



## Original Article

# Influence of anxiety and depression symptoms on the quality of life in patients undergoing lumbar spine surgery<sup>☆</sup>



Martins Back Netto<sup>a,\*</sup>, Ana Beatriz Sanches Barranco<sup>b</sup>,  
Karen Waleska Kniphoff de Oliveira<sup>b</sup>, Fabrícia Petronilho<sup>a</sup>

<sup>a</sup> Programa de Pós-Graduação em Ciências da Saúde, Universidade do Sul de Santa Catarina, Tubarão, SC, Brazil

<sup>b</sup> Universidade do Sul de Santa Catarina, Tubarão, SC, Brazil

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## ABSTRACT

**Objective:** Comparative analysis of the quality of life and functionality of patients undergoing lumbar spine arthrodesis due to degenerative lumbar spine disease. The authors sought to correlate the influence of anxious and depressive symptoms before and after surgery.

**Methods:** A prospective cohort study was performed, with 32 patients submitted to arthrodesis due to degenerative lumbar spine disease and the visual analogue pain scale pain questionnaire, the Oswestry Disability Index questionnaire, the Medical Outcomes Survey Short Form questionnaire – 36 items (SF-36), and the Hospital Anxiety and Depression Scale, applied in the preoperative period and four months after the procedure.

**Results:** There was improvement in the mean scores of the visual analogue pain scale ( $p < 0.001$ ) and the Oswestry Disability Index ( $p < 0.001$ ). In the preoperative period, the variables that presented a difference between patients with and without anxiety symptoms were the SF-36 domains of general health ( $p = 0.031$ ), social aspects ( $p = 0.008$ ), and mental health ( $p = 0.035$ ). In the postoperative period, patients without anxiety symptoms showed better results in the vitality ( $p = 0.004$ ), social aspects ( $p = 0.001$ ), mental health ( $p < 0.001$ ), and pain ( $p = 0.011$ ) domains. In the preoperative period, the variable that presented a difference between patients with and without depression was the SF-36 domain of emotional aspects ( $p = 0.022$ ). In the post-operative period, patients without depression presented better vitality ( $p < 0.001$ ), social aspects ( $p < 0.001$ ), emotional aspects ( $p = 0.004$ ), and mental health results ( $p = 0.001$ ).

<sup>☆</sup> Study conducted at Universidade do Sul de Santa Catarina, Tubarão, SC, Brazil.

\* Corresponding author.

E-mail: [mbackn@yahoo.com.br](mailto:mbackn@yahoo.com.br) (M.B. Netto).

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**Conclusion:** Lumbar spine arthrodesis was effective in improving pain, low back pain, functional capacity, limitation due to physical aspects, vitality, and social and emotional aspects. Patients without anxiety and depression symptoms had better results on the scales compared to those with such symptoms.

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## Influência dos sintomas de ansiedade e depressão na qualidade de vida em pacientes submetidos à artrodese de coluna lombar

### R E S U M O

#### Palavras-chave:

Artrodese  
Qualidade de vida  
Dor lombar  
Depressão  
Ansiedade

**Objetivo:** Análise comparativa da qualidade de vida e funcionalidade dos pacientes submetidos a artrodese de coluna lombar devido a doença degenerativa da coluna lombar. Os autores buscaram correlacionar a influência dos sintomas de ansiedade e depressão antes e após a cirurgia.

**Métodos:** Estudo de coorte prospectivo, que acompanhou 32 pacientes submetidos à artrodese por doença degenerativa da coluna lombar e aplicou os questionários escala visual analógica da dor, *Oswestry Disability Index*, *Medical Outcomes Survey Short Form - 36 items* (SF-36) e *Hospital Anxiety and Depression Scale*. Esses questionários foram aplicados no período pré-operatório e quatro meses após o procedimento.

**Resultados:** Observou-se melhoria nas médias das pontuações das escalas escala visual analógica ( $p < 0,001$ ) e *Oswestry Disability Index* ( $p < 0,001$ ). No pré-operatório, as variáveis que apresentaram diferença entre pacientes com e sem sintomas ansiosos foram os domínios de SF36 de estado geral de saúde ( $p = 0,031$ ), aspectos sociais ( $p = 0,008$ ) e saúde mental ( $p = 0,035$ ). No pós-operatório, os pacientes sem sintomas de ansiedade demonstraram melhores resultados nos domínios vitalidade ( $p = 0,004$ ), aspectos sociais ( $p = 0,001$ ), saúde mental ( $p < 0,001$ ) e dor ( $p = 0,011$ ). No pré-operatório, a variável que apresentou diferença entre pacientes com e sem depressão foi o domínio do SF36 de aspectos emocionais ( $p = 0,022$ ). No pós-operatório os pacientes sem depressão apresentaram melhores resultados nos domínios dor ( $p = 0,009$ ), estado geral de saúde ( $p = 0,001$ ), vitalidade ( $p < 0,001$ ), aspectos sociais ( $p < 0,001$ ), aspectos emocionais ( $p = 0,004$ ) e saúde mental ( $p = 0,001$ ).

**Conclusão:** A artrodese de coluna lombar mostrou-se efetiva na melhoria da dor, lombalgia, capacidade funcional, limitação por aspectos físicos e vitalidade, bem como em aspectos sociais e emocionais. Pacientes sem sintomas ansiosos e depressivos apresentaram melhores resultados nas escalas avaliadas quando comparados com aqueles com sintomas de ansiedade e depressão.

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## Introduction

Low back pain is defined as pain, muscle tension, or stiffness, which is established below the rib cage and above the lower gluteal fold, and which may be associated with pain radiating to the lower limbs.<sup>1,2</sup> Lumbar pain accounts for 50% of all chronic musculoskeletal diseases and affects 70% of the population in developed countries.<sup>3,4</sup> Responsible for most orthopedic medical appointments, admissions to hospital, and surgery, it is observed mainly in men over 40 years and women over 50 years.<sup>5</sup> Of the patients affected by this disease, 16.4–73.3% have depression, which is usually associated with worse postoperative results.<sup>6,7</sup>

Lumbar spine arthrodesis is a surgical procedure used for the treatment of low back pain and sciatica due to advanced

degenerative disease that has failed clinical treatment.<sup>8,9</sup> There is no good correlation between the clinical findings and the severity of the disease perceived by patients in relation to painful symptoms and functional disability.<sup>10</sup> Several instruments have been proposed to assess quality of life, psychological aspects, and functional capacity in patients with vertebral disease.<sup>11-15</sup>

Studies have evaluated the repercussion of the surgical procedure for lumbar spine diseases on patients' quality of life and functionality; these data still need to be complemented, correlating them with the pre-existing depressive or anxious state and the postoperative evolution.<sup>10,16</sup> This study is aimed at evaluating the health-related quality of life and functional status of patients before and after posterolateral arthrodesis of the spine with instrumentation, as well as to correlate

the influence of anxiety and depression symptoms before and after surgery.

## Material and methods

The present study was approved by the Ethics Committee in Research Involving Human Beings of this institution, under opinion No. 1,248,210.

### *Study design, sample, and inclusion and exclusion criteria*

This was a prospective cohort observational study conducted from October 2015 to April 2016. A total of 32 patients with indication of spinal arthrodesis due to degenerative lumbar spine disease awaiting surgery through the Brazilian National Health System were interviewed to assess whether they met the inclusion criteria. Then, a convenience sample was established. The surgeries were performed by the orthopedic department of Hospital Nossa Senhora da Conceição (HNSC).

Patients older than 18 years with surgery indication due to degenerative spine disease who had complaints of axial pain and/or root pain refractory to clinical treatment were included. Those who underwent the procedure due to trauma, tumor, or revision of lumbar spine arthrodesis were excluded, as well as those who did not agree to participate and the illiterate. After signing the Informed Consent Form, all patients answered the questionnaires. Patient information regarding age, gender, marital status, duration of symptoms, and treatment, as well as the desire of returning to work and receiving sick leave, were collected at the time of recruitment for preoperative evaluation. All questionnaires were applied in the preoperative period and four months after surgery.

### Tools

The first questionnaire included the visual analog scale (VAS) of pain, which ranges from 0 to 10, in which 0 means no pain, 5 indicates moderate pain, and 10, unbearable pain; the respondents were instructed to indicate the maximum intensity of their pain at the time of the interview.<sup>17</sup> Functional limitation for low back pain was evaluated by the Oswestry Disability Index (ODI), which has been validated for the Brazilian Portuguese language.<sup>11</sup> The scale consists of ten questions with six options to choose from, ranging from 0 to 5. The first question assesses the intensity of pain, while the other nine analyze the effect of the patient's pain on daily activities, such as caring for oneself (dressing, bathing, for example), weightlifting, walking, sitting, walking, sleeping, getting around, and having a sexual and social life. The total scale score is divided by 50 if the patient answered all the items or by 45 if the patient did not answer an item (sex life, for example); the result is then multiplied by 100. The result is expressed as a percentage and ranges from 0% for patients without disability to 100% for patients with maximum disability. Values are classified as minimum disability (0–20%), moderate disability (21–40%), severe disability (41–60%), full disability (61–80%), and bed-ridden or exaggerated symptoms (81–100%).

Quality of life was evaluated by the Medical Outcomes Survey Short Form-36 items (SF-36), in its Brazilian Portuguese version, which comprises 36 items, grouped into eight scales or domains.<sup>12</sup> These include: functional capacity, physical aspects, pain, general health, vitality, social aspects, emotional aspects, mental health, and one question that allows comparative evaluation between the assessment of the individual's current health condition and the condition one year previously. In the second step, it is necessary to calculate the raw score (term used since the value does not represent a unit of measurement). The values of the questions have to be transformed into grades for each of the eight domains of the questionnaire. These domains range from 0 to 100, where 0 is worse and 100 is better. The closer to 100, the better the person's quality of life in that domain, and the closer to 0, the worse. Therefore, each of the domains is standardized on a scale from zero to 100. Low numerical values reflect a poorer health-related quality of life.

Finally, the presence of anxiety and depression symptoms was assessed through the Hospital Anxiety and Depression Scale (HADS), consisting of 14 items: seven for anxiety assessment (HAD-A) and seven for depression assessment (HAD-D).<sup>18</sup> Anxiety is assessed through questions about feelings of tension, fear, worry, relaxation, restlessness, and panic. Depression is assessed by questions about feelings of joy, slowness in thinking and to perform activities, humor, motivation, personal care, hope, and pleasure in common activities. Each of the items can be scored from 0 to 3, with a maximum of 21 points for each scale; for anxiety, values from 0 to 8 are categorized as "no symptoms" and 9 or above, as "with symptoms." For depression, values from 0 to 9 are categorized as "no symptoms" and 10 or above, as "with symptoms."

### *Surgical technique*

The same surgical team performed the procedure in all patients. After general anesthesia, the patients were placed in a prone recumbent position on a radiolucent table. A midline lumbar incision and dissection to bone were performed. Instrumentation with pedicular screws. Neurological decompression with laminectomy, foraminotomy, and/or discectomy. Longitudinal rods to connect the screws. An autologous bone graft placed posterolaterally. Suture by layers, suction drain, and dressing.

### *Data processing and statistical analysis*

The data was organized on Microsoft Excel and analyzed on SPSS, version 15.0. The quantitative variables were described as measures of central tendency and dispersion. The qualitative variables were described as absolute frequencies and percentages. The differences in proportions regarding anxiety and depression symptoms were tested by the chi-squared test or Fisher's exact test; differences in mean pain score and SF-36 (quality of life) score in the preoperative and postoperative periods were assessed using the paired Student's t-test, according to the adequacy of the data. The level of statistical significance was 5% (*p* value 0.05).

**Table 1 – Sociodemographic and clinical characteristics of patients.**

Variable	n	%
<i>Gender</i>		
Male	11	34.4
Female	21	65.6
<i>Ethnicity</i>		
White	31	96.9
Non white	1	3.1
<i>Marital status</i>		
Single	1	3.1
Married	25	78.1
Widower	2	6.3
Separated	4	12.5
<i>Education</i>		
Incomplete elementary school	24	81.2
Complete elementary school	5	15.6
Incomplete high school	0	0
Complete high school	2	6.3
Incomplete College or University education	1	3.1
College or University Degree	0	0
<i>Symptom presentation</i>		
<2 years	8	25.0
>2 years	24	75.0
<i>Associated orthopedic comorbidities</i>		
No	22	68.8
Yes	10	31.3
<i>Associated clinical comorbidities</i>		
No	13	40.6
Yes	19	59.4
<i>Treatment</i>		
Physical therapy	1	3.1
Medication	3	9.4
Both	28	87.5
<i>Duration of previous treatments</i>		
<2years	13	40.6
>2 years	19	59.4
<i>Intention of returning to work</i>		
No	7	21.9
Yes – desire	14	43.8
Yes – as an obligation	11	34.4
<i>Sick leave</i>		
No	12	37.5
Yes	20	62.5

## Results

The mean age was  $50.97 \pm 7.46$  years, ranging from 35 to 64. Most patients were female (65.6%), and the predominant marital status was married (78.1%). The majority of patients had presented clinical symptoms for more than two years (75%), and used medication and physical therapy treatment prior to the procedure (87.5%) for a period longer than two years (18.8%; Table 1).

Table 2 presents the mean differences in the VAS and ODI scales, as well as in the SF-36 domains in the preoperative and postoperative periods. In the first two scales, the mean scores were significantly lower in the postoperative period.

These associations were statistically significant ( $p=0.000$ ). In SF-36, the domains that showed a significant improvement with statistical significance were those of functional capacity ( $p=0.001$ ), limitation by physical aspects ( $p=0.006$ ), pain ( $p=0.000$ ), vitality ( $p=0.034$ ), social aspects ( $p=0.005$ ), and emotional aspects ( $p=0.002$ ).

Table 3 shows that, in the preoperative period, the variables that presented a difference between patients with and without anxiety symptoms were the SF-36 domains of general health, social aspects, and mental health. Then, in the postoperative period, patients without anxiety symptoms demonstrated better results in the areas of vitality, social aspects, mental health, and pain.

Finally, Table 4 indicates that, in the preoperative period, the only variable that presented differences between patients with and without depression was the SF-36 domain of emotional aspects; in turn, in the postoperative period, patients without depression presented better results in the areas of pain, general health, vitality, social aspects, emotional aspects, and mental health.

No association was observed between the variables intention to return to work and sick leave with the scores of the questionnaires applied; the results were statistically non significant ( $p > 0.05$ ).

## Discussion

Low back pain is one of the major causes of sick leaves and work disability in Brazil, culminating in excessive spending by the healthcare and welfare systems.<sup>19</sup> In the present study, 62.5% of the patients received sick leave and 21.9% of them did not intend to return to work, while 34.4% reported returning to economic activities due to financial need.

In this study, VAS presented a pain decrease from  $8.47 \pm 1.41$  to  $4.84 \pm 3.26$ , once a two-point improvement is considered to be satisfactory.<sup>20</sup> Milani et al.<sup>21</sup> reported a similar improvement, from  $8.3 \pm 1.28$  to  $4.55 \pm 2.25$ , corroborating the consequent improvement in functionality, as the pain picture is disabling. Robleda et al.<sup>22</sup> reported an association between preoperative anxiety and postoperative pain; nonetheless, in the present study no statistically significant relationship was observed between pain improvement and the presence or absence of anxiety symptoms in the preoperative period.

Questionnaires that assess quality of life help evaluate the efficacy of surgical treatment and the functional capacity of patients. Routinely used for this purpose, the SF-36 allows the assessment of various aspects of an individual's well-being. In the postoperative period, an improvement was observed in all areas of the SF-36; however, only functional capacity, limitation by physical aspects, pain, vitality, social, and emotional aspects were statistically significant. These results were similar to those by Milani et al.,<sup>21</sup> who reassessed their patients after 60 days of the procedure and observed statistically significant improvement in the domains of functional capacity, physical aspects, pain, and mental health.

As it is a disease-specific questionnaire, the ODI is useful in the adequate assessment of lower back diseases and their evolution after treatment. It is often used in studies, whether

**Table 2 – Comparison and mean difference of the VAS, Oswestry and SF-36 domains scores.**

Variable	Mean ( $\pm$ SD) before	Mean ( $\pm$ SD) after	Difference of means	95% CI	p <sup>a</sup>
VAS	8.47 $\pm$ 1.41	4.84 $\pm$ 3.26	3.62	4.90–2.34	<0.001
Oswestry	67.75 $\pm$ 14.03	45.44 $\pm$ 19.62	22.31	32.27–12.34	<0.001
<b>SF-36</b>					
Functional capacity	20.78 $\pm$ 14.54	41.25 $\pm$ 28.48	20.46	31.22–9.71	0.001
Limitation due to physical aspects	3.91 $\pm$ 18.08	29.69 $\pm$ 43.27	25.78	43.58–7.97	0.006
Pain	17.19 $\pm$ 13.65	40.19 $\pm$ 19.93	23.00	32.73–13.26	<0.001
General health	44.66 $\pm$ 22.35	52.57 $\pm$ 29.55	7.81	19.29–3.67	0.175
Vitality	31.72 $\pm$ 21.83	45.63 $\pm$ 29.23	13.90	26.66–1.14	0.034
Social aspects	33.38 $\pm$ 26.66	51.34 $\pm$ 31.85	17.96	30.07–5.85	0.005
Emotional aspects	12.50 $\pm$ 33.60	37.5 $\pm$ 47.71	25.00	40.26–9.73	0.002
Mental health	40.00 $\pm$ 24.29	46.63 $\pm$ 27.76	6.62	16.70–3.45	0.190

VAS, visual analogue scale; SF-36, Medical Outcomes Survey Short Form-36 items.

<sup>a</sup> Paired t-test.

**Table 3 – Mean difference in quality of life scores and clinical aspects between patients with and without anxiety symptoms.**

Variable	No symptoms of anxiety	With symptoms of anxiety	p
<b>Preoperative</b>			
VAS	7.75 $\pm$ 0.95	8.57 $\pm$ 1.41	0.284
Oswestry	62.75 $\pm$ 13.79	68.46 $\pm$ 14.16	0.455
<b>SF-36</b>			
Functional capacity	24.09 $\pm$ 15.78	19.05 $\pm$ 13.93	0.360
Limitation due to physical aspects	0.00	5.95 $\pm$ 22.27	0.385
Pain	15.73 $\pm$ 13.19	17.95 $\pm$ 14.14	0.669
General health	56.27 $\pm$ 16.64	38.57 $\pm$ 22.86	0.031 <sup>a</sup>
Vitality	39.55 $\pm$ 17.95	27.62 $\pm$ 22.94	0.145
Social aspects	50.18 $\pm$ 29.53	24.57 $\pm$ 20.71	0.008 <sup>a</sup>
Emotional aspects	27.27 $\pm$ 46.71	4.76 $\pm$ 21.82	0.071
Mental health	52.36 $\pm$ 27.56	33.52 $\pm$ 20.17	0.035 <sup>a</sup>
<b>Postoperative</b>			
VAS	6.25 $\pm$ 0.95	4.64 $\pm$ 3.43	0.365
Oswestry	61.75 $\pm$ 16.60	43.11 $\pm$ 19.47	0.075
<b>SF-36</b>			
Functional capacity	51.36 $\pm$ 33.39	35.95 $\pm$ 24.78	0.149
Limitation due to physical aspects	36.36 $\pm$ 43.82	26.19 $\pm$ 43.64	0.536
Pain	52.27 $\pm$ 21.45	33.86 $\pm$ 43.64	0.011 <sup>a</sup>
General health	65.27 $\pm$ 26.59	45.76 $\pm$ 29.37	0.076
Vitality	65.45 $\pm$ 24.43	35.24 $\pm$ 26.38	0.004 <sup>a</sup>
Social aspects	76.18 $\pm$ 23.98	38.33 $\pm$ 27.71	0.001 <sup>a</sup>
Emotional aspects	48.45 $\pm$ 50.26	31.76 $\pm$ 46.53	0.356
Mental health	69.82 $\pm$ 26.00	34.48 $\pm$ 20.13	<0.001 <sup>a</sup>

VAS, visual analogue scale; SF-36, Medical Outcomes Survey Short Form-36 items.

<sup>a</sup> Chi-squared test or Fisher's exact test.

or not in comparison with other scores.<sup>23</sup> In the present study, the mean ODI score in the preoperative period was 67.75%, which corresponded to intense disability, vs. 45.44% in the postoperative period; these results are similar to those obtained by Ghizoni et al.,<sup>24</sup> who observed a mean of 72.3% in the preoperative period and 51% with one month of follow-up.

Regarding anxiety symptoms and their comparison with the SF-36 domains, worse scores were observed in six out eight domains in the patients with preoperative anxiety symptoms, particularly in the general health status, social aspects, and mental health domains. Pacola et al.<sup>25</sup> observed similar results in patients awaiting surgical treatment for lumbar stenosis.

Patients with preoperative depression symptoms presented worse results on the VAS, ODI, and in seven out of eight SF-36 domains. Some authors have suggested that symptoms of depression may predispose to chronic low back pain, while others have suggested that the emotional problems are reactions to chronic low back pain.<sup>26</sup>

In the postoperative period, patients with symptoms of depression presented worse results in all SF-36 domains when compared with those without symptoms of depression. Katz et al.<sup>27</sup> also observed that patients with depression symptoms undergoing decompression surgery for spinal stenosis reported more pain, less satisfaction with treatment, less

**Table 4 – Mean difference in quality of life scores and clinical aspects between patients with and without symptoms of depression.**

Variable	No symptoms of depression Mean ± SD	With symptoms of depression Mean ± SD	p
<b>Preoperative</b>			
VAS	8.15 ± 1.34	8.68 ± 1.45	0.305
Oswestry	63.69 ± 14.30	70.53 ± 13.51	0.180
<b>SF-36</b>			
Functional capacity	21.00 ± 14.16	20.59 ± 15.29	0.938
Limitation due to physical aspects	6.67 ± 25.82	1.47 ± 6.06	0.426
Pain	16.27 ± 12.69	18.00 ± 14.78	0.726
General health	51.73 ± 17.84	38.41 ± 24.51	0.093
Vitality	35.00 ± 25.77	28.82 ± 17.98	0.434
Social aspects	41.87 ± 29.66	25.88 ± 21.91	0.091
Emotional aspects	26.67 ± 45.77	0.00 ± 0.000	0.022 <sup>a</sup>
Mental health	45.07 ± 27.65	35.53 ± 20.73	0.275
<b>Postoperative</b>			
VAS	6.00 ± 3.10	4.05 ± 3.20	0.098
Oswestry	50.15 ± 17.17	42.21 ± 20.96	0.268
<b>SF-36</b>			
Functional capacity	51.33 ± 29.84	32.35 ± 24.75	0.059
Limitation due to physical aspects	41.67 ± 47.87	19.12 ± 37.00	0.144
Pain	49.67 ± 18.32	31.82 ± 17.80	0.009 <sup>a</sup>
General health	69.27 ± 27.40	37.65 ± 23.17	0.001 <sup>a</sup>
Vitality	64.67 ± 27.67	28.82 ± 18.58	<0.001 <sup>a</sup>
Social aspects	75.93 ± 23.78	29.65 ± 20.09	<0.001 <sup>a</sup>
Emotional aspects	62.20 ± 48.59	15.71 ± 35.61	0.004 <sup>a</sup>
Mental health	62.93 ± 25.72	32.24 ± 21.09	0.001 <sup>a</sup>

VAS, visual analogue scale; SF-36, Medical Outcomes Survey Short Form-36 items.

<sup>a</sup> Chi-squared test or Fisher's exact test.

walking capacity, and less satisfaction with life after surgery than the group that did not present symptoms of depression.

Thus, it is necessary to use validated instruments to assess patients with degenerative spinal disease in order to assist in the selection and follow-up of patients. Without an objective evaluation, there is a risk of indicating surgery for a patient who will not have a good clinical outcome.

Vialle et al.<sup>28</sup> prospectively evaluated the ability of a group of spine surgeons to subjectively identify patients with depressive disorders, in comparison to an objective assessment. The study demonstrated that spine surgeons were unable to subjectively identify most patients with psychological disorders.

Some authors<sup>29,30</sup> report that worse postoperative results occur in patients with secondary gains; however, the present study did not find significant statistical results to corroborate this claim. This may have occurred because the evaluation was performed four months after surgery, and most patients receive social security benefits for over four months when they undergo lumbar spine arthrodesis. Long-term assessments are necessary to analyze this association.

## Conclusion

Lumbar spine arthrodesis has been shown to be effective in improving pain, low back pain, functional capacity, limitation due to physical aspects, vitality, and social and emotional aspects in patients with degenerative spinal disease. Patients without symptoms of anxiety and depression presented better

health-related quality of life outcomes at the scales assessed when compared to those with anxiety and depression symptoms.

## Conflicts of interest

The authors declare no conflicts of interest.

## REFERENCES

1. Koes BW, van Tulder MW, Thomas S. Diagnosis and treatment of low back pain. *BMJ*. 2006;332(7555):1430-4.
2. Airaksinen O, Brox JI, Cedraschi C, Hildebrandt J, Klüber-Moffett J, Kovacs F, et al. European guidelines for the management of chronic nonspecific low back pain. *Eur Spine J*. 2006;15 Suppl. 2:S192-300 (chapter 4).
3. Fransen M, Woodward M, Norton R, Coggan C, Dawe M, Sheridan N. Risk factors associated with the transition from acute to chronic occupational back pain. *Spine (Phila Pa 1976)*. 2002;27(1):92-8.
4. Speed C. Low back pain. *BMJ*. 2004;328(7448):1119-21.
5. Marras WS. Occupational low back disorder causation and control. *Ergonomics*. 2000;43(7):880-902.
6. Fanian H, Ghassemi GR, Jourkar M, Mallik S, Mousavi MR. Psychological profile of Iranian patients with low-back pain. *East Mediterr Health J*. 2007;13(2):335-46.
7. Currie SR, Wang J. Chronic back pain and major depression in the general Canadian population. *Pain*. 2004;107(1-2):54-60.
8. DeBerard MS, LaCaille RA, Spielmanns G, Colledge A, Parlin MA. Outcomes and presurgery correlates of lumbar

- discectomy in Utah Workers' Compensation patients. *Spine J*. 2009;9(3):193-203.
9. Atlas SJ, Tosteson TD, Blood EA, Skinner JS, Pransky GS, Weinstein JN. The impact of workers' compensation on outcomes of surgical and nonoperative therapy for patients with a lumbar disc herniation: SPORT. *Spine (Phila Pa 1976)*. 2010;35(1):89-97.
  10. Michel A, Kohlmann T, Raspe H. The association between clinical findings on physical examination and self-reported severity in back pain. Results of a population-based study. *Spine (Phila Pa 1976)*. 1997;22(3):296-303.
  11. Vigatto R, Alexandre NM, Correa Filho HR. Development of a Brazilian Portuguese version of the Oswestry Disability Index: cross-cultural adaptation, reliability, and validity. *Spine (Phila Pa 1976)*. 2007;32(4):481-6.
  12. Ciconelli RM, Ferraz MB, Santos W, Meinão I, Quaresma MR. Tradução para a língua portuguesa e validação do questionário genérico de avaliação de qualidade de vida SF-36 (Brasil SF-36). *Rev Bras Reumatol*. 1999;39(3):143-50.
  13. Cook C, Richardson JK, Braga L, Menezes A, Soler X, Kume P, et al. Cross-cultural adaptation and validation of the Brazilian Portuguese version of the Neck Disability Index and Neck Pain and Disability Scale. *Spine (Phila Pa 1976)*. 2006;31(14):1621-7.
  14. Deyo RA, Battie M, Beurskens AJ, Bombardier C, Croft P, Koes B, et al. Outcome measures for low back pain research. A proposal for standardized use. *Spine (Phila Pa 1976)*. 1998;23(18):2003-13.
  15. Fairbank JC, Couper J, Davies JB, O'Brien JP. The Oswestry low back pain disability questionnaire. *Physiotherapy*. 1980;66(8):271-3.
  16. Noshchenko A, Hoffecker L, Lindley EM, Burger EL, Cain CM, Patel VV. Perioperative and long-term clinical outcomes for bone morphogenetic protein versus iliac crest bone graft for lumbar fusion in degenerative disk disease: systematic review with meta-analysis. *J Spinal Disord Tech*. 2014;27(3):117-35.
  17. Huskisson EC. Measurement of pain. *Lancet*. 1974;2(7889):1127-31.
  18. Botega NJ, Bio MR, Zomignani MA, Garcia C Jr, Pereira WA. Mood disorders among inpatients in ambulatory and validation of the anxiety and depression scale HAD. *Rev Saúde Pública*. 1995;29(5):355-63.
  19. Bulhões JR, Irineu TP, Masini MCG. Eficiência dos métodos fisioterapêuticos de reabilitação no pós-operatório de hérnia de disco lombar. *Rev Bras Med*. 2008;65(7):206-13.
  20. Carvalho DSKP. Avaliação da intensidade da dor. Migrêneas Cefaleias. 2006;9:164-8.
  21. Milani JP, Martins MRI, Silva EC, Rocha CE. A qualidade de vida no pré e pós-operatório de pacientes portadores de hérnia de disco lombar. *J Bras Neurocir*. 2009;20(3):345-51.
  22. Robleda G, Sillero-Sillero A, Puig T, Gich I, Baños JE. Influence of preoperative emotional state on postoperative pain following orthopedic and trauma surgery. *Rev Lat Am Enfermagem*. 2014;22(5):785-91.
  23. Mirza SK, Deyo RA. Systematic review of randomized trials comparing lumbar fusion surgery to nonoperative care for treatment of chronic back pain. *Spine (Phila Pa 1976)*. 2007;32(7):816-23.
  24. Ghizoni MF, Sakae TM, Bardini E, Felipe A, Souza BC, Danielli L, et al. Aplicação da Escala de Oswestry em pacientes com doença degenerativa da coluna lombar submetidos à artrodese Application of the Oswestry Scale in patients with degenerative lumbar spine underwent arthrodesis. *Arq Catarinenses Med*. 2011;40(1):19-24.
  25. Pacola LM, Nepomuceno E, Dantas RAS, Costa HRT, Cunha DCPT, Herrero CFPSDH. Qualidade de vida relacionada à saúde e expectativas com o tratamento cirúrgico de pacientes com estenose espinhal. *Coluna/Columna*. 2014;13(1):35-8.
  26. Magni G. Chronic low-back pain and depression: an epidemiological survey. *Acta Psychiatr Scand*. 1984;70(6):614-7.
  27. Katz JN, Stucki G, Lipson SJ, Fossel AH, Grobler LJ, Weinstein JN. Predictors of surgical outcome in degenerative lumbar spinal stenosis. *Spine (Phila Pa 1976)*. 1999;24(21):2229-33.
  28. Vialle E, de Oliveira Pinto BM, Vialle LR, Gomez JD. Evaluation of psychosomatic distress and its influence in the outcomes of lumbar fusion procedures for degenerative disorders of the spine. *Eur J Orthop Surg Traumatol*. 2015;25 Suppl. 1:S25-8.
  29. Duggal N, Sonntag VK. Fusion options and indications in the lumbosacral spine. *Contemp Neurosurg*. 2001;23(1):1-8.
  30. Don AS, Carragee E. A brief overview of evidence-informed management of chronic low back pain with surgery. *Spine J*. 2008;8(1):258-65.