

Fear Avoidance Beliefs and Quality of Life after Lumbar Disc Surgery

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Abstract

Fear avoidance beliefs (FAB) in low back pain (LBP) are associated with disability and pain. There is no data on how changes in FAB affect disability and other factors after lumbar disc surgery. The aim of this study was to evaluate the effects of lumbar disc surgery on FAB and to investigate whether FAB changes predict changes in emotions, disability, and quality of life after lumbar disc surgery. 106 patients with chronic LBP were evaluated 1 day preoperatively and 3 months postoperatively. Sociodemographic questionnaire, Visual Analog Scale (VAS), Beck Anxiety Inventory (BAI), Beck Depression Inventory (BDI), Fear and Avoidance Beliefs Questionnaire (FABQ), Oswestry Disability Index (ODI), and Short form-36 (SF-36) Health Survey Questionnaire were used. The end point ODI, VAS, BDI, BAI, FABQ fear avoidance (work) scores, most of SF-36 the subscale scores were significantly lower than the baseline scores. According to correlation analyses between mean changes in the outcome measures, there was no significant relationship between changes in fear avoidance (physical), fear avoidance (work) and other outcome measures. In conclusion, future research is needed to evaluate the effect of lumbar disc surgery on FAB.

Keywords: Fear and avoidance, disability, quality of life, lumbar disc surgery

Öz

Bel Ağrısı Nedenli Operasyon Sonrası Korku Kaçınma İnanışları ve Yaşam Kalitesi

Bel ağrısındaki korku kaçınma inanışları (KKİ), yeti yitimi ve ağrı ile ilişkilidir. Bel fıtığı cerrahi operasyonu geçiren hastalardaki KKİ değişiminin yeti yitimi ve diğer etmenleri nasıl etkilediğine dair bir veri bulunmamaktadır. Bu çalışmanın amacı bel fıtığı cerrahisinin KKİ üzerine etkisi olup olmadığını ve KKİ değişiminin, yeti yitimi ve yaşam kalitesi değişimi ile ilişkisini araştırmaktır. Kronik bel ağrısı yakınması ile başvuran 106 hasta ameliyattan hemen önceki gün ve ameliyat sonrası 3. ayda değerlendirildi. Sosyodemografik veri formu, Görsel Analog Skala (GAS), Beck Anksiyete Envanteri (BAE), Beck Depresyon Envanteri (BDE), Korku kaçınma inanışlar anketi (KKİA), Oswestry skalası (OS) ve Kısa form-36 uygulandı. Ameliyat sonrası OS, GAS, BDE, BAE, KKİA-iş bölümü, genel olarak KF-36 alt ölçekleri ameliyat öncesi değerlere göre anlamlı olarak düştü. Sonuç değişkenlerindeki ortalama değişimler arasındaki korelasyon analizine göre, KKİA-iş bölümü, KKİA-fiziksel aktivite bölümü ve diğer sonuç değişkenleri arasında anlamlı ilişki saptanmadı. Sonuç olarak bel fıtığı cerrahisinin KKİ üzerinde etkisinin anlaşılması için ileri araştırmalara gereksinim vardır.

Anahtar Kelimeler: Korku kaçınma, yeti yitimi, yaşam kalitesi, bel cerrahisi

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INTRODUCTION

Low back pain (LBP) is a common health problem. Its point prevalence ranges from 12% to 33%, 1-year prevalence ranges from 22% to 65%, and lifetime prevalence ranges from 11% to 84% (Walker, 2000). When the pain lasts more than 3 months, it is accepted as chronic pain (Raj, 2000). LBP is an important factor that causes disability, inability to work, low quality of life, emotional disorders, and economic loss (Atlas & Nardin, 2003; Bener et al., 2013).

Biomedical model is insufficient to explain LBP since it is difficult to indicate specific somatic symptoms for LBP (Turk & Okifuji, 2002). Anxiety, depression, beliefs on pain, and fear of pain were defined as psychological factors of chronic pain and disability (Nagarajan & Nair, 2010). According to the 'Gate Control Theory', cognitive mechanisms in the brain are an indispensable part of the phenomenon of pain. It was revealed that previously learned behavior and information are important in the perception of pain (Melzack & Wall, 1965).

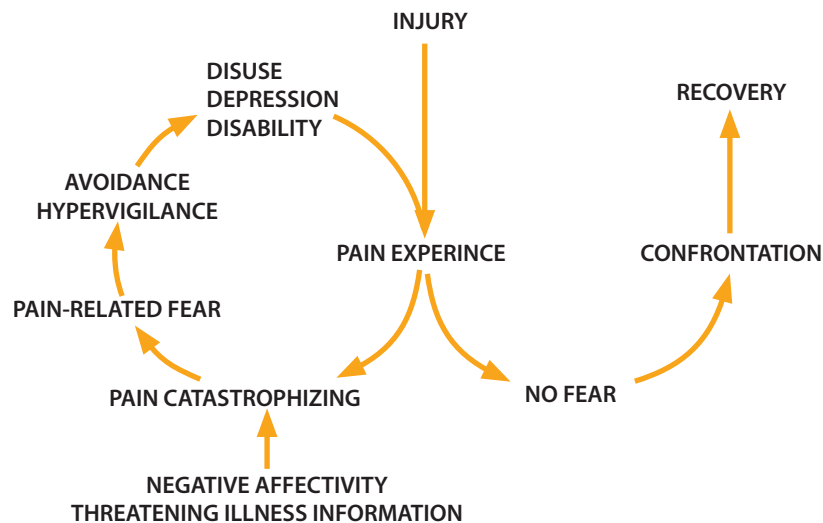
Pain-related fear and anxiety can best be defined as the fear that emerges when stimuli that are related to pain are perceived as the main threat (Leeuw et al., 2007). According to learning theories, traumatic experience that causes pain is interpreted in a catastrophic way. The information of threatening illness that comes from previous experience causes fear and anxiety. That leads to avoidance to perceived harmful physical activity or hypervigilance to bodily sensations. In other words, pain is considered as an unconditioned stimulus that activates an immediate

defensive system, FAB which is considered as conditioned stimulus that leads to depression, and disability. An association develops between pain and FAB (see Figure 1) (Corbière et al., 2011; Vlaeyen & Linton, 2012).

There is accumulated research literature supporting that FAB are important factors for LBP (Vancleef, Peters, Roelofs, & Asmundson, 2006; Cook, Brawer, & Vowles, 2006; Swinkels-Meewisse, Roelofs, Oostendorp, Verbeek, & Vlaeyen, 2006; Gatchel, Peng, Peters, Fuchs, & Turk, 2007; Leeuw et al., 2007; Gheldof et al., 2010; Jensen, Albertsen, Karpatschof, & Labriola, 2010). FAB are associated with disability and pain in LBP (Vlaeyen & Linton, 2000). It has even been suggested that FAB are more disabling than pain intensity itself (Crombez, Vlaeyen, Heuts, & Lysens, 1999; Linton, 2000; Thibodeau, Fetzner, Carleton, Kachur, & Asmundson, 2013).

It has been investigated to find out whether changes on these cognitive factors were related to changes in chronic LBP and disability. It was found that reductions in fear-avoidance beliefs about work and physical activity were related to reductions in disability, even after controlling for reductions in pain intensity, age and sex (Woby, Urmston, Watson, & Roach, 2004). The effectiveness of counseling on pain management education on conventional physical therapy in people with fear-avoidance beliefs and acute LBP has been studied. It was found that the number of days off work are less in patients who got education compared to patients who got only a conventional physical therapy (Godges, Anger, Zimmerman, & Delitto, 2008). The effects of three different pain education methods on

Figure 1.



fear avoidance belief have been compared in low back pain. It was concluded that seminar or booklet educations are useful to reduce FAB (Tonga, Özünlü, Daşkapan, & Duger, 2012). The prediction of pre-surgery cognitive behavioral factors on post-surgery disability at 6 weeks and 6 months in LBP was studied. It was found that more fearful patients reported more disability after controlling for levels of pain and disability prior to surgery (den Boer, Oostendorp, Beems, Munneke, & Evers, 2006).

We have known that educational interventions of cognitive factors change FAB and pre-surgery cognitive behavioral factors affect post-surgery disability and pain. There were no studies on how FAB changes affect disability and other factors after lumbar disc surgery until now. The aim of this study is to investigate the effects of lumbar surgery on FAB and to study the relationship between FAB changes and changes on disability, quality of life after lumbar disc surgery.

METHODS

Participants and study design

This study included patients consecutively admitted to the Bakırkoy Sadi Konuk Education and Research Hospital neurosurgery outpatient clinic during eighteen months period. From 115 patients; 2 refused to approve the informed consent, 3 of them did not attend to the control examination as they were living at other city, 4 of them were drop out. The study included 106 patients with lumbar disc hernia compatible with lumbar MRI findings. All patients had both medical and conventional physical therapy before, but were still suffering from pain and neurological symptoms so that the decision for surgery was based on the neurosurgeons' assessments according to their neurological examination and MRI findings of lumbar disc hernia.

Inclusion criteria were age older than 15 years, history of failure of conservative treatment, being literate, and capable of completing the self-report scales, and all provided written informed consent.

Subjects were first evaluated when they were hospitalized, one day preoperatively. The second evaluation was performed three months after surgery. For both evaluations, sociodemographic data form, Visual Analog Scale, Beck Anxiety Inventory, Beck Depression Inventory, Fear

and Avoidance Belief Questionnaire, Oswestry Disability Index and Short Form (SF-36) were used.

Instruments

Sociodemographic Data Form: The researchers developed a form to obtain sociodemographic data from the participants according to the objectives of the study.

Visual Analog Scale (VAS): It is a 10 cm rule. One end signifies most severe pain and the other end signifies no pain. The distance from no pain to where the patient has made his/her mark reflects the pain of the patient (Price, McGrath, Rafii, & Buckingham, 1983).

Beck Anxiety Inventory (BAI): It is a Likert type self-evaluation scale containing 21 items. High overall score indicates high level of anxiety (Beck, Brown, Epstein, & Steer, 1988; Ulusoy, Sahin, & Erkmen, 1988).

Beck Depression Inventory (BDI): It was developed to determine the risk of depression in the individual and to measure the severity of depressive symptoms and the change in severity (Beck, Ward, Mendelson, Mock, & Erbaugh, 1961; Hisli, 1989).

Fear and Avoidance Belief Questionnaire (FABQ): It includes 16 questions and 2 parts. First part of the questionnaire evaluates the attitude towards physical activities and the second part attitudes towards professional work activities. It is a 7 point Likert type scale and physical activity section is scored between 0-24 and work section between 0-36 (Waddell, Newton, Henderson, Somerville, & Main, 1993; Korkmaz et al., 2009).

Oswestry Disability Index (ODI): The scale assesses activity limitations, and contains 10 different items that were scored on a six-point scale, with 0 representing no limitation and 5 representing maximal limitation. A percentage score from 0 to 100 is calculated (Fairbank, Davies, Couper, & O'Brien, 1980; Yakut et al., 2004).

Health Survey Questionnaire Short Form (SF-36): It is the most commonly used scale in the measurement of the quality of life. It was developed to measure quality of life particularly in people with physical disease. Its scoring requires detailed instructions. There is no overall score. Overall score of 8 scales, i.e. physical functioning, social functioning, role-physical, role-emotional, mental health, vitality, bodily pain, and general health perception is

calculated (Ware & Sherbourne, 1992; Kocyigit, Aydemir, Fisek, & Memis, 1999).

Statistical analysis

Statistical analyses were performed with SPSS 18.0 software (SPSS Inc., Chicago, IL, USA). Distribution of data was determined by Kolmogorov-Smirnov test. Continuous variables were expressed as mean \pm std. error of mean or median (min-max), categorical variables as frequency and percent. The Wilcoxon Signed Ranks test was used to compare repeated measurements of the variables. Linear relation between two continuous variables was evaluated by Pearson correlation analysis or Spearman correlation analysis. *p* value of less than 0.05 was considered statistically significant for all tests.

RESULTS

Study included overall 106 patients, 68 of whom were (64.2%) female and 38 of whom (35.8%) male. Their ages ranged between 15 - 74 with a mean age of 46.5 ± 14.2 . Study included 20 (18.9%) single, 86 (81.1%) married individuals. There were 24 patients with BDI scores of 21 or above. Sociodemographic and clinical characteristics of study is shown in Table 1.

The baseline and the end point scores in ODI, VAS, BDI, BAI, FABQ fear avoidance (physical), FABQ fear avoidance (work), and SF-36 subscales scores are listed in Table 2. The end point ODI ($p < 0.001$), VAS ($p < 0.001$), BDI ($p < 0.001$), BAI ($p < 0.001$), FABQ fear avoidance (work) ($p = 0.001$), SF-36 pain ($p < 0.001$), SF-36 social functioning ($p = 0.029$), SF-36 general health ($p < 0.001$) scores were significantly lower than baseline scores. The end point SF-36 physical function ($p < 0.001$), SF-36 role function (physical) ($p < 0.001$), SF-36 role function (emotional) ($p < 0.001$) scores were significantly higher than baseline scores. There was no significant difference for the SF-36 mental health and SF-36 fatigue/vitality scores (Table 2).

We used bivariate correlation analyses between mean changes in the outcome measures. There was no significant relationship between changes in FABQ fear avoidance (physical), FABQ fear avoidance (work) and other outcome measures ($p > 0.05$).

Table 1: Sociodemographic and clinical characteristics of study (n = 106)

Age, mean \pm SD	46.5 \pm 14.2
Duration of complaints, med (min -max)	2 (1 - 15)
Sex, n (%)	
Female	68 (64.2)
Male	38 (35.8)
Marital status, n (%)	
Single	20 (18.9)
Married	86 (81.1)
Educational level, n (%)	
Primary	70 (66.1)
Secondary	18 (17.0)
High	17 (16.0)
University	1 (0.9)
Occupation, n (%)	
Job requiring physical activity	18 (17)
Job not requiring physical activity	12 (11.3)
Unemployed	8 (7.5)
Retired	11 (10.4)
House wife	57 (53.8)
The number of pregnancies, n (%)	
0	39 (57.4)
1	1 (1.5)
2	5 (7.4)
3	9 (13.2)
4 or over	14 (20.6)
Smoking status	
Does not smoke	80 (75.5)
0-10	17 (16.0)
10-20	3 (2.8)
20-30	6 (5.7)

There was no significant relationship between preop and postop FABQ scores and BDI, BAI, ODI, VAS, SF-36 scores after operation ($p > 0.05$).

DISCUSSION

In our study, we investigated effects of lumbar disc surgery on cognitions associated with pain. It is well known that psychological distress such as anxiety, depression is more prevalent in LBP (Bener et al., 2013). Changes in pain are related to changes especially in anxiety and depression

Table 2:

	<i>Baseline, med (min – max)</i>	<i>Endpoint, med (min – max)</i>	<i>p</i>
ODI	60 (32 – 98)	22 (16 – 42)	<0.001
VAS	8 (5 - 10)	3 (1 - 10)	<0.001
BDI	13 (0 – 57)	6 (0 – 32)	<0.001
BAI	14 (0 – 59)	2 (0 – 8)	<0.001
FABQ			
Fear avoidance (physical)	16 (0 – 30)	15 (0 – 30)	0.429
Fear avoidance (work)	19 (0 – 66)	13.5 (0 – 41)	0.001
SF-36			
Physical function	17 (10 - 25)	24 (18 - 28)	<0.001
Social functioning	6 (2 - 10)	6 (2 - 8)	0.029
Role function (physical)	4 (4 - 7)	6 (4 - 8)	<0.001
Role function (Emotional)	4 (3 - 6)	5 (3 - 6)	<0.001
Mental health	18 (9 - 28)	19 (15 - 23)	0.138
Fatigue/ Vitality	15 (5 - 21)	14 (11 - 18)	0.522
Pain	9 (3 - 11)	5 (3 - 7)	<0.001
General health	17 (12 – 21)	16 (13 - 19)	<0.001

Wilcoxon signed-rank test
 ODI=Oswestry Disability Index, VAS=Visual Analog Scale, BDI=Beck depression inventory, BAI=Beck anxiety inventory, FABQ=Fear and avoidance beliefs questionnaire, SF-36=Short form-36.

after surgery (Carr, Nicky Thomas, & Wilson-Barnet, 2005). It is shown that pain caused preoperative depression, anxiety, and poor life quality in patients with LBP. After the surgery, patients' pain decreased, and that led to decrease in depression, anxiety, and improvement in quality of life (Lebow et al., 2012). In the current study, baseline anxiety, depression, and most of the life quality scores were significantly higher than end point anxiety, depression, and most of the life quality scores. These changes can be related to continued effects of pain on an individual's life quality or evaluating surgery as a physical and psychological stressor by patients. It is more acceptable that pain and emotional parameters, and life quality have a cumulative effect (Carr et al., 2005).

Studies on FAB were criticized in terms of their methods. Some researchers tend to select studies which support their beliefs. Then analysis and discussion of some studies are not proper for systematic research. As a result, studies may have bias and may overestimate FAB effect (Kovacs et al., 2012). Although it is found both fear avoidance work and physical activity are related to disability, some studies suggested that fear-avoidance work explains the variance in disability as well (Waddell et al., 1993; Crombez et al.,

1999). Some studies suggested that fear avoidance physical activity explains the variance in disability well (van den Hout, Vlaeyen, Heuts, Sillen, & Willen, 2001; Woby et al., 2004). According to our previous study in Turkish patients with LBP, we found a relation between fear avoidance work and disability, whereas there was no relation between fear avoidance physical and disability (Guclu, Guclu, Ozaner, Senormanci, & Konkan, 2013). It has been suggested that differences between results of studies may be caused by different baseline levels of the measurements (Woby et al., 2004). It has also been suggested that self-efficacy and anxiety sensitivity are related with fear associated pain and disability (Connolly, Aitken, & Tower, 2014; Zale & Ditre, 2015).

The current study has a prospective nature that is different from aforementioned studies. Therefore, we only detected a significant reduction on fear avoidance work score after surgery. The results of the study may be affected from the high percentage of housewives, low education level and the low rate of occupation in nonphysical activities.

It has been suggested that studies that were conducted in some cultures show minimal or no relationship between

FAB and disability (Kovacs et al., 2012). According to the fear avoidance model, individual reaction to painful stimulus may lead disability in an individual's life. When the individual confronts his fear, he continues his activities gradually, and then he returns to the previous activity level. On the other hand, avoidance is a maladaptive response. In case of avoidance, individuals avoid activities that are perceived to exaggerate pain, and then that causes exaggerated pain perception, disability, and mental problems (figure 1) (Woby et al., 2004). Pain can be considered as conditioned stimulus, and fear avoidance work beliefs as unconditioned stimulus. Catastrophic thinking style about pain and learning processes has a key role to develop the behavioral pattern. This also stems from individual's unique life experiences. It has also been stated that postoperative disability and pain intensity may be influenced by cognitive-behavioral factors arising from past learning history, predispositional factors, social factors, information from health care providers, and/or cultural background (den Boer et al., 2006). We think that different results of studies on FAB don't stem from bias or overestimation in the studies. These differences may result from study samples that have different cultural backgrounds, life experiences, and learning processes.

It has been found that FAB were reduced by cognitive behavioral therapy in both acute and chronic LBP (Moore, Von Korff, Cherkin, Saunders, & Lorig, 2000; Brox et al., 2003). Although we did not apply any cognitive behavioral interventions to the patients, fear avoidance work beliefs significantly decreased after surgery. This can be similar with some psychiatric disorders which describe their cognitive behavioral mechanisms well. Antidepressants work for cognitions indirectly with their effect on emotion without direct cognitive behavioral interventions (Besiroglu, Çetinkaya, Selvi, & Atli, 2011). In the current study, association between pain and FAB may be disappeared by lumbar disc surgery. Our study has no method and measurement that can indicate the mechanism.

In terms of mean change in outcome measurements, we could not find correlation between FAB and other outcome measurements after surgery. We also did not find any correlation between pre-op and post-op FAB beliefs and outcome measures. On the other hand, Woby et al.'s study that has a similar method with our study showed that cognitive behavioral therapy was effective (2004). Although, the current study showed a significant decrease of FAB score, it is reasonable not to make correlations between

mean change of FAB and mean change of other outcome measurements. According to the learning principles, direct interventions of cognitions may result in correlation between them. BDI has cognitive and physical symptom items. Items that assess physical symptoms in BDI could have affected and covered the correlations.

Our study has some limitations. FABQ was not developed to assess post-surgery beliefs. This population might have some fear of specific movements, such as turning in bed or lifting heavy objects from the floor (Ostelo, Vlaeyen, van den Brandt, & de Vet, 2005). Although studies that have longer follow-up periods on FAB show no additional effect, the short duration of our study can be considered as another limitation. We didn't also inquire the degree to which present work life required physical effort. Especially in patients with high fear-avoidance behavior (work), studies evaluating the effect of work characteristics on disability and quality of life should be planned.

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