels of weekly pain. The back beliefs questionnaire significantly predicted higher levels of impaired work performance while work-related fear-avoidance beliefs significantly predicted greater frequency and intensity of weekly low-back pain, as well as higher levels of weekly impairment. Fear-avoidance beliefs about physical activity significantly predicted higher levels of weekly low-back pain intensity.

Our second hypothesis proposed that the scores from

Table 3. Multilevel regression analysis predicting weekly, low-back pain intensity and frequency, and weekly impairment of work performance. Sample size: 9497 week questionnaire ratings from 264 participants. [PED = probability of estimate to differ from zero (one-tailed)]

	Low-back pain				Impairment of work performance ^{a, b}	
	Intensity ^{b, c}		Frequency ^{b, c}		Estimate ^d	PED
	Estimate ^d	PED	Estimate ^d	PED		
Level 2 (individual)						
Gender (0 = female, 1 = male)	-204.534	0.004	-204.122	0.004	-0.318	0.951
Age (years)	11.266	0.000	11.708	0.000	0.023	0.000
Body mass index	13.994	0.074	13.442	0.074	0.044	0.037
Back beliefs	4.774	0.109	4.753	0.109	0.018	0.045
Fear-avoidance beliefs						
Work	14.571	0.002	14.880	0.001	0.033	0.002
Physical activity	9.874	0.043	10.520	0.198	0.023	0.126
Baseline low-back pain	159.574	0.000	159.630	0.000	0.243	0.001
Anxiety/depression ^e	56.828	0.200	57.404	0.216	0.437	0.010
Involvement in sport ^f	-122.205	0.141	-110.922	0.876	-0.102	0.627
Heavy workload ^g	91.994	0.126	60.630	0.118	-0.192	0.783
Level 1 (weekly measure)						
Week	-5.299	0.000	-5.195	0.000	-0.006	0.000
Cross-level interactions						
Week X – back beliefs	0.088	0.006	0.092	0.010	0.000227	0.000
Week X – fear-avoidance beliefs						
Week X – work	0.093	0.018	0.095	0.026	0.000197	0.000
Week X – physical activity	-0.034	0.687	-0.053	0.591	-0.000217	0.999

^a Poisson distribution-based multilevel regression analysis.

^b Iterative Generalized Least Squares (IGLS) algorithms converged, $-2 \times \log$ likelihood was 147581.33 in weekly low-back pain intensity, 186003.36 in weekly low-back pain frequency, and 142328.04 in weekly impairment of work performance.

^c Linear multilevel regression of normalized weekly low-back pain intensity and frequency.

^d Unstandardized regression coefficient.

^e Euroqol anxiety/depression depression (0 = not anxious/depressed, 1 = moderately anxious/depressed, 2 = extremely anxious/depressed).

^f Do any sport? (0 = no, 1 = yes).

^g Have a heavy workload? (0 = no, 1 = yes).

the back and fear-avoidance beliefs questionnaires would predict delayed, or lack of, recovery from low-back pain; this was tested by the interaction between beliefs and time (weeks) in the multilevel regression analyses. Our second hypothesis was confirmed for the back beliefs questionnaire and the work aspect of the fear-avoidance beliefs questionnaire – the interactions were significant and displayed the direction of association proposed in the hypothesis. In other words, those participants who reported more favorable beliefs showed decreasing trends (ie, recovery) over the year while those with unfavorable beliefs showed little recovery. The interaction between week and the physical activity component of the fear-avoidance questionnaire was not significant.

Discussion

Our first hypothesis stated that initial adverse beliefs regarding the inevitability of the future due to low-back pain (ie, negative back beliefs) and fear-avoidance beliefs would correspond to more intense pain and impairment throughout the year's follow-up. This hypothesis was confirmed for work-related fear-avoidance beliefs (which significantly predicted higher levels of low-back pain intensity and frequency) and work impairment throughout the following 52 weeks. Negative back beliefs were significantly associated with higher levels of impairment. Our second hypothesis stated that recovery over the 52 weeks would be delayed or fail to occur for those who reported more unfavorable beliefs. This hypothesis was confirmed for back beliefs and work-related fear-avoidance beliefs. Unfavorable beliefs were significant predictors of delayed recovery concerning levels of low-back pain intensity and frequency, and impairment of work performance. Our results confirm the conclusions of Vlaeyen & Linton (5) and Leeuw et al (7).

In their review of fear avoidance and low-back pain, Vlaeyen & Linton (5) postulated that fear-avoidance beliefs were associated with the transition from acute to chronic low-back pain. In contrast, the review of Pincus et al (6) indicated that there was too little evidence to support this model and suggested that instead distress and depressive mood promoted the transition to a chronic state. The recent review by Leeuw et al (7) reported that there was new evidence to suggest that fear-avoidance beliefs do indeed influence the transition from acute to chronic low-back pain, but that there was a distinct lack of studies that had examined in detail the course of recovery from current low-back pain. To our knowledge, our study is the first to show that the process of recovery from current low-back pain depends on back beliefs and work-related fear-avoidance beliefs in

a multilevel time-series analysis. The study shows how inter-individual differences in back beliefs modulate the intra-individual process of recovery from low-back pain when anxiety/depression is controlled for in the analysis. The study, therefore, adds important evidence to the hypothesis that fear-avoidance beliefs are an independent risk factor in the transition from current to chronic low-back pain.

In our view, the importance of our findings is three-fold. First, maladaptive back beliefs and higher levels of fear-avoidance beliefs were shown to correspond to a more unfavorable course of recovery from low-back pain. While the study adds further support to recent cross-sectional (16, 17) and longitudinal studies (3), it is the first to show that negative back beliefs and higher levels of fear-avoidance beliefs have an adverse impact on real, measured, individual courses of back pain. Cross-sectional studies only show a snapshot of current back beliefs and pain without considering whether and to what degree individuals are recovering. This neglect of the recovery process may, in part, explain the apparently inconsistent results highlighted in the review of Pincus et al (6). Attention to pain-related processes over time seems to be a more promising approach (18). Most longitudinal studies include only one follow-up and rely on the interpolation of intervening outcomes during this period, with the true course not being measured at all. Even longitudinal studies with three or four follow-ups necessarily rely on hypothetical courses of pain, disability, and impairment during follow-up without explicitly documenting the actual course of change. Hence, the current findings contribute to prognostic risk factor analyses.

A second important finding of this study was that both types of unfavorable beliefs about low-back pain (ie, back beliefs and work-related aspects of fear-avoidance beliefs) were independently associated with a more unfavorable course of recovery with respect to both the intensity and frequency of low-back pain, and the impairment of performance resulting from such pain. Beliefs about the inevitability of low-back pain and work-related fear-avoidance beliefs are, therefore, both unique predictors of delayed recovery from low-back pain in a population-based sample. The unique contribution of both predictors holds even when other risk factors are controlled for (eg, involvement in sport, anxiety/depression and workload). The study supported the conclusion of a recent review on psychosocial predictors of return to work in non-chronic, non-specific, low-back pain that showed fear-avoidance beliefs and recovery expectations to be meaningful predictors (8).

Third, our study showed that inter-individual differences in both back beliefs and work-related fear-avoidance beliefs influence intra-individual courses of back pain in a non-clinical sample. As a result, the study adds

information regarding the process by which media-based cognitive interventions in the population might prevent persistent low-back pain (19).

In summary, this is the first study to show that intra-individual fluctuations in both low-back pain intensity and frequency, and work impairment after an initial bout of low-back pain depend on inter-individual differences in cognitive beliefs about such pain.

Limitations

A limitation of this study was that it lacked information on the specific causes of back pain (red flags). Another limitation was that we were unable to assess all the components involved in the fear-avoidance model of low-back pain. For example, it might be interesting to assess immobility as a consequence of avoidance behavior in future in-depth studies of the transition to chronic low-back pain (3). Furthermore, the effect size describing the extent of the influence of both fear-avoidance and back beliefs on the speed of recovery from low-back pain could, at best, be defined as moderate. Nonetheless, the effects remained stable when other important risk factors such as anxiety/depression were controlled for in the analysis. Taking into consideration that recovery from low-back pain is likely to depend on many factors, the findings are thus meaningful. A strength of the study was its longitudinal design with the repeated weekly measurement approach, which avoided recall bias in the assessment of the dependent variables. Recall bias in the assessment of pain can have a critical influence on estimates of the prevalence of spinal disorders (20). Weekly measurements have been shown to represent well the daily values for the week (21). The sample was representative of the German-speaking population of Switzerland with current, or a history of, low-back pain.

Concluding remarks

In conclusion, work-related fear-avoidance beliefs and beliefs about the inevitability of low-back pain influence the time course of recovery from such pain for individuals reporting current low-back pain at baseline. The study, therefore, adds to our knowledge of the natural course of low-back pain.

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