



# Effect of Basic Characteristics on Improving Quality of Life After Lumbar Spine Decompression Surgery

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## Abstract

**Background:** Lumbar disc degeneration is one of the most common causes of low back pain which can gradually reduce the health-related quality of life (HRQoL).

**Objectives:** The aim of this study was determining factors related with improvement of QOL in lumbar spine decompression surgery.

**Methods:** This quasi-experimental research was conducted on 145 patients with lumbar disc degeneration who underwent lumbar spine decompression surgery during 2017 - 2018. We analyzed the quality of life based on EQ5D/VAS score by self-assessment examination according to age, gender, BMI, educational level, life model, smoking habit, leg and back pain scale, regular activity and walking distance (meters). For the reporting of results, descriptive analysis and repeated measure ANOVA for comparison quality of life (QOL) in three times before, 6 and 12 months after surgery were used. P value less than 0.05 was considered statistically significant. All analyses were conducted using SPSS version 19.

**Results:** Overall, 90 (62.1%) of patients were female. Most patients (30.3%) were in the 41 - 50 years age groups. The EQ-5D/VAS scores improved in all age groups in the three times measured ( $P = 0.001$ ). QOL in normal BMI improved more than overweight and obese ( $P = 0.001$ ). High level of education was associated with more improvement of QOL after surgery ( $P < 0.001$ ). Patients who lived with the family had significantly higher QOL score before, 6 and 12 months after surgery ( $P < 0.001$ ). No association was observed cigarette smoking ( $P = 0.03$ ) so the lower duration of pain preparation was associated with higher QOL statistically. Overall, EQ5D score in the leg, back pain, regular activity and walking distance (meters) improved in the duration of one year in all subgroups ( $P < 0.001$ ).

**Conclusions:** According to the results, various factors were effective in improving postoperative quality of life in patients who underwent lumbar spine decompression. So, more study is recommended on the socioeconomic, lifestyle to further improve quality of life after surgery.

**Keywords:** Basic Characteristics, Health-Related Quality of Life (HRQoL), Lumbar Spine Decompression Surgery, EQ5D Questionnaire

## 1. Background

Degenerative lumbar spine conditions involve the slow loss of normal structure and function of the spine over time especially in aging (1). In general, symptoms of a degenerating lumbar disc include pain with movement or at rest, limited motion, weakness, bladder and bowel function problems, sensory loss, and sexual dysfunction. These symptoms can negatively affect daily tasks (2). Health-related quality of life (HRQoL) is multidimensional and in-

corporates domains related to physical, emotional, mental and social functioning. Assessing the health-related quality of life is an important marker for the results of treatment and care interventions (3). Finding the quality of life score in addition to providing proper treatments can be effective in the promotion of therapeutic programs, care, and rehabilitation (4). Further, HRQoL measurement in clinical studies makes a closer relationship between the patient and physician as well as treatment team members. Overall quality of life is a multi-dimensional subject that is

affected by the disease and therapeutic interventions (5). Treatment of the lumbar degenerative spinal disease depends on the type and severity of the condition. Surgery may be required in more severe cases involving herniated discs or spinal stenosis. In one study analyzing the health-related quality of life (HRQoL) by (EQ-5D-3L/EQ-VAS (Euro Quality of Life - 5 Dimension - 3 Level/visual analog scale)), Jansson et al. reported that the mean EQ-5D score improved from 0.36 to 0.64, and the HRQoL improved in 80% of the patients (6). Other studies indicated that EQ-5D is increasingly used in spinal research and as an outcome measure in spinal surgery (7-11). However, no studies have reported EQ-5D scores in patients who have undergone surgery for degenerative spine conditions in Iran.

## 2. Objectives

The aim of this study was to demonstrate related factors with quality of life improvement in patients before, 6 and 12 months after lumbar spine decompression surgery in three tertiary hospitals of Tehran, Iran.

## 3. Methods

This quasi-experimental research was conducted on 145 patients with lumbar disc degeneration disease who underwent decompression surgery with or without fusion during 2017 - 2018. Inclusion criteria for surgery were neurogenic spinal claudication, reduced muscle strength, intractable pain, and those in whom an appropriate 6 to 12 months non operative course of treatment fails. Patients with a previous history of spinal surgery were excluded from the study. A data collection form including demographic characteristics (age, sex, educational level, life model, smoking, past medical history, duration of pain before surgery,) filled by patients before surgery. One form containing signs and symptoms of patients [leg and back pain scale, regular activity, walking ability (meter) (< 100 m, 100 - 500 m, 501 - 1000 m and over 1000 m)] was completed by the neurosurgeons before, 6 and 12 months after surgery. The type of surgery was also explained (decompression with or without fusion). The EuroQol-5D-3L (EQ-5D) questionnaire as an instrument for measuring health-related quality of life was provided to patients three times; before, 6 and 12 months after neurosurgery. The EQ-5D-3L essentially consists of 2 pages, the EQ-5D descriptive system and the EQ visual analog scale (EQ-VAS). The EQ-5D-3L descriptive system comprises the following 5 dimensions: mobility, self-care, usual activities, pain/discomfort, and anxiety/depression. Each dimension has 3 levels: no problems, moderate problems, extreme problems which were

on a scale of 1 to 3. The total score in 5 dimensions was categorized between 5 and 15, in which 5 was the worst (extreme problems) and 15 was the best (no problem) in all dimensions (12). The EQ VAS records the respondent's self-rated health on a vertical, visual analog scale where the endpoints are labeled "Best imaginable health" (100 scores) and "Worst imaginable health state" (0 scores). This information can be used as a quantitative measure of health outcome as judged by the individual respondents (13). The mean score of QOL/VAS in leg and back pain scales, regular activity scale and walking distance (meters) is estimated. Overall EQ5D is one comprehensive and short questionnaire which only takes 1 to 5 minutes to fill depending on the individual's condition. Meanwhile, it has been translated into different languages and its reliability and validity have been confirmed (1, 14-16). In this study, all surgeries were performed by three skilled neurosurgeons with at least 10 years of experience in three general and private hospitals. In most cases, patients referred for the follow-up 6 and 12 months after the operation. The quality of life questionnaire (EQ5D/VAS) was completed via phone interview by the researcher. If the patient left the study for any reason (death, travel, etc.), a new eligible case was replaced for beginning the study. All patients completed the informed consent form at the beginning of the study. It was explained to the patients that all information remained confidential and the results of the study will be published only in groups. RCT code registered in irct.ir is 33996. Finally, this study was approved by the Ethics Committee of Shahid Beheshti University of Medical Sciences, Tehran, Iran.

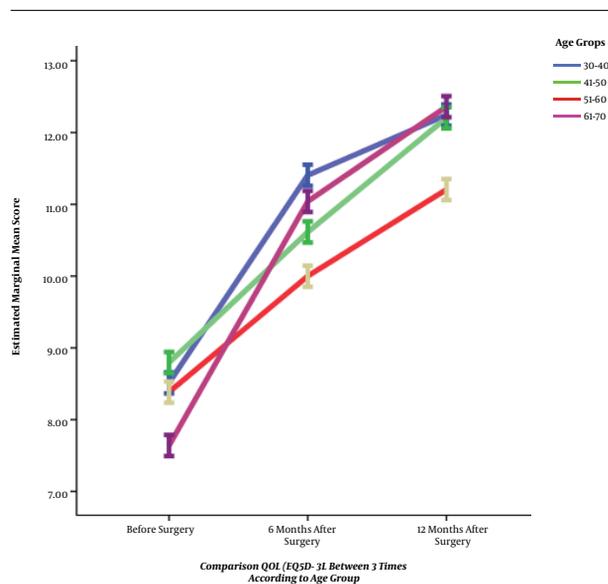
### 3.1. Statistical Analysis

In this study basic descriptive statistics (demographic, signs, and symptoms), reports of each dimension of the EQ5D questionnaire for 3 times, before, 6 and 12 months after surgery (Tables 1 and 2). For comparison of the three EQ-5D-3L/VAS scores before, 6 and 12 months after surgery, repeated measures ANOVA analysis was used. Post-hoc multiple comparisons for observed means of groups performed. In equal variance assumed, *Scheffé* test was used. The charts of quality of life (EQ5D) were drawn in three periods based on age, BMI, life model and duration of pain before surgery. Analyzes were performed using the SPSS version 19 software. The statistical significance level P value < 0.05 was considered.

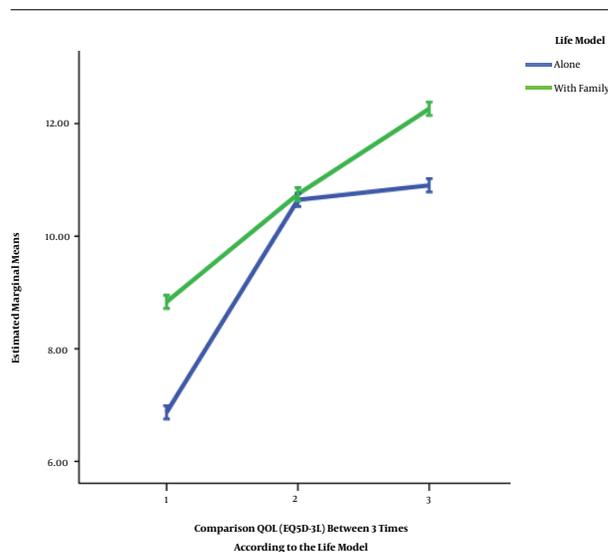
## 4. Results

Overall, among 145 patients with lumbar disc degeneration participated in this study, 90 (62.1%) were female. The

most patients (30.3%) were in the 41 - 50 years age group. Only 10 (6.8%) patients were not available even by phone 6 or 12 months after surgery who were replaced with other patients for the baseline. All results of the descriptive analysis are presented in Table 1. A detailed analysis of the 5 dimensions of the EQ-5D comparing the severity of problems at the three times are demonstrated in Table 2. Overall, in Repeated Measure ANOVA analysis, there was a significant mean difference in the quality of life promotion in all age groups in before, 6 and 12 months after surgery ( $P = 0.001$ ). Post hoc analysis indicated there was a significant mean difference of quality of life in 30 - 40 and 51 - 60 years age groups ( $P = 0.01$ , 95% CI: 0.12 - 1.58) (Figure 1). In VAS, the highest increased score was in the age group of 30 - 40 years. In post hoc comparison, there was significant mean difference between 30 - 40 and 51 - 60 ( $P = 0.008$ , 95% CI: 1.61 - 15.1) also in the 30 - 40 and 61 - 70 years age group ( $P < 0.001$ , 95% CI: 5.71 - 20.99). Furthermore, between 41 - 50 and 61 - 70 years age groups significant difference was estimated ( $P = 0.02$ , 95% CI: 0.84 - 15.6). In comparison QOL in 3 three times based on BMI subgroups, there was the significant mean difference between normal and overweight ( $P = 0.01$ , 95% CI: 0.15 - 1.5) also between overweight and obese ( $P = 0.006$ , 95% CI: -0.15 - -0.2). In VAS comparison between BMI subgroups, a significant mean difference between normal and overweight was reported ( $P = 0.01$ , 95% CI: 1.46 - 15.62). In all educational level, QOL improved in 3 times ( $P < 0.001$ ) but significant mean difference was between QOL in illiterates and elementary school ( $P = 0.03$ , 95% CI: -2.6 - -0.04) as well as illiterate and university education ( $P < 0.001$ , 95% CI: -3.03 - -0.6). In comparison of VAS in educational levels, significant mean difference was between illiterates and elementary ( $P = 0.04$ , 95% CI: -20 - -0.13) as well as illiterate and diploma ( $P = 0.01$ , 95% CI: -25.9 - -1.47) and university education ( $P < 0.001$ , 95% CI: -32.30 - -8.36). Also, in repeated measure ANOVA, the mean of QOL/VAS score in 2 models of life improved in three times significantly ( $P < 0.001$ ) (Figure 2). Furthermore, there was the mean difference between QOL/VAS score and smoking ( $P < 0.05$ ), duration of pain before surgery (only QOL/VAS) ( $P < 0.001$ ,  $P = 0.001$ ) before, 6 and 12 months after surgery (Figure 3). The mean difference between QOL/VAS and walking distance (meters), leg and back pain level as well as regular activity before, 6 and 12 months after was statistically significant ( $P < 0.05$ ). We did not find any difference between QOL/VAS and kind of surgery. All the results of comparison between mean EQ-5D-3L/VAS score in three times, before, 6 and 12 months after surgery are showed in Table 3.



**Figure 1.** A before-after comparison of quality of life-based on "age groups" in patients underwent lumbar disc degeneration decompression surgery (EQ5D,  $P = 0.007$ ) (VAS,  $P < 0.001$ )



**Figure 2.** A before-after comparison of quality of life-based on "life model" in patients underwent lumbar disc degeneration decompression surgery (EQ5D,  $P < 0.001$ ) (VAS,  $P < 0.001$ )

## 5. Discussion

In this study among 145 patients participating who were candidates for lumbar disc degeneration surgery, 62.1% were female. The mean age was 49.53 (9.8) years with range 36 (32 - 68 years). In the majority of similar studies, the mean and average age of disc degeneration was higher (17, 18). Stromqvist et al. in one cohort survey pub-

**Table 1.** Characteristics of Patients Undergoing Lumbar Disc Degenerative Disease Surgery Questionnaire 3 Times Before, 6 and 12 Months After Surgery

Variable	Frequency, No. (%)	Variable	Frequency, No. (%)
<b>Gender</b>		<b>Age groups</b>	
Male	55 (37.9)	30 - 40	37 (25.5)
Female	90 (62.1)	41 - 50	44 (30.3)
<b>Educational level</b>		51 - 60	39 (26.9)
Illiterate	8 (5.5)	61 - 70	25 (17.2)
Elementary school	25 (17.2)	<b>BMI</b>	
Middle/high school	7 (4.8)	18.5 - 24.9 (normal)	45 (31)
Diploma	44 (30.3)	25 - 29.9 (overweight)	22 (15.2)
University education	61 (42.1)	≥ 30 (obese)	78 (53.8)
<b>Back pain</b>		<b>Walk</b>	
Before surgery		Before surgery, m	
1 >	16 (11)	100 >	125 (86.2)
1 - 2	36 (24.8)	100 - 500	20 (13.8)
2 <	93 (64.1)	6 months after surgery, m	
6 months after surgery		100 >	61 (42.1)
1 >	45 (31)	100 - 500	81 (55.9)
1 - 2	92 (63.4)	501 - 1000	3 (2.1)
2 <	8 (5.5)	12 months after surgery, m	
12 months after surgery		100 >	4 (2.8)
1 >	106 (73.1)	100 - 500	64 (44.1)
1 - 2	39 (26.9)	501 - 1000	53 (36.6)
2 <	93 (64.1)	1000 <	24 (16.6)
<b>Past medical history</b>		<b>Regular activity</b>	
Diabetes	3 (21)	Before surgery	
HTN	3 (21)	Yes	13 (9)
DM and HTN	20 (13.8)	No	132 (91)
Cardiac diseases	10 (6.9)	6 months after surgery	
Spine fracture	5 (3.4)	Yes	63 (43.4)
Depression/anxiety	15 (10.3)	No	82 (56.6)
Osteoporosis	16 (11)	12 months after surgery	
Combined	15 (10.3)	Yes	137 (94.5)
None	58 (40)	No	8 (5.5)
<b>Leg pain</b>		<b>Smoking</b>	
Before surgery		Yes	
1 - 2	64 (44.1)	No	117 (80.7)
2 <	51 (55.9)	<b>Duration of pain before surgery</b>	
6 months after surgery		1 - 6 months	27 (18.6)
1 >	16 (11)	> 6 months	118 (81.4)
1 - 2	116 (80)	<b>Type of surgery</b>	
2 <	13 (9)	Decompression with fusion	66 (45.5)
12 months after surgery		Decompression without fusion	79 (54.5)
1 >	48 (33.1)		
1 - 2	97 (66.9)		

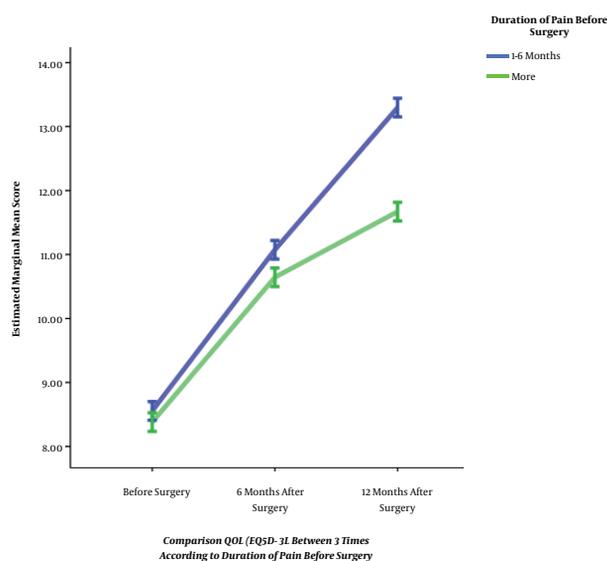
lished in 2017 indicated the quality of life in patients in all age groups before and one year after the disc degeneration surgery improved but this improvement was higher in older age significantly (19). Although in the current study the best preoperative QOL score was in the 41 - 50 age

group the best situation 6 and 12 months after surgery was related to the 61 - 70 age group (despite the worst score before the surgery). Nonetheless, the best VAS score belonged to 30 - 40 age group's three times ( $P < 0.001$ ). In this research we did not find mean difference between EQ5D/VAS

**Table 2.** Number and Proportion of Levels 1 (No Problem), 2 (Moderate Problem) and 3 (Severe Problem) in 5 Dimensions of Quality of Life by EQ-5D Questionnaire at 3 Times Before, 6 and 12 Months After Surgery<sup>a</sup>

EQ-5D-3L Dimension	Before Surgery	6 Months After Surgery	12 Months After Surgery
<b>Mobility</b>			
Level 1	56 (38.6)	3 (2.1)	0 (0)
Level 2	89 (61.4)	109 (75.2)	74 (51)
Level 3	0 (0)	33 (22.8)	71 (49)
<b>Self-care</b>			
Level 1	78 (53.8)	3 (2.1)	0 (0)
Level 2	67 (46.2)	137 (94.5)	119 (82.1)
Level 3	0 (0)	5 (3.4)	26 (17.9)
<b>Usual activity</b>			
Level 1	72 (49.7)	3 (2.1)	0 (0)
Level 2	73 (50.3)	136 (93.8)	119 (82.1)
Level 3	0 (0)	6 (4.1)	26 (17.9)
<b>Pain/discomfort</b>			
Level 1	64 (44.1)	139 (95.9)	0 (0)
Level 2	81 (55.9)	6 (4.1)	67 (46.2)
Level 3	0 (0)	0 (0)	78 (53.8)
<b>Anxiety/depression</b>			
Level 1	18 (12.4)	7 (4.8)	3 (2.1)
Level 2	78 (53.8)	64 (44.1)	66 (45.5)
Level 3	49 (33.8)	74 (51)	76 (52.4)

<sup>a</sup>Values are expressed as No. (%).



**Figure 3.** A before-after comparison of quality of life-based on “duration of pain before surgery” in patients undergoing lumbar disc degeneration decompression surgery (EQ5D,  $P < 0.001$ ) (VAS,  $P = 0.001$ )

score and gender while Jansson et al. showed women had lower pre- and post-operative EQ-5D scores than men (6). In the current survey, the maximum EQ5D/VAS score reported

in normal BMI after surgery while before surgery was in the obese group. In another cohort study by Knutsson et al., the 2 years following-up showed that despite the reduced pain and improved walking ability in obese patients after surgery, the QOL score was higher in normal and overweight groups (11). Another study by Chapin et al. pointed outpatients with BMI scores over 40 had a worse outcome than who were not morbidly obese (18). We found higher QOL in living with family vs alone ( $P < 0.001$ ). Fitzgerald et al. in one investigation mentioned that patients with more social support (married or living with someone) had 9 times more improvement in bodily pain over 3 follow-up periods (20). Yazdi Ravandi et al. in one research in Iran showed the longtime pain is associated with less quality of life in patients which is in agreement with our study (21). Sanden et al. reported that smoking is a significant factor in patient stratification after surgery (22). Forst et al. in one randomized trial compared the efficacy of the decompression surgery with or without fusion technique in patients who have lumbar spinal stenosis and reported EQ-5D score for leg pain was lower in infusion group (23) though we did not find any difference between mean QOL score in 2 type decompression in three measured times. In the Jansson et al. study back and foot pain and preoperative walk distance improved after one year of surgery (6). In our study also, QOL based EQ5D/VAS significantly improved in regular activity, leg and back pain scale as well as walking distance (meters) in following up 6 and 12 months after surgery. There are some limitations to this study. Major information was obtained from the patients themselves, which may lead to information bias. In addition, we replaced patients who had not referred or called for following up with other patients during this survey. So, we did not have the information of these patients to missing data analysis.

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## Footnotes

**Authors' Contribution:** Study concept and design: Arezoo Chouhdari and Kaveh Ebrahimzadeh; analysis and interpretation of data: Arezoo Chouhdari; drafting of the manuscript: Arezoo Chouhdari, Parinaz Rezapour, and Hadi Shahrabi Farahani; critical revision of the manuscript

for important intellectual content: Arezoo Chouhdari, Omidvar Rezaei, Parinaz Rezapour, Mohammad Samadian, Hadi Shahrabi Farahani, Mohammadreza Hajiesmaeili, and Kaveh Ebrahimzadeh; statistical analysis: Arezoo Chouhdari.

**Conflict of Interests:** There are no conflicts of interest.

**Ethical Approval:** IR.SBMU.REC.1396.68

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**Table 3.** Comparison Between Mean EQ-5D-3L/VAS Score in Three Times, Before, 6 and 12 Months After Surgery

Variable	EQ-5D (First)	EQ-5D (Second)	EQ-5D (Third)	P Value	VAS (First)	VAS (Second)	VAS (Third)	P Value
<b>Age groups</b>				0.007 <sup>*</sup>				< 0.001 <sup>*</sup>
30 - 40	8.51 (1.44)	11.40 (0.79)	12.24 (0.89)		22.29 (5.60)	45 (15)	81.48 (7.53)	
41 - 50	8.79 (2.31)	10.61 (0.57)	12.20 (1.47)		21.93 (8.43)	42.18 (12.10)	69.31 (10.65)	
51 - 60	8.38 (1.84)	10 (1.41)	11.20 (1.43)		17.56 (6.05)	42.48 (26.6)	63.5 (18.24)	
61 - 70	7.64 (1.94)	10.72 (1.07)	12.36 (1.82)		19.40 (12.18)	32.92 (16.25)	56.40 (18.84)	
<b>Gender</b>				0.3				0.4
Male	8.29 (2.10)	10.65 (0.88)	11.98 (1.56)		20.09 (7.35)	39.80 (16.10)	68.65 (13.30)	
Female	8.04 (1.88)	10.57 (0.99)	11.76 (1.31)		20.61 (8.73)	42.35 (20.09)	69.65 (18.12)	
<b>BMI</b>				0.001 <sup>*</sup>				0.01 <sup>*</sup>
18.5 - 24.9 (normal)	8.08 (1.56)	11.15 (0.87)	12.24 (1)		20.11 (4.45)	41 (13.7)	41 (13.7)	
25 - 29.9 (over weight)	7.36 (1.52)	10.09 (0.61)	11.97 (1.66)		18.63 (10.02)	33.13 (12.62)	33.13 (12.62)	
≤ 30 (obese)	8.89 (2.12)	10.65 (1.18)	11.97 (1.40)		21.08 (9.28)	43.93 (21.78)	43.93 (21.78)	
<b>Educational level</b>				< 0.001 <sup>*</sup>				< 0.001 <sup>*</sup>
Illiterate	6.25 (0.70)	8.2 (0.01)	10.10 (0.55)		10 (0)	21.25 (3.53)	25.50 (15.81)	
Elementary school	6.30 (1.18)	9.72 (0.54)	11.52 (1.80)		23.40 (13.21)	39.16 (18.41)	64 (20.86)	
Middle/high school	6.57 (1.27)	10.57 (0.54)	11.78 (1.20)		19.28 (12.05)	33.85 (15.08)	67.85 (11.49)	
Diploma	7.70 (1.77)	11.18 (1.40)	12.06 (1.40)		17.15 (5.84)	41.59 (25.51)	66.13 (18)	
University education	9.54 (1.44)	11.09 (0.92)	12.89 (1.56)		23.03 (4.58)	45.65 (18.06)	76.06 (8.76)	
<b>Life model</b>				< 0.001 <sup>*</sup>				< 0.001 <sup>*</sup>
Alone	6.67 (1.42)	10.54 (1.70)	10.77 (1.54)		14.03 (5.54)	38.87 (31.19)	55.16 (17.62)	
With family	8.53 (1.91)	10.62 (0.61)	12.14 (1.23)		22.14 (7.98)	42.07 (13.54)	72.32 (14.09)	
<b>Cigarette smoking</b>				0.03 <sup>*</sup>				0.01 <sup>*</sup>
Yes	7.57 (1.73)	10.25 (1.37)	11.57 (1.52)		20.35 (10.70)	41.38 (18.66)	68.65 (16.44)	
No	8.27 (2.02)	10.69 (0.80)	11.91 (1.38)		20.42 (7.55)	47.60 (26.22)	69.28 (21.37)	
<b>Duration of pain before surgery</b>				< 0.001 <sup>*</sup>				0.001 <sup>*</sup>
1 - 6 months	8.44 (2.20)	11 (0.96)	13.18 (1.27)		23.51 (12.69)	42.11 (18.11)	66.85 (19.66)	
> 6 months	8.06 (1.91)	10.51 (0.09)	11.54 (1.26)		19.70 (6.67)	41.22 (18.86)	69.66 (15.68)	
<b>Type of surgery</b>				0.07				0.08
Decompression + fusion	7.80 (1.76)	10.46 (0.58)	11.78 (1.37)		19.54 (8.35)	36.33 (13.71)	66.43 (14.92)	
Decompression- fusion	8.41 (2.09)	10.72 (1.16)	11.89 (1.45)		21.13 (8.08)	45.60 (21.30)	70.50 (17.49)	
<b>Leg pain</b>				0.04 <sup>*</sup>				0.002 <sup>*</sup>
<b>Before surgery</b>								
1 - 2	8.5 (1.75)	10.75 (0.69)	11.93 (1.53)		21.48 (9.66)	37.32 (14.52)	70 (15.01)	
2 <	7.83 (2.08)	10.49 (1.10)	11.77 (1.32)		19.56 (6.80)	44.59 (20.91)	67.59 (17.51)	
<b>6 months after surgery</b>				< 0.001 <sup>*</sup>				< 0.001 <sup>*</sup>
< 1	6.50 (1.09)	11.30 (1.09)	11.06 (1.98)		13.43 (5.97)	25.62 (8.13)	56.25 (14.08)	
1 - 2	8.54 (1.92)	10.57 (0.57)	12 (1.32)		21.63 (8.12)	40.13 (13.37)	70.56 (13.95)	
2 <	6.53 (1.19)	9.92 (2.36)	11.38 (0.96)		18.07 (6.93)	71.92 (32.05)	66.92 (29.82)	
<b>12 months after surgery</b>				< 0.001 <sup>*</sup>				0.02 <sup>*</sup>
< 1	6.97 (1.31)	10.70 (1.40)	11.41 (1.30)		18.33 (6.86)	44.79 (25.88)	68.75 (20.48)	
1 - 2	8.71 (1.98)	10.55 (0.59)	12.06 (1.42)		21.44 (8.65)	39.70 (13.63)	68.60 (15.15)	
<b>Back pain</b>				< 0.001 <sup>*</sup>				0.02 <sup>*</sup>
<b>Before surgery</b>								
1 >	9.37 (2.06)	10.87 (0.34)	13.5 (1.09)		30.62 (15.37)	50.68 (20.94)	70.31 (24.25)	
1 - 2	8.41 (1.71)	10.16 (0.37)	11.9 (0.94)		18.75 (4.83)	36.52 (5.58)	70 (6.76)	
2 <	7.8 (1.96)	10.73 (1.11)	11.51 (1.41)		19.30 (6.14)	41.66 (20.92)	67.8 (17.56)	
<b>6 months after surgery</b>				< 0.001 <sup>*</sup>				0.008 <sup>*</sup>
1 >	7.57 (2.02)	10.68 (0.46)	12.13 (1.63)		19.55 (12.82)	36.57 (17.45)	63.66 (17.78)	
1 - 2	8.58 (1.79)	10.71 (0.76)	11.80 (1.29)		21.30 (4.62)	40.54 (12.16)	72.39 (12.89)	
2 <	6.12 (1.55)	8.87 (2.47)	10.75 (0.88)		15 (5.34)	78.12 (40.35)	53.70 (28.62)	
<b>12 months after surgery</b>				< 0.001 <sup>*</sup>				0.002 <sup>*</sup>
1 >	8.49 (2.02)	10.77 (0.66)	13.53 (1.19)		21.60 (8.90)	42.22 (14.11)	71.08 (14.94)	
1 - 2	7.17 (1.41)	10.15 (1.38)	11.68 (1.32)		17.17 (4.55)	39.10 (27.62)	62.05 (18.62)	
2 <	8.13 (1.96)	10.60 (0.95)	11.84 (1.41)		20.41 (8.21)	41.38 (18.66)	68.65 (16.44)	
<b>Regular activity</b>								

Before surgery				< 0.001 <sup>*</sup>			0.02 <sup>*</sup>
Yes	9.46 (2.29)	10.92 (0.27)	13.53 (1.19)		30 (15)	50.15 (21.1)	70 (23.80)
No	8 (1.89)	10.57 (0.98)	11.68 (1.32)		19.46 (60)	40.52 (18.26)	68.52 (15.66)
6 months after surgery				< 0.001 <sup>*</sup>			0.03 <sup>*</sup>
Yes	9.12 (1.98)	10.79 (0.72)	12.53 (1.54)		22.69 (10.6)	42.15 (14.77)	68.65 (14.76)
No	7.37 (1.58)	16.46 (1.07)	11.31 (1.04)		18.65 (5.55)	40.79 (21.24)	68.65 (17.72)
12 months after surgery				< 0.001 <sup>*</sup>			0.02 <sup>*</sup>
Yes	8.26 (1.93)	8.37 (1.99)	11.87 (1.40)		20.72 (8.25)	39.56 (14.22)	70.51 (14.51)
No	6 (1.19)	10.73 (0.66)	11.37 (1.59)		15 (0.34)	72.50 (45.43)	68.65 (16.44)
<b>Walk, m</b>							
Before surgery				< 0.001 <sup>*</sup>			0.001 <sup>*</sup>
100 >	8.01 (1.92)	10.59 (1)	11.60 (1.31)		19.12 (5.89)	40.56 (18.31)	69.24 (14.86)
100 - 500	8.90 (2.10)	16.70 (0.47)	13.35 (1.08)		28.50 (14.33)	46.55 (20.45)	65 (24.33)
6 months after surgery				< 0.001 <sup>*</sup>			0.002 <sup>*</sup>
100 >	8.01 (2.31)	10.44 (1.16)	11.44 (1.51)		17.29 (6.86)	40.90 (23.08)	61.63 (15.18)
100 - 500	8.23 (1.69)	10.64 (0.61)	12.03 (1.16)		22.77 (8.55)	42.17 (14.89)	74.01 (15.62)
501 - 1000	8 (1.73)	13 (0.01)	15 (0.01)		20 (0)	30 (0)	66.66 (11.54)
12 months after surgery				< 0.001 <sup>*</sup>			< 0.001 <sup>*</sup>
100 >	5 (0.01)	6.75 (1.50)	10 (0.01)		16.56 (5.69)	31.48 (8.43)	62.42 (13)
100 - 500	7.64 (1.72)	10.31 (0.55)	11.29 (1.29)		25.56 (9.07)	50.64 (13.06)	75.94 (16.23)
501 - 1000	9.13 (2.08)	11.61 (0.41)	12.52 (1.26)		21.04 (5.10)	35.08 (12.11)	68.65 (16.44)
1000 <	7.79 (1.21)	11.12 (0.79)	12.12 (1.32)				