Acute low back pain – a cross sectional study:

Fear-avoidance beliefs and associated characteristics

Anne Riiser Svensen, physiotherapist, MSc, Assistant Professor at Oslo University College, Faculty of Health Science, Physiotherapy, Oslo Norway, e-post: anne.riiser.svensen@hf.hio.no

May L. T. Ringvold, physiotherapist, MSc, Assistant Professor at Oslo University College, Faculty of Health Science, Physiotherapy, Oslo Norway, e-post: Maya.ringvold@hf.hio.no

Astrid Bergland, physiotherapist, PhD, Professor at Oslo University College, Faculty of Health Science, Physiotherapy, Oslo Norway

This scientific original article, received 01.07.10 and accepted 30.05.11, is externally peer-reviewed according to Tidsskriftet Fysioterapeuten's guidelines for authors at www.fysioterapeuten.no.

Conflicts of interest declared: none.

Sammendrag

- **Bakgrunn og hensikt**: Fear-avoidance beliefs (FAB) er overdreven frykt for bevegelser som kan medføre unngåelse av bevegelser og aktiviteter, og bidra til å opprettholde ryggplagene. Hensiktene var å (i) avdekke forekomsten av fear-avoidance beliefs (FAB) hos pasienter med akutte korsryggsmerter og (ii) utforske sammenhenger mellom demografiske variabler, smerte og FAB i utvalget.
- **Design**: en tverrsnittsundersøkelse med strategisk utvalg.
- **Materiale**: 115 pasienter mellom 20 og 70 år gamle med akutte (varighet mindre enn 12 uker) korsryggsmerter rekruttert via fysioterapeuter på fysikalske institutter i Norge i perioden november 2006 til og med februar 2007.
- **Metode**: Spørreskjema for Fear-avoidance beliefs (FABQ). Skjemaet er delt i to deler med henholdsvis 5 spørsmål (FABQ-PA om fysisk aktivitet) og 11 (FABQ-W om arbeidsrelaterte forhold), med skåring fra 0-6 der 6 er verst. Skjema har ingen angitt kuttverdi, i artikkelen anvendes kuttverdier hentet fra andre forfattere. Pasientene ble også bedt om å angi demografiske variabler og smerte.
- **Resultat**: I alt 115 pasienter deltok i undersøkelsen: 85 prosent svarte på FABQ-W og 20.4 prosent av disse hadde høye skårer ved en kuttverdi på >29. Totalt 95 prosent svarte på FABQ-PA, av disse hadde 32.1 prosent høye skårer ved en kuttverdi >14. Gjennomsnittskår (SD) for FABQ-W var 18.3 (10.9) og FABQ-PA 12.3 (5.8). Pasienter med lavest utdanning skåret signifikant høyere på FABQ-W.
- **Konklusjon**: Høy smerteskår ved nåtidig smerte var signifikant assosiert med høye skår på FABQ-PA. I tillegg var det å være sykmeldt og ha lav utdanning signifikant uavhengig assosiert med høye skår på FABQ-W.
- **Nøkkelord**: Acute low back pain, fear-avoidance beliefs, cutoff score, formal education.

Introduction

The disability caused by low back pain (LBP), defined as pain and discomfort localized below the costal margin and above the inferior gluteal folds (1), has been characterized as the most common cause of restricted activity in people younger than 45 years and as the second most frequent reason for visits to the physician in the USA (2, 3). Approximately 80 per cent of the general public will experience low back pain (LBP), with or without leg pain, on one if not several occasions during their lifetime (3). LBP is associated with lack of ability to perform work. In Norway, approximately 15-17 per cent of the cases of those reporting sick have been based on a low back pain diagnosis (4). In the Western world over the last 10 years, there has been a tremendous increase in low back pain, hindering workers and increasing claims for social security benefits (5).

The development of chronic LBP (CLBP) from an acute injury has been difficult to explain. Pain problems are complex, mul-

> Many patients have more fear about their back pain than necessary.

KORSRYGGSMERTER Fear-avoidance beliefs (FAB) er overdreven frykt for bevegelser. Dette kan føre til at man unngår bevegelser og aktiviteter, og dermed bidrar til å opprettholde ryggplagene.

tidimensional developmental processes where various psychosocial factors seem to be important. A possible explanation can be the so-called «fear-avoidance» model. Fear-avoidance refers to the avoidance of movements or activities based on fear (6). The fear-avoidance is related to exaggerated pain perception (7). Exaggerated pain perception could take different forms, i.e. pain experience and/or pain behaviour which is out of all proportion to demonstrable organic pathology or current levels of nociceptive stimulation. In practice, exaggerated pain perception is identified by a marked discrepancy between pathological signs and symptoms, together with clear evidence of exaggerated and inconsistent symptoms obtained from such standard instruments as pain drawings or by eliciting certain clinical signs.

The fear-avoidance beliefs (FAB) model is based on patients' reactions to LBP, presenting as confrontational and avoidance behaviour (7, 8). The underlying assumption of the model is that the patients' LBP is not from a serious pathological source. The confrontational behaviour has been described as leading to recovery. The avoidance behaviour has been characterized by catastrophizing and pain-related fear, which leads to avoidance behaviour and hypervigiliance to bodily sensations, followed by disability, disuse and depression (6). Hypervigiliance is understood as having increased attention directed to potential frightening stimuli in the surroundings. Leeuw (9) presents a model where «pain-related fear» is expanded to include «fear of pain» and «pain anxiety». Fear is understood as the emotional reaction to a specific identifiable and immediate threat. Anxiety is a future-oriented affective state, where the source of the threat is more elusive and without a clear focus, creating a more long-lasting state of apprehension (9). However, the consequences of avoidance behaviour remain mainly the same. It seems that FAB is a phenomenon that can be treated by combining a cognitive approach with a graded exposure to movements that are related to fear (10).

To measure FAB the Fear-Avoidance Beliefs Questionnaire (FABQ) was developed. It was introduced in 1993 (11) based on a biopsychosocial understanding of LBP. The FABQ has been used to quantify the level of fear regarding pain and to investigate the beliefs of individuals with LBP about the alteration in their behaviour that they think necessary to avoid pain (12). It distinguishes between behaviour related to work (FABQ-W) and behaviour related to physical activity (FABQ-PA). FABQ is a reliable questionnaire (13) with proven validity at an acceptable level (6, 13, 14).

Several studies have been done on patients with LBP and FAB. Some of these studies investigate if elevated FAB can predict

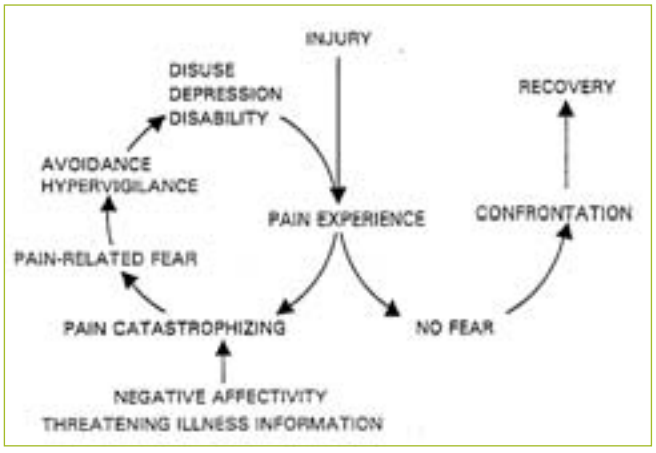

FIGURE 1 The Fear-avoidance model (6).

CLBP. Fritz et al (12) found that FABQ-work subscale may serve as an effective screening tool for estimating risk of prolonged work restrictions. Storheim et al (15) report in their study that a high degree of FAB-work is a strong predictor for not returning to work. Grotle et al (16) compared two different subgroups of the back pain population, a sample of patients with ALBP and another sample with CLBP. The results show that the patient with CLBP reported significantly more FAB than those with ALBP especially regarding FABQ-W. Other studies use FAB questionnaires as a measure of effect of intervention (10, 17).

The association between FAB and demographic variables has been investigated (18, 19). Coudeyre et al (18) demonstrates an association between FAB and formal education in patients with acute LBP (ALBP). In their study patients with LBP for more than four weeks were excluded. The study shows that those with primary school education only scored higher than those with high school, and high school educated scored higher than postgraduate on FABQ (18). Poiraudeau (19) presents a moderate correlation between low level of formal education and high FAB about physical activities in patients with subacute LBP.

To our knowledge, the percentage occurrence of high FAB in patients with ALBP has not been focused in other studies. High FAB is understood as a score above a cut-off score on FABQ. Furthermore, the association between FAB and demographic variables such as formal education has not yet been in the centre of research into patients with acute low back pain (with duration less than 12 weeks). The level of formal education seems to play a role in most health-related issues (20-22) so it seems to be of interest to look for the association between FAB and level of education.

Purpose

In the belief that elevated FAB in patients with ALBP predicts prolonged sick leave (19) and the risk of developing CLB (12, 15, 16, 23), we wanted to find the occurrence of elevated FAB in a Norwegian population with ALBP. The particular aims of the present study, within a patient group seeking physical therapy for ALBP, defined as having lasted less than 12 weeks (5), are to:

- Identify the percentage occurrence of high FAB (FABQ-PA or FABQ-W).
- Identify the relationships between FAB (FABQ-PA or FABQ-W) and demographic variables (especially formal education, work status), and pain.

To identify this, we performed a cross-sectional survey.

Method

The survey was undertaken in Norway comprising a group of patients with LBP. 122 patients with acute (less than 12 weeks) low back pain were recruited from physiotherapists in outpatient clinics in Norway in the period November 2006 to February 2007. All the patients presenting with ALBP, with or without known aetiology, were to be included. The physiotherapists were asked to include patients in a period of four weeks. All physiotherapists registered with the Norwegian Physiotherapy Association, either as sports specialist physiotherapists or manual therapists, were asked to participate. The physiotherapists were spread over the country. 115 schemas were included in the analysis. Patients aged 19 years or less were excluded due to not being able to have completed higher education.

The study was considered to have no obligation to report by the Norwegian Regional Committee for Ethics.

A letter giving information about the survey was sent with the questionnaires to all the physiotherapists involved. Patients were asked to complete the questionnaires on their initial visit to the physiotherapist and then the questionnaires were returned to the researchers.

Demography and pain

The demographic variables were gender, age, work status (working, on sick leave or non-working) and educational level (lower education is defined as twelve years or less of completed schooling, and higher education involves more than twelve years of completed education) The variable concerning the respondents' work status was when analyzed changed from three categories, into two categories. The new categories are: 1. on sick leave or not in income-producing work and 2. not on sick leave.

A Visual Analog Scale (VAS) was used for the measurement of self-reported pain. The scale shows a line from 0–10 where 0 is defined as no pain and 10 as worst pain (24). The informants were asked to indicate on two different lines respectively the worst experienced pain (maximal pain) and the pain at the time of registration (current pain). The distance from the left-hand (zero) side to the mark was recorded in centimetres.

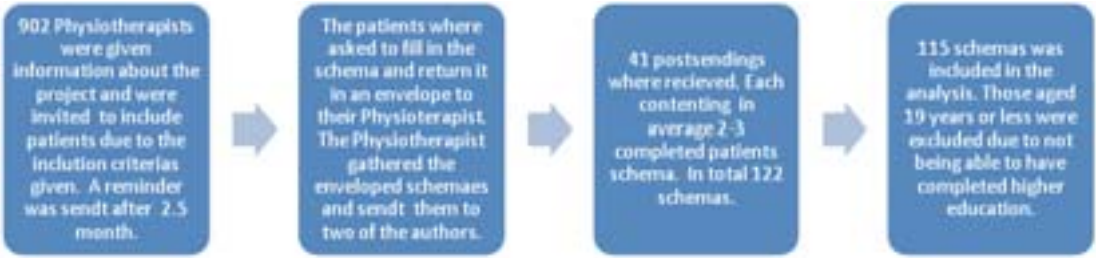

FIGURE 2 The process of the study.

Fear Avoidance Belief Questionnaire

The Fear Avoidance Belief Questionnaire (FABQ) contains 16 items. The items connected to fear-avoidance beliefs related to work (FABQ-W) are covered in 11 questions, and those for physical activity (FABQ-PA) in five questions. A higher score indicates higher fear-avoidance beliefs. A low score is a good score. The respondents answer on a 7-stage Likert scale rising from agreement (0) to no agreement at all (6). The questionnaire had been translated from English into Norwegian (25). The scoring procedure for the FABQ-W was calculated by adding the scores for questions 6, 7, 9-12 and 15, whereas FABQ-PA was calculated by adding the scores from questions 2-5. The question 1, 8, 13, 14 and 16 was not part of the scoring procedure due to previous studies validating the questionnaire. Maximal score for FABQ-W are 42 and for FABQ-PA 24 points. There are not given any standardized score for high or low FAB when using the FABQ.

For patients with LBP in physical therapy trials, George et al (26) investigated the ability for FABQ to predict future outcomes: For high FABQ-W the cutoff score was >29 whereas for high FABQ-PA it was >14. We used their cutoffs.

Analysis

Data were analyzed using SPSS windows version 18 (SPSS Inc., Chicago, IL). A significance level of 0.05 for all statistical analyses was chosen. For data without parametric assumptions, non-parametric tests were used. Descriptive statistics were used for computing frequencies, central tendency and variability.

For continuous variables t-tests for independent groups used to check for differences between groups. Chi-square tests were used for nominal and categorical variables. Bivariate logistic regression analyses were performed to specify associations between the dependent dichotomized variable FABQ-W as well as the dependent dichotomized variable FABQ-PA and the variables of demography and pain. Multivariate logistic regression analyses were performed to specify independently associations of variables regarding demography and pain and the dependent dichotomized variable FABQ-W as well as the dependent dichotomized variable FABQ-PA. Only items contributing substantially ($p<0.20$) to the model in the bivariate logistic regression analyses were included in the multivariate regression analyses. Regarding interpretation of output from the multivariate logistic regression we used Hosmer–Lemeshow Goodness of Fit Test. Poor fitness is indicated by a significance value less than 0.05. Our value P = 0.16 therefore indicates support for the model presented in table (27). The sample size was based on Altman's general recommendations of at least 50 subjects in a study to ensure statistical significance (28).

TABLE 1 Distributions of key characteristics for all 115 patients with acute low back pain.

Characteristics		Distribution	
Gender	Female	48.7 %	
	Male	51.3%	
Work status	On sick leave/not income	56.5%	
	Not on sick leave	43.5%	
Educational level	Lower education >12 years	55.7%	
	Higher education <12 years	43.5%	
Age in years	Mean (SD), min-max	45 (12) ,	20-74
Maximal pain (VAS)	Mean (SD), min-max	7.5 (2.2),	0-10
Current pain (VAS)	Mean (SD), min-max	4.2 (2.9) ,	0-10
FAB-W*	Mean (SD), min-max	18.3 (10.9),	0-42
FAB-PA**	Mean (SD), min-max	12.3 (5.8),	0-24

*FAB-W (Fear-Avoidance Beliefs-Work), **FAB-PA (Fear-Avoidance Beliefs-Physical Activity).

TABLE 2 Characteristics associated with high fear-avoidance beliefs related to physical activity (FABQ-PA) for 115 patients with acute low back pain.

	Unadjusted			Adjusted for demographic variables and pain		
Variables	**P4**	**OR**	**(95%CI)**	**P5**	**OR**	**(95%CI)**
Age	0.32	1.02	(0.98 -1.05)			
Gender1	0.22	1.70	(0.74-3.73)			
On sick leave2	0.93	1.04	(0.42-2.55)			
Education3	0.12	1.99	(0.85-4.64)			
Maximal pain	0.000	1.97	(1.36-2.76)	0.02	1.77	(1.22- 2.54)
Current pain	0.004	1.24	(1.07-1.40)			

Notes: The multivariate logistical regression analysis shows that maximum pain was independently associated with FABQ-PA, when adjusted for demographic variables and pain. P = level of significance, OR = odds ratio; CI = confidence interval. 1referensce value = women; 2 reference value = on sickleave; 3reference value = low education; 4 p value based on bivariate logistic regression analyses with dependent dichotomized variable FABQ-PA 5p value based on multivariate logistic regression analyses with dependent dichotomized variable FABQ-PA.

Results

In total 115 patients with ALBP seeking physical therapy were included in the analysis. 85 per cent answered the FABQ-W part and 20.4 per cent of these had high scores at a cutoff >29. 95 per cent answered the FABQ-PA part and 32.1 per cent of these had high scores at a cutoff >14. The study comprised 48.7 per cent women and 51.3 per cent men, ranging between 20 and 74 years. There were no significant differences in FAB-scores connected to gender. As regards to education, 55.7 per cent had a lower level of education, and 43.5 per cent had completed higher education. Concerning work status, 43.5 per cent of the patients were not on sick leave. The mean value with standard deviation and range of age, maximal pain,

TABLE 3 **Characteristics associated with high or low fear-avoidance beliefs related to work (FABQ-W) for 115 patients with acute low back pain.**

	Unadjusted			Adjusted for demographic variables and pain		
Variables	**P4**	**OR**	**(95%CI)**	**P5**	**OR**	**(95%CI)**
Age	0.73	1.01	(0.96-1.06)			
Gender1	0.69	0.82	(0.31-2.19)			
On sick leave2	0.04	4.2	(1.01-16.15)	0.14	0.34	(0.08 -1.40)
Education 3	0.00	21.05	(2.69-165.09)	0.03	11.15	(1.37-91.41)
Maximal pain	0.30	1.16	(0.88-1.53)			
Current pain	0.03	1.21	(1.02-1.44)	0.35	1.10	(0.90-1.35)

Notes: The multivariate logistical regression analysis shows that low level of education was independently associated with high (bad) FABQ-W result, when adjusted for demographic variables and pain. P = level of significance, OR = odds ratio; CI = confidence interval. [1]reference value = women; [2]reference value = on sickleave; [3]reference value = low education; [4]P value based on bivariate logistic regression analyses with dependent dichotomized variable FABQ-Q; [5]P value based on multivariate logistic regression analyses with dependent dichotomized variable FABQ-Q.

current pain, FAB-W and FAB-PA are displayed in table 1.

A high level of maximal pain and pain at present (current pain) were both associated with a high level of FABQ-PA (Table 2). Further the analyses showed that only maximal pain was significantly associated with FABQ-PA when adjusted for the variables age, gender, being on sick leave, education and current pain.

The variables marking being on sick leave or having the lowest level of education and a high level of current pain were all significantly associated with high scores on FABQ-W (Table 3). When controlling for the variables age, gender, being on sick leave, education and maximal pain the analyses showed that those who were on sick leave and had the lowest level of education were independently associated with high scores on FABQ-W to a significant degree.

Discussion

In this study 20.4 per cent of the participants had high FABQ-W and 32.1 per cent had high FABQ-PA. There was a significant independent association between a lower level of formal education and high FABQ-W.

The design of this study will not allow us to use statistical analysis with a ROC curve and thereby the possibilities to find a cutoff score for our sample. To look into the occurrence of FAB we had to use a cutoff score and not only the mean. Defining a cutoff score for a test gives us the possibility to find those individuals identified as positive by the test and those identified as negative (29). Although we used the same cutoff score as George et al (26) the occurrence of FABQ-W and FABQ-PA in our study deviates from their results. George et al's (26) investigation of elevated FAB for patients with LBP, showed that 11.9 per cent had elevated FABQ-W and 69.4 per cent had elevated FABQ-PA. This major difference in the occurrence of FABQ-PA between the two studies may be explained by differences in the inclusion criteria. In George et al's study more than 80 per cent of the patients were recruited from a military health care clinic. This sample deviates clearly from an average population and can at least partly explain the differences. No participants were excluded due to the duration of the LPB. In our study the ALBP was defined as having lasted less than 12 weeks. Inclusion criteria in general should be taken into consideration when comparing the response to the FABQ and the level at which the cutoff score is set. Previous research shows higher scores on a FABQ in patients with CLBP than in patients with ALBP (16).

The results of our study demonstrated that the mean value of FABQ-W (18.3) and FABQ-PA (12.3) was lower than Coudeyre et al. FABQ-W (19.5) and FABQ-PA (16.8) (18). This minor difference might be explained by the present view on LBP in Norway where the approach to ALBP is more in the direction of confronting the pain than to rest. The FABQ-W mean was higher than in the study of Grotle (13.2), but FABQ-PA (12.3) showed no difference (16).

In this project the survey asks for pain experience in a VAS scale. This way of evaluating pain excludes other qualities of the patients' pain. In a survey it is hard to catch the qualitative dimensions of pain.

Education and work status

We found a significant independent association between a lower level of formal education and high FAB-W. This corresponds well with Coudeyre's (18) findings. A low level of education has been shown to be associated with an increased risk of back pain disability, but the underlying mechanisms are poorly understood (20). Formal education is considered to be a good measure of socioeconomic status and low socioeconomic status is considered to play an important role in LBP disorders (20). Dionne (20) presents five hypotheses that could explain the association between level of formal education and back pain; behavioral and environmental risk factors, occupational factors, compromised «health stock», access to health services and finally adaptation to stressful events. Concerning behavioural and environmental risk factors, psychological factors seem to be of greatest relevance for understanding the association between FAB and the level of education. The avoidance behaviour in people with elevated FAB is characterized by catastrophizing, pain-related fear, avoidance, disuse, depression and disability. Catastrophizing is reported to be highly associated with less formal education. In addition, lower levels of education act as a risk factor for adverse pain-related outcomes (30). Patients with elevated FAB seem to be more anxious and depressed. Dionne suggests a link between low education, back pain and anxiety and depression. This indicates that these patients may have greater awareness of pain or they may have more difficulty in coping with it (20).

Thoughts and beliefs are powerful processes and influence the pain experience (31, 32). Meyer (33) finds that negative psychological attributes such as catastrophizing, somatic hypervigilance or FAB are associated with greater perceptions of pain and disability. We suspect that fearful people may be more inclined to misinterpret ambiguous physical sensations as threatening or painful, and therefore they may have an in-

creased likelihood of experiencing pain.

Medical knowledge is often communicated in language which may be more accessible to people with higher education. We assume that people with higher education have better skills in gathering knowledge, particularly about their own health and may therefore be less likely to misinterpret and become distressed about their state of health. Cutler (34) suggests that increasing levels of education lead to different thinking and decision making patterns.

Our study showed that patients who were on sick leave and had a lower level of education had significantly higher scores on FABQ-W. Formal education will, to a degree, determine what kind of jobs is open to the worker. Several factors influence the job situation (22). Conditions like «authority to plan my own work», «physically demanding work», «concentration and attention» and the level of «job satisfaction» are significant risk factors for back pain (BP) disability retirement and consistently associated with level of education. Occupational class (manual workers, routine non-manual and professionals), working conditions and individual lifestyle mediate the effect of formal education (22). Dionne found that the evidence is stronger for an effect of education on the duration of BP episodes or the negative consequences of BP episodes than for an effect of education on the incidence of BP (20). This may be explained by the difference in the perceived possibility of controlling one's own working situation.

Limitations

A cross-sectional survey is designed to obtain information from populations regarding the prevalence, distribution and interrelations of variables within those populations. Thus, this study will not show any causal connection. The physiotherapists who participated in gathering data for the project were spread over the country; still, some areas of the country may not be represented.

Conclusion

In this study 20 per cent had high scores on FABQ-W (>29 points) and 32 per cent on FABQ-PA (>14). Increased pain at present (current pain) was significantly associated with high score on the FABQ-PA, as well as being on sick leave and having attained the lowest level of education were independently associated with having high FABQ-W to a significant degree. In a clinical situation it might be useful to measure FAB in patients with ALBP in order to identify patients with a high level of FAB. More research on this field is strongly recommended.

Title: Acute low back pain – a cross sectional study: Fear-avoidance beliefs and associated characteristics

- **Background/Aim**: Fear-avoidance beliefs (FAB) is exsessive fear of movements that may lead to movement avoidance and contribute to maintenance of LBP. The aim of the study was (i) to identify the percentage of fear-avoidance beliefs (FAB) in patients with acute low back pain (ALBP) and (ii) find any association that may exist between demographic variables, pain and FAB in the sample.
- **Design**: The study is a cross sectional survey with a strategic sample.
- **Material**: 115 patients between 20 and 70 years of age with acute (less than 12 weeks) low back pain recruited from physiotherapists in outpatient clinics in Norway in the period November 2006 to February 2007.
- **Method**: A questionnaire including questions on fear-avoidance beliefs (FABQ) was used. The questionnaire has two parts with five questions about Physical Activities (FABQ-PA) and 11 questions about work related issues. The scores go from 0-6 where 6 is worst. No cutoff values are indicates in the questionnaire, the cut values in the article are quoted from other authors. The patients were also asked for demographic variables and pain.
- **Result**: 115 patients participated in the survey: 85 percent answered the FABQ-W part and 20.4 per cent of these had high scores at a cutoff >29. In total 95 per cent answered the FABQ-PA part and 32.1 per cent of these had high scores at a cutoff >14. Mean scores of FABQ-W were 18.3 (10.9) and FABQ-PA 12.3 (5.8). Patients with lowest level of education were significantly associated with high scores on FABQ-W.
- **Conclusion**: Increased pain at present (current pain) was significantly associated with high score on the FABQ-PA. Further, being on sick leave and having attained the lowest level of education were independently associated with having high FABQ-W to a significant degree.
- **Keywords**: Acute low back pain, fear-avoidance beliefs, cutoff score, formal education.

Acknowledgement

We want to thank Oslo University College and head of physiotherapy program Nina Bugge Rigault for giving us the opportunity to do this project.

References

1. Costa LOP, Maher CG, Latimer J, Hodges PW, Herbert RD, Refshauge KM, et al. Motor control exercise for chronic low back pain: a randomized placebo-controlled trial... including commentary by Fritz JM with author response. Physical Therapy 2009;89(12):1275-91.
2. Andersson GBJ. Epidemiological features of chronic low-back pain. Lancet 1999;354(9178):581-5.
3. Waddell G, editor. The back pain revolution. 2nd ed. Edinburgh: Churchill Livingstone; 2004.
4. Ihlebaek C, Hansson TH, Laerum E, Brage S, Eriksen HR, Holm SH, et al. Prevalence of low back pain and sickness absence: a «borderline» study in Norway and Sweden. Scandinavian Journal of Public Health 2006;34(5):555-8.
5. Laerum E, Brox JI, K. Storheim. National clinical guidelines. Low back pain - with or without nerve root affection. In: Norwegian Directorate of Health C-arufmd, Division for neuroscience and musculoskeletal medicine (FORMI), editor 2005.
6. Vlaeyen JW, Linton SJ. Fear-avoidance and its consequences in chronic musculoskeletal pain: a state of the art. Pain 2000;85(3):317-32.
7. Lethem J, Slade PD, Troup JD, Bentley G. Outline of a Fear-Avoidance Model of exaggerated pain perception-I. Behaviour Research And Therapy 1983;21(4):401-8.
8. Troup JD, Foreman TK, Baxter CE, Brown D. 1987 Volvo award in clinical sciences. The perception of back pain and the role of psychophysical tests of lifting capacity. Spine 1987;12(7):645-57.
9. Leeuw M, Goossens MEJ, Linton SJ, Crombez G, Boersma K, Vlaeyen JWS. The fear-avoidance model of musculoskeletal pain: current state of scientific evidence. Journal of Behavioral Medicine 2007;30(1):77-94.
10. George SZ, Zeppieri G, Jr., Cere AL, Cere MR, Borut MS, Hodges MJ, et al. A randomized trial of behavioral physical therapy interventions for acute and sub-acute low back pain. Pain 2008;140(1):145-57.
11. Waddell G, Newton M, Henderson I, Somerville D, Main CJ. A Fear-Avoidance Beliefs Questionnaire (FABQ) and the role of fear-avoidance beliefs in chronic low back pain and disability. Pain 1993;52(2):157-68.
12. Fritz JM, George SZ. Identifying psychosocial variables in patients with acute work-related low back pain: the importance of fear-avoidance beliefs. Physical Therapy 2002;10:973-83.
13. Grotle M, Brox JI, Vollestad NK. Reliability, validity and responsiveness of the Fear-Avoidance Beliefs Questionnaire: methodological aspects of the Norwegian version. Journal of Rehabilitation Medicine 2006;38(6):346-53.
14. Heneweer H, van Woudenberg NJ, van Genderen F, Vanhees L, Wittink H. Measuring psychosocial variables in patients with (sub) acute low back pain complaints, at risk for chronicity: a validation study of the Acute Low Back Pain Screening Questionnaire-Dutch Language Version. Spine 2010;35(4):447-52.

15. Storheim K, Brox JI, Holm I, Bo K. Predictors of return to work in patients sick listed for sub-acute low back pain: a 12-month follow-up study. Journal of Rehabilitation Medicine 2005;37(6):365-71.
16. Grotle M, Vøllestad NK, Veierød MB, Brox JI. Fear-avoidance beliefs and distress in relation to disability in acute and chronic low back pain. Pain 2004;112(3):343-52.
17. Woods MP, Asmundson GJG. Evaluating the efficacy of graded in vivo exposure for the treatment of fear in patients with chronic back pain: A randomized controlled clinical trial. Pain 2008;136(3):271-80.
18. Coudeyre E, Tubach F, Rannou F, Baron G, Coriat F, Brin S, et al. Fear-avoidance beliefs about back pain in patients with acute LBP. Clinical Journal of Pain 2007;23(8):720-5.
19. Poiraudeau S, Rannou F, Baron G, Henanff AL, Coudeyre E, Rozenberg S, et al. Fear-avoidance beliefs about back pain in patients with subacute low back pain. Pain 2006;124(3):305-11.
20. Dionne CE, Von Korff M, Koepsell TD, Deyo RA, Barlow WE, Checkoway H. Formal education and back pain: a review. Journal of Epidemiology & Community Health 2001;55(7):455-68.
21. Dionne C, Koepsell TD, Von Korff M, Deyo RA, Barlow WE, Checkoway H. Formal education and back-related disability: in search of an explanation. Spine 1995;20(24):2721-30.
22. Hagen KB, Tambs K, Bjerkedal T. What mediates the inverse association between education and occupational disability from back pain?-A prospective cohort study from the Nord-Trondelag health study in Norway. Social Science & Medicine 2006;63(5):1267-75.
23. Swinkels-Meewisse IEJ, Roelofs J, Schouten EGW, Verbeek ALM, Oostendorp RAB, Vlaeyen JWS. Fear of movement/(re) injury predicting chronic disabling low back pain: a prospective inception cohort study. Spine 2006;31(6):658-64.
24. Ritter PL, Gonzalez VM, Laurent DD, Lorig KR. Measurement of pain using the Visual Numeric Scale. Journal of Rheumatology 2006;33(3):574-80.
25. Grotle M, Vollestad NK. The Fear-Avoidance Beliefs Questionnaire (FABQ) translated by Grotle and Vollestad (Waddell et al 1993). 2001.
26. George SZ, Fritz JM, Childs JD. Investigation of elevated fear-avoidance beliefs for patients with low back pain: a secondary analysis involving patients enrolled in physical therapy clinical trials. Journal of Orthopaedic & Sports Physical Therapy 2008;38(2):50-8.
27. Pallant J. SPSS Survival Manual. New York: Open University Press; 2007.
28. Altman D. Practical Statistics for Medical Research. London: Chapman and Hall; 1997.
29. Carter Russell E, Lubinsky Jay, Elizabeth D. Rehabilitation Research Principles and Applications: Elsevier; 2005.
30. Edwards RR, Goble L, Kwan A, Kudel I, McGuire L, Heinberg L, et al. Catastrophizing, pain, and social adjustment in scleroderma: relationships with educational level. Clinical Journal of Pain 2006;22(7):639-46.
31. Price DD. Psychological and Neural Mechanisms of the Affective Dimension of Pain. Science 2000;288(5472):1769.
32. Main CJ, Foster N, Buchbinder R. How important are back pain beliefs and expectations for satisfactory recovery from back pain? Best Practice & Research Clinical Rheumatology 2010;24(2):205-17.
33. Meyer K, Tschopp A, Sprott H, Mannion AF. Association between catastrophizing and self-rated pain and disability in patients with chronic low back pain. Journal of Rehabilitation Medicine (Stiftelsen Rehabiliteringsinformation). 2009;41(8):620-5.
34. Cutler DM, Lleras-Muney A. Education and Health: Evaluating Theories and Evidence National Bureau of Economic Research, Inc, NBER Working Papers: 12352 2006.

FYSIO Laken
og oppbevaringsrør
GRANTON

Di medisinsk
Postboks 128, 1309 Rud
Telefon 67177440 • Fax 67177474
firmapost@digruppen.no
www.digruppen.no

Kjøp eller lease Redcord Stimula

redcord MEDICAL

Redcord Stimula muliggjør en ny behandlingstilnærming som er spesielt effektiv i behandling av:

- Funksjonsforstyrrelser og avvik i muskel-skjelett
- Smertetilstander relatert til dysfunksjon i muskel-skjelett
- Problemer med rygg, nakke, skuldre og bekken

"Kjøpe eller lease, valget er ditt!"

Redcord Workstation med Redcord Stimula.

www.redcord.no
redcord@redcord.com
tlf. 37 05 97 70

redcord