

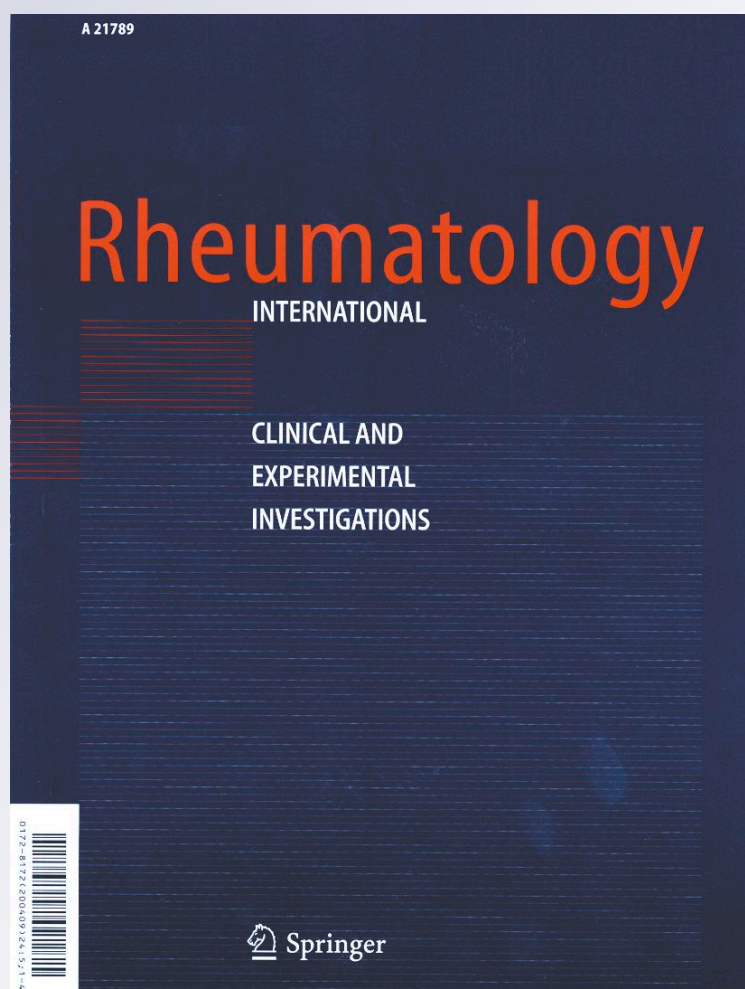
# *Psychosocial, educational, and somatic factors in chronic nonspecific low back pain*

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## Psychosocial, educational, and somatic factors in chronic nonspecific low back pain

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**Abstract** Analysis of the effect of psychosocial factors and co-morbidities on the health status of patients with chronic nonspecific low back pain and patients with surgical intervention because of disk herniation was performed. One hundred and two nonselected consecutive inpatients with chronic nonspecific low back pain were included in the study. Their average age was 56.7 (SD = 10.9) years. The control group consisted of 199

subjects matched according to age and sex, chosen from the database of the national representative health survey Hungarostudy 2006, which involved 4,527 subjects. We measured quality of life including mental health with the SF-36 questionnaire validated for use in Hungary, the short 9-item version of the Beck Depression Inventory, the WHO-Five Well-Being Index, and the Hospital Anxiety-Depression Scale. We characterized the socio-demographic status with variables on age, sex, marital status, and education. Data on symptoms and signs of low back pain, other musculoskeletal diseases, and their treatments including spinal surgery were recorded. Co-morbidity and body mass index were considered as independent indicators of health. Depression as measured by Beck Depression Inventory and severity of depression did not vary significantly according to marital status, education, hypertension, diabetes, and gastrointestinal disease. Only half of the patients (52 %) were in the normal range of the scale; 22 % suffered from mild, 16 % from moderate, and 12 % from severe depression. Average values for anxiety and depression as measured by Hospital Anxiety-Depression Scale and Beck Depression Inventory were both significantly higher in the patient than in the control group (Hospital Anxiety Scale:  $p = 0.0001$ ; Beck Depression Inventory:  $p = 0.0001$ ). According to the WHO Well-Being Index-5 scale, the difference between patients and the control group was significant ( $p = 0.0001$ ). Furthermore, correlation was found between the incidence of depression and surgery. Depression was demonstrated in 47.4 % of those patients who had no surgery, in 50 % of patients who had one round of surgery, and in 62.5 % of those who had undergone surgery more than once; the contingency coefficient was 0.211. According to different measurements, the psychological state of patients with chronic nonspecific low back pain was significantly altered as compared to the matched

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Hungarian population. Higher anxiety and depression markers occurred in 48 % of the patients. There was no correlation between the depression of patients with low back pain and variables such as marital status, education, and co-morbidities. Our study is the first to demonstrate that depression runs parallel with the number of surgical procedures. Therefore, if there is a relative indication for surgery, depression and severity of depression should be assessed and considered when deciding on the intervention.

**Keywords** Low back pain · Spinal surgery · Depression

### Abbreviations

BDI	Beck Depression Inventory
BMI	Body mass index
HADS	Hospital Anxiety-Depression Scale
HHP	Hungarostudy Health Panel
HSCL	Hopkins Somatization Scale
SD	Standard deviation
SF-36	Short form
PF	Physical function
PR	Physical role
PP	Physical pain
GH	General health
VT	Vitality
SF	Social function
ER	Emotional role
MH	Mental health
SHS	Subjective health symptoms

### Introduction

Chronic nonspecific low back pain (LBP) is one of the most common musculoskeletal problems. It is considered as a multifactorial disorder in which somatic, including musculoskeletal and psychosocial, factors play an important role. It does not affect lifespan, but produces distressing symptoms, causes inability to work, and requires regular medicinal and physical therapy in order to maintain fitness to work. Despite every effort, inability to work is often irreversible. LBP is recorded as the most common medicinal cause of disability. Waddel reported a return-to-work rate of 50 % after a work absence of 6 month and 25 % after 1 year [1]. Medical staff are frustrated because of the frequent failures of therapy. The prevalence of major depression in patients with chronic nonspecific LBP is approximately three to four times greater than that reported in the general population [2].

If we analyze the therapeutical failures, one possibility is that chronic LBP is just a somatization symptom or part of an underlying depression, which was not recognized or

treated efficiently. Patients often undergo surgery for chronic LBP if they do not respond to conservative treatment and radiological studies show morphological changes. However, asymptomatic spinal disk herniations are incidentally found on MRI scans performed on patients without LBP [1, 3]. Surgery usually does not help somatizing patients and does not prevent disability.

The other possibility is that we did not treat the acute LBP effectively, whether conservative treatment only or rehabilitation after surgery. It may be that the patient is not referred to a specialist soon enough, is not mobilized in time, and then the LBP becomes chronic. So there begins a vicious circle in which the patient cannot return to work, becomes disabled, and becomes depressed due to deteriorating medical and social status.

The primary end-point of this study was to analyze the occurrence of psychological disorders predominantly depression among patients who have chronic nonspecific LBP or had undergone spinal surgery. The second aim was to study whether the number of spinal surgeries correlates with the incidence and severity of depression in patients suffering from chronic nonspecific LBP.

### Methods

#### Sample

The study group included 102 nonselected consecutive inpatients, 17 male and 85 female patients who presented with chronic nonspecific LBP as their major symptom. Chronic nonspecific LBP was defined as pain in the lower lumbar region without nerve root symptoms lasting over 3 months and with exclusion of anatomical/pathological reasons. Their average age was 56.7 (SD = 10.9) years. Among them, 25.5 % had spinal surgery for intervertebral disk disease. They received comprehensive treatment at the National Institute of Rheumatology, Budapest. Participation was voluntary, and the patients signed an informed consent in agreement with the local ethical committee. Inclusion criteria were the twice ineffective comprehensive including balneo-physiotherapy treatment as inpatient and at least one year from the last spinal surgery. The patients did not suffer from overt depression. For assessment, we used a standardized questionnaire at admission and prior to discharge. The control group consisted of 199 patients matched according to age and sex, chosen from the database of the national representative health survey, Hungarostudy 2006, based on the data of 4,527 subjects [4].

We have also used some data from a parallel study of our group. In fact, the same investigators using the same standardized assessment and tests performed a survey about the musculoskeletal disorders and psychosocial state

among miners. These results are published in detail in a separate paper (see [9]).

### Survey

Many inventories have been created in the past couple of decades to survey patients' evaluation of their own physical, social, and psychological well-being. We measured the quality of life with the short-form (SF-36) questionnaire validated for use in Hungary, the short 9-item version of the Beck Depression Inventory (BDI), the Five Well-Being Index of the World Health Organization (WBI-5), and the Hospital Anxiety-Depression Scale (HADS) [4–8]. We characterized the socio-demographic status with variables on age, sex, marital status, and economic activity. Data on musculoskeletal symptoms, signs, and treatments (surgery of the spine, comprehensive treatments) were collected. Co-morbidity including diabetes, hypertension, gastrointestinal disease, and body mass index (BMI) were considered as independent indicators of health.

### Statistical analysis

The following statistical methods were applied: quantitative analysis of distribution, calculation of average scores, chi-square test, *t* test, ANOVA, odds ratio, and calculating correlation and regression analysis.

### Results

Education: 2 of the patients in the studied group had an education of less than 8 years of elementary school, 18 had finished the 8 years of elementary school, 24 were trained skilled workers, 20 had finished technical middle schools, 18 had a high school degree, and 20 patients had either a college or university degree.

In terms of marital status, 13 were divorced, 61 were married, 2 were married but separated, 8 unmarried, and 18 widowed.

Data on economic activity: 66.7 % of the study group was not economically active versus 33.3 % (Table 1).

Body mass index: 1 % of LBP patients were undernourished, 20.6 % had normal BMI values within normal range, 27.5 % were obese, 40.7 % were severely obese, and 36.3 percent were overweight.

Hypertension was observed in the study group in 48 %, diabetes in 8.8 %, and gastrointestinal disease in 9.8 %.

Average HADS results in the group that refers to the severity of anxiety was 7.9 (SD = 4.75); these values are borderline pathological.

The WHO Well-Being Index (WBI-5) is suited for studying quality of life in terms of health. It is self-

**Table 1** Descriptive statistics of the study group and control group

	Study group N (%)	Control group N (%)
Sex		
Male	17 (16.7)	34 (17.1)
Female	85 (83.3)	165 (82.9)
Education		
Less than 8 years	2 (2.0)	6 (3.0)
Elementary school	18 (17.6)	32 (16.1)
Skilled workers	24 (23.5)	46 (23.1)
Technical middle school	20 (19.6)	40 (20.1)
High school	18 (17.6)	34 (17.1)
University	20 (19.6)	41 (20.6)
Marital status		
Unmarried	8 (7.8)	16 (8.0)
Married	61 (59.8)	116 (58.3)
Separated	2 (2.0)	11 (5.5)
Divorced	13 (12.7)	24 (12.1)
Widowed	18 (17.6)	32 (16.1)
Economic activity		
Yes	34 (33.3)	108 (54.3)
No	68 (66.7)	91 (45.7)
Age		
Mean (SD)	56.7 (10.9)	54.3 (14.2)

administered, has a multi-dimensional approach, and takes psychological, physical, and social aspects into account. In our study, we used the Hungarian 5-item short version of this test. Average WBI-5 score was 15.7 (SD = 5.4) in the study group.

Distribution in the study group according to results on the Beck Depression Inventory score was as follows: 51 % scored within normal range, 21 % suffered from mild, 16 % from moderate, and 12 % severe depression.

We examined the correlation between normal, mild, moderate, and severe depression groups according to the BDI and having undergone spinal surgery once, more, or not at all (Table 2).

**Table 2** BDI values correlated to the number of performed spinal surgeries

BDI categories	Spinal surgery			
	Once	More than once	None	
Normal	9	3	40	52 (51.0 %)
Mild	6	2	14	22 (21.6 %)
Moderate	1	1	14	16 (15.7 %)
Severe	2	2	8	12 (11.8 %)
	18 (17.6 %)	8 (7.8 %)	76 (74.5 %)	102

1–9, normal; 10–18, mild; 19–25, moderate; and ≥26, severe

49 % of the patients with LBP suffered from mild, moderate, or severe depression. 40.8 % of patients with LBP had no spinal surgery nor did they suffer from depression. Half of the patients (9 people) who had undergone surgery once and 5 of those who had undergone surgery more than once (8 people) turned out to be depressed (62 %). Of 76 patients who had not been operated on, 36 were depressed (47.4 %). A correlation was found between depression and spinal surgery; the contingency coefficient was 0.211.

#### Comparison of the results of the study group and controls

Average HAS value of the control population has been: 4.9 (SD = 4.5). The average result in the control group was unquestionably within the normal range. A significant difference ( $p < 0.0001$ ) was found between the HAS average values of the study and the control group.

Average WBI-5 scores were 15.7 (SD = 5.4) in the study group and 8 (SD = 3.9218) in the control population. The difference was significant ( $p < 0.0001$ ).

We compared BDI results of the study group and the control population: BDI average of patients was: 9.5 and 4.4 in the control population. The difference between the study group and the control population was significant ( $p < 0.0001$ ).

Body mass index was also calculated in both the study and the control group. The average BMI of patients was 28.6 (SD = 6.2) and 25.5 (SD = 4.4) in the control population. The difference in terms of BMI between the study group and the control population was significant ( $p < 0.0001$ ).

We analyzed whether there was a correlation between BMI, spinal surgery, and the number of surgeries performed. The contingency coefficient was 0.254, so a correlation was found.

Correlations between the psychological condition of the patients and factors such as education, marital status, co-morbidities, and BMI were analyzed.

There was a significant difference between hypertensive diabetic patients and patients with gastrointestinal diseases according to BMI (in the case of hypertensive patients  $p = 0.0001$ , diabetics  $p = 0.0158$ , patients with gastrointestinal diseases  $p = 0.0149$ ). So, higher BMI values are associated with cardiovascular, metabolic, and gastrointestinal co-morbidity. No statistic correlation was found between the above-mentioned diseases and the depressive state.

BDI results did not vary significantly according to level of education ( $p = 0.09$ ) in the studied group. In the same way, BDI results did not vary significantly according to the marital status ( $p = 0.70$ ).

The SF-36 questionnaire examines the individual according to the following dimensions: physical function (PF), physical role (PR), physical pain (PP), general health (GH), vitality (VT), social function (SF), emotional role (ER), and mental health (MH). Each dimension in the questionnaire is scored between 0 and 100 and may be compared visually when marked on a graph (Fig. 1, below). Considering the results of all 8 dimensions, we may conclude that the higher the score, the healthier the patient feels and the fewer disabilities the patient has. No significant differences were found between results on this scale in terms of age, level of education, marital status, occupation, number of work years completed, and presence or lack of musculoskeletal symptoms.

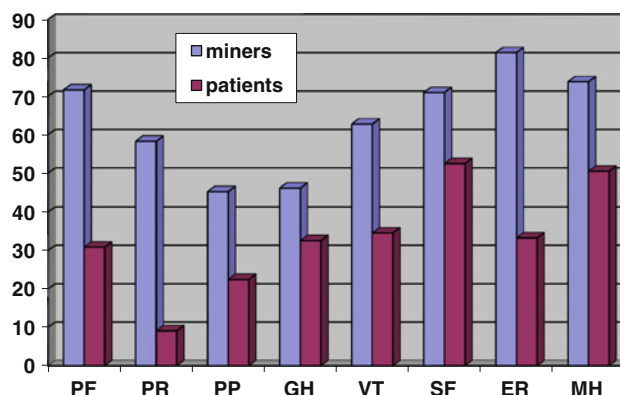
In a previous study, SF-36 dimensions of miners who had undergone spinal surgery because of disk herniation but were fit to work were analyzed [9]. These results were compared to the values of the Hungarian normal population and also to a group of patients in this study who went back to work after spinal surgery. It was clear that spinal surgery in itself did not influence the miners' physical, mental, emotional, and social state, while our chronic LBP patients in this study scored significantly lower in all dimensions (Fig. 1). This figure is based on the data of 26 patients and 6 miners, respectively.

#### Discussion

Our study confirms that depression is a significant factor in chronic nonspecific LBP.

According to data in the literature on this topic, the psychological problems of patients suffering from chronic nonspecific LBP must be addressed in the first place, while they are already in primary care [10].

In a controlled study, Ang et al. [11] came to the conclusion that chronic musculoskeletal pain and depression



**Fig. 1** Analysis of SF-36 dimensions of patients as a function of spinal surgery compared to results of miners operated and fit to work

were inseparably united with psychosocial and socio-demographic factors and pain-related psychological state. Vranceanu et al. [12] suggested that a cognitive-behavioral therapy may be effective in this complex and difficult problem. In their study, Mohr et al. [13] used the HADS depression questionnaire (HADS), the Hopkins Somatization Scale (HSCL), and the SF-12 questionnaire to determine physical and mental well-being. During the 24-month follow-up, they also found that a cognitive-behavioral therapy may be effective in patients suffering from both depression and LBP. The improvement was slow. Ahrens [14] also used the SF-36 questionnaire to determine life quality of patients with LBP and also suffering from depression. Their study clearly concluded that the co-morbid group was more severely affected, but they also demonstrated slow but unequivocal improvement to therapy. Furthermore, the long-term prognosis was good. Reme [15] studied depressed patients with LBP with the aid of the HSCL and the Subjective Health Symptoms (SHS) questionnaire. This study proved that SHS in itself is good enough to diagnose depression and is both adequately sensitive and specific. Wright [16] analyzed the correlation between obesity and chronic LBP and found that many underlying factors such as family status, socio-demographic factors, and depression may contribute to the association between chronic LBP and depression.

Reviewing the data in the literature [3], similar studies analyzed the correlation between spinal surgery and depression. Filiz et al. [17] found that physical therapy was most effective in alleviating both the postoperative pain and depression. In patients who had undergone surgery for spinal canal stenosis, treating depression both pre- and post-operatively was vital to the effectiveness of surgery [18]. Kaapa et al. [19] emphasize that the rehabilitation of patients with chronic LBP with or without surgery can only be successful when complimented with cognitive-behavioral therapy. Slover et al. measured the improvement of patients who had undergone surgery with the SF-36 and Oswestry questionnaires. They found that psychosocial factors are responsible for the less favorable long-term results and results in terms of fitness to work [20].

In our study, we analyzed the close relationship between chronic nonspecific LBP and depression in terms of quality of life, socio-demographic factors, co-morbidity, psychological state, presence of depression and anxiety, and factors contributing to the success of spinal surgery including physiotherapy and psychotherapy.

Our study confirmed in accordance with the data from the literature that almost half of chronic nonspecific LBP patients suffer from depression, which is significantly higher than the Hungarian population average. Our study is the first to demonstrate that the incidence of depression is higher among patients who had undergone surgery once or

more compared to those who had not. Therefore, if there is a relative indication for surgery in a patient suffering from chronic nonspecific LBP, the presence and severity of depression must be evaluated and considered when deciding on intervention. When treating patients with chronic LBP, we need to focus on diagnosing and treating depression.

Limitation of our study: further prospective research with a larger number of observations might confirm the association between LBP and depression.

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