

ORIGINAL RESEARCH



Assessment of sexual dysfunction, the quality of life and difficulties in broaching sexual issues in patients with chronic low back pain by using cluster analysis

Dilek Cokar^{1,*}, Yusuf Celik², Ozge Ozdemir Ayla³, Gulis Kavadar⁴, Sadiye Murat⁵, Levent Ozgonenel⁶

¹Physical Therapy and Rehabilitation, Faculty of Health Sciences, Istinye University, 34010 Istanbul, Turkey

²Department of Biostatistics and Medical Informatics, Faculty of Medicine, Biruni University, 34010 Istanbul, Turkey

³Physical Therapy and Rehabilitation, Faculty of Health Sciences, Demiroglu Science University, 34394 Istanbul, Turkey

⁴Department of Physical Medicine and Rehabilitation, Faculty of Medicine, Istanbul Atlas University, 34408 Istanbul, Turkey

⁵Department of Physical Medicine and Rehabilitation, Faculty of Medicine, Istanbul Medeniyet University, 34720 Istanbul, Turkey

⁶Department of Physical Medicine and Rehabilitation, Faculty of Medicine, Demiroglu Science University, 34394 Istanbul, Turkey

*Correspondence

dilek.cokar@istinye.edu.tr

(Dilek Cokar)

Abstract

The aim of this study is to investigate the physical and psychosocial problems and the clinical and sociodemographic factors affecting sexual life in patients with nonspecific chronic low back pain (CLBP), thus drawing attention to sexual disability and patients' concerns in the conservative management of the disease. A total of 140 patients were included in the study. The assessment of disease characteristics, information about sexual life and related factors were evaluated by a self-constructed questionnaire. The Oswestry Disability Index (ODI), Pain Catastrophizing Scale (PCS), International Physical Activity Questionnaire (IPAQ), Tampa Scale of Kinesiophobia (TSK) and Beck Depression Inventory (BDI) were used to assess functional disability, pain-related anxiety, physical activity level, fear of movement and depression severity, respectively. Hierarchical cluster analysis was used to discover relationships among variables. Based on the dendrogram, the intensity of CLBP, the impact of CLBP on sexual life, decrease in libido, sexual satisfaction, frequency of intercourse, painful sexual behavior and questionnaire results (BDI, TSK, ODI, PCS) were in the same cluster. Consistent with this, positive correlations were found between BDI and PCS ($p < 0.001$, $r = 0.481$), BDI and TSK ($p < 0.001$, $r = 0.319$), and BDI and ODI ($p < 0.001$, $r = 0.408$). The other main clusters included demographic and clinical characteristics, ODI and IPAQ scores. The sexual lives of patients with CLBP are affected physically and psychosocially. In clinical practice, it is important to counsel sexual disability patients because of their concerns and hesitations.

Keywords

Chronic low back pain; Sexual activities; Kinesiophobia; Pain catastrophizing; Intercourse position

1. Introduction

Chronic low back pain (CLBP) is a major medical and social problem and one of the most important causes of functional and psychosocial disability [1]. Kinesiophobia and catastrophe are known to increase disability in CLBP. Kinesiophobia is defined as an excessive and irrational fear of painful injury or reinjury that reduces physical movement and activity [2]. On the other hand, catastrophe is defined as the tendency to magnify the perceived threat and exaggerate the seriousness of its potential consequences [3]. These defined problems and psychological factors, such as depression and anxiety, significantly affect the sexual life of patients with CLBP.

Sexual function is a multidimensional process that is affected by neurological, endocrine, vascular and musculoskeletal systems; psychosocial factors; and prescribed medications [4]. However, there are not many studies about low back pain in the literature evaluating the frequency and importance of

changes in sexual functions, contributing factors and lack of communication between the patients and the physicians. In some studies, sexual dysfunction has been evaluated before and after lumbar disc surgery, but the effects of sexual life in patients with CLBP under conservative treatment have not been sufficiently emphasized [5–7]. This may be due to mutual hesitation between the physician and the patient. The lack of attention focused on sexual functioning and hesitation in getting and giving information on this subject may reflect in the daily life of the patient as kinesiophobia and psychosocial problems.

Consequently, we believe that performance-related psychosocial anxiety and fear of experiencing pain during sexual activity highly affect sexual function in patients with CLBP, but this issue cannot be easily discussed by physicians. Therefore, we aimed to draw attention to sexual disability in assessing and conservatively managing chronic low back pain.

2. Materials and methods

Patients between 18–65 years old who were evaluated in an outpatient clinic at the Physical Medicine and Rehabilitation Clinic of Istanbul Florence Nightingale Hospital with the diagnosis of CLBP were prospectively included in this study. The sample size was established considering the general linear model.

We included volunteers who had an active sexual life and CLBP for more than three months (with or without radiculopathy). Patients with neurological deficits after back surgery, a systemic disease affecting sexual life, cognitive disorders, other painful musculoskeletal system disorders, and psychiatric disorders were excluded from the study.

Patients who agreed to participate in the study completed an evaluation form specially established for this study in the company of a clinician face-to-face. These questions were about CLBP features (disease duration, pain severity by visual analog scale (VAS 0–100 mm), sexual life and socio-demographic characteristics, such as age, gender and educational level.

To determine the impact of CLBP on sexual life we created questions given below.

- Impact of LBP on sexual life (yes/no)
- LBP during intercourse (VAS 0–100 mm)
- LBP after intercourse (VAS 0–100 mm)
- Decrease of frequency of intercourse (yes/no)
- Decrease of libido (yes/no)
- Decrease of sexual satisfaction (yes/no)
- Comfortable intercourse position (sidely/prone/supine)
- Painful intercourse position (sidely/prone/supine)
- Behavior toward painful sexual activity (change position/taking pain relievers/postponing the intercourse)

To determine the patients' sensation of discussing sexual problems with their healthcare provider, we created the following questions.

- Broaching sexual issues with a healthcare provider (yes/no)
 - Request for information about sexual concerns (yes/no)
 - Type of information (medical advice/referral to another department/written notice)
 - Satisfaction with information (yes/no)
 - Barriers to broaching sexual issues (patient shame/unsuitable environment/apprehension of healthcare provider's gender)

In addition, we used questionnaires to evaluate the effects of CLBP on different variables.

- Functional disability (Turkish version of the Oswestry Disability Index (ODI))
- Pain-related anxiety (Turkish version of Pain Catastrophizing Scale (PCS))
- Physical activity level (Turkish version of International Physical Activity Questionnaire (IPAQ))
 - Fear of movement (Turkish version of Tampa Scale of Kinesiophobia (TSK))
 - Depression severity (Turkish version of Beck Depression Inventory (BDI))

Statistical Analyses: The data on the relationship between all these variables and the scales applied above regarding sexual activity were evaluated using hierarchical cluster analysis

of multivariate statistical methods, which are useful for many applications in terms of classification. Using this method, the relationships between variables and clustering trends were determined by the dendrogram, which allowed us to obtain more details for clinical interpretation. In this study, common linkage and Ward's hierarchical clustering method were used for cluster analysis. Pearson's correlation test was used to assess the correlation between the questionnaire outcomes. Data were analyzed using "R programming, version 3.6.2 (2019), R Core Team, Vienna, Austria", which was adapted as a standard software package for data analysis by statisticians.

3. Results

Forty-five men and ninety-five women were included in the study. Descriptive statistics (mean and standard deviation) for the continuous variables and the questionnaire results of the patients are presented in Table 1. The mean age of participants was 45.29 years. The mean duration of CLBP was 7.5 years.

The educational level of the patients was categorized into three basic levels. It was seen that the educational levels were evenly distributed among these levels (primary school (38.2%), high school (28.7%) and university (32.4%). 86.8% of the patients did not have regular exercise regularly. According to the IPAQ, 82.6% of the patients were found to be in the inactive or minimally active category.

Clusters formed by the related variables are shown by a dendrogram using cluster analysis (Fig. 1). The dendrogram allowed us to see how the variables that may affect sex life related to low back pain were clustered. Based on the dendrogram, two main clusters of similar-quality variables were created.

Discomfort from the survey, effects of gender of the healthcare provider, the impact of information, the impact of healthcare provider, gender of patients, the impact of LBP on sexual life, decrease in libido, sexual satisfaction, frequency of intercourse, painful sexual behavior, the intensity of LBP and questionnaire results (BDI, TSK, ODI Sexual Life Score, PCS) were in the same cluster (Fig. 1). Consistent with this, positive correlations were found between BDI and PCS ($p < 0.001$, $r = 0.481$), BDI and TSK ($p < 0.001$, $r = 0.319$), and BDI and ODI ($p < 0.001$, $r = 0.408$). Questions such as "gender of healthcare provider, sufficient information on sexual problems, barriers to discussion on sexual problems, type of information, asking for information and consulting with the healthcare providers" questioning the patient's communication about her/his problem were also included in the same subcluster (Fig. 1).

The other main clusters included demographic and clinical characteristics, ODI and IPAQ scores. Educational level, exercise habits, age of patients, job and disease duration were related and in the same subcluster (Fig. 1). The ODI and IPAQ scores were in the same subcluster, and a negative correlation was found between these scores ($p < 0.05$, $r = -0.254$). Discussing sexual concerns with healthcare providers registered as a sub-cluster between the two main clusters.

Evaluation forms specially established for this study category; evaluation of changes in the sexual life of patients with CLBP and discussion of sexual concerns are given below in Tables 2 and 3, respectively.

TABLE 1. Descriptive statistics for continuous variables and questionnaire results.

Variables	Mean (95% CI)	SD
Age (yr)	45.2 (43.1–47.4)	12.7
Duration of Disease (yr)	7.5 (5.8–8.1)	7.5
Oswestry Disability Index	34.4 (31.2–36.8)	17.0
Pain Catastrophizing Scale	23.8 (20.9–25.1)	13.5
Beck Depression Inventory	11.6 (9.5–12.5)	9.2
TAMPA Scale of Kinesiophobia	24.7 (22.8–25.2)	7.6

yr: Year; CI: Confidence Interval; SD: Standard deviation.

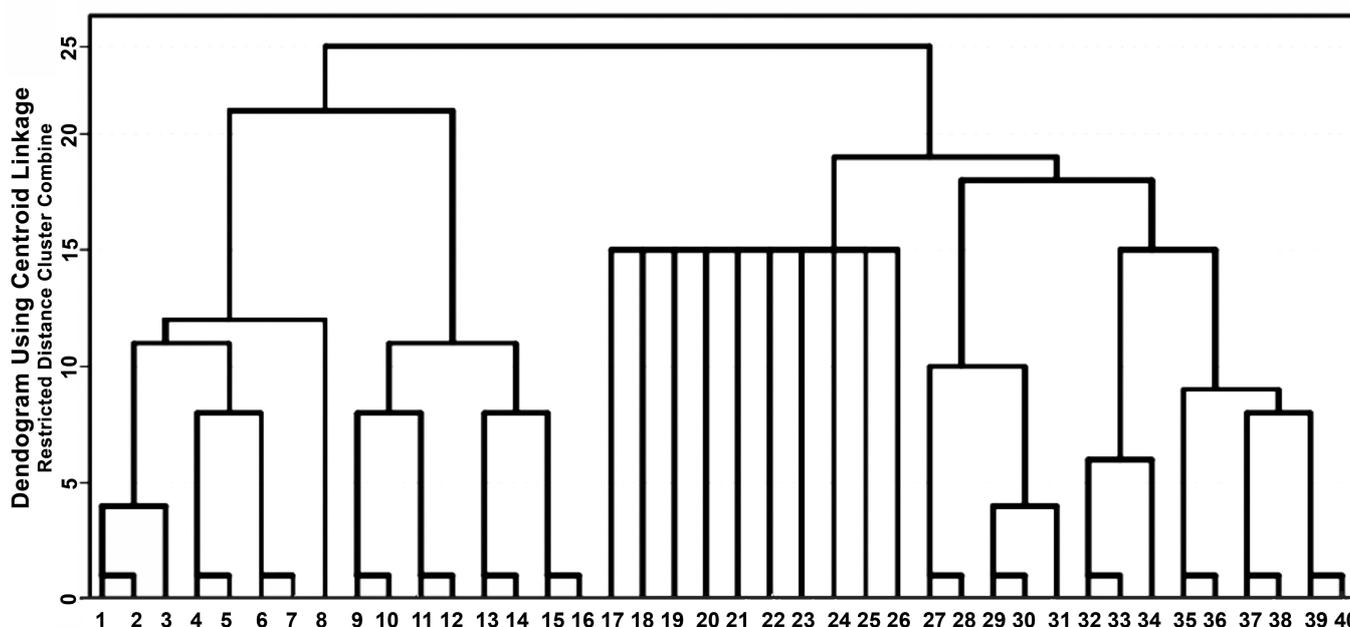


FIGURE 1. Dendrogram of Assessment of Sexual Activity and Related Factors in Patients with CLBP. 1: Discomfort from the survey, 2: Effect of genders of healthcare provider, 3: Beck depression inventory score, 4: Impact of information, 5: Impact of healthcare provider, 6: Gender of patient, 7: Impact of low back pain on sexual life, 8: Tampa kinesiophobia score, 9: Decrease of libido, 10: Sexual satisfaction, 11: Painful sexual behavior, 12: Frequency of intercourse, 13: Oswestry sexual life score, 14: Position type of low back pain, 15: Pain catastrophizing score, 16: Intensity of low back pain, 17: Leg pain, 18: Gender of the healthcare provider, 19: Sufficient information of sexual problems, 20: Barriers for discussion on sexual problems, 21: Type of information, 22: Asking for information, 23: Consulting with the healthcare provider, 24: Low back pain during intercourse, 25: Low back pain after intercourse, 26: Impact of low back pain on activity of daily living, 27: Education level, 28: Exercise habit, 29: Age of patients, 30: Job, 31: Disease duration, 32: Oswestry total score, 33: Coital position, 34: Healthcare provider, 35: International physical activity questionnaire met score, 36: International physical activity questionnaire category, 37: Requent of discussing about sexual problems, 38: Awareness, 39: Concerns of sexual life dysfunction, 40: Painful coital position.

4. Discussion

Our study demonstrated that patients with CLBP have disturbed sexual lives, which is correlated with patient and disease characteristics such as pain, physical activity level, disability, kinesiophobia, pain-related anxiety, depression and patient concerns.

CLBP is a major cause of disability, kinesiophobia and depression, all of which affect sexual function in many ways [1]. Several studies have demonstrated that sexual problems are prevalent among patients with CLBP. The frequency of sexual problems in patients with CLBP has been reported from

50% to 80% in the studies [8–10]. In this study, the negative effect of CLBP on sexual activity was found in 46.7% of men and 59.1% of women. In another Turkish population survey, 55% of men and 84% of women reported experiencing sexual problems after LBP onset of low-back pain [4].

In a study that investigated the relationship between CLBP and sex life in the Swedish population, 30% of patients reported that their sex life was severely limited [11]. In a study describing sexual dysfunction in CLBP in the Iranian population, 71.1% of female patients and 59.5% of male patients with CLBP complained of sexual disability. In a study by Nikoobakht *et al.* [12], sexual disability was lower in those

TABLE 2. Evaluation of changes in the sexual life of patients with CLBP.

	All patient (n = 140)	Women (n = 95)	Men (n = 45)
The intensity of LBP (VAS 0–100 mm)	7.25 ± 1.96	7.16 ± 1.96	7.44 ± 1.96
Impact of LBP on sexual life (yes/no)	Yes (50.7%)	Yes (59.1%)	Yes (46.7%)
Behavior to painful sexual activity (change position/taking pain relievers/postponing the intercourse)	Change position (43.2%)	Change position (46.2%)	Postponing intercourse (48.3%)
Concerns of sexual life dysfunction (VAS 0–100 mm)	6.29 ± 3.16	5.83 ± 3.20	7.17 ± 2.95
Decrease of frequency of intercourse (yes/no)	Yes (62.2%)	Yes (57.6%)	Yes (71.0%)
Decrease of libido (yes/no)	No (51.0%)	No (59.3%)	No (50.0%)
Decrease of sexual satisfaction (yes/no)	No (60.4%)	No (62.7%)	No (53.6%)
Comfortable intercourse position (sidely/prone/supine)	Supine (60.9%)	Supine (64.9%)	Supine (53.3%)
Painful intercourse position (sidely/prone/supine)	Prone (46.6%)	Prone (46.4%)	Prone (46.9%)

LBP: low back pain; VAS: visual analog scale.

TABLE 3. Discussing sexual concerns.

	All patient (n = 140)	Women (n = 95)	Men (n = 45)
Broaching sexual issues with a healthcare provider (yes/no) (n = 92)	No (91.3%)	No (95.0%)	No (84.4%)
Request for information about sexual concerns (yes/no) (n = 39)	No (56.4%)	No (66.7%)	Yes (55.6%)
Type of information (medical advice/referral to another department/written notice) (n = 23)	Medical advice (65.2%)	Medical advice (77.8%)	Medical advice (57.1%)
Satisfaction with information (yes/no) (n = 28)	Yes (82.1%)	Yes (83.3%)	Yes (81.3%)
Barriers to broaching sexual issues (patient shame/not suitable environment/apprehension of healthcare provider's gender) (n = 46)	Patient shame (71.7%)	Patient shame (75.0%)	Patient shame (60.0%)
Requested form of information type (face-to-face/online/written notice) (n = 123)	Face-to-face (63.4%)	Face-to-face (60.5%)	Face-to-face (69.0%)
Impact of the healthcare provider's gender (yes/no) (n = 134)	Yes (50.7%)	Yes (62.2%)	No (50.7%)
Awareness created by the survey (yes/no) (n = 134)	Yes (71.6%)	Yes (68.9%)	Yes (77.3%)
Discomfort from survey (yes/no) (n = 134)	No (78.4%)	No (76.7%)	No (81.8%)
Effect of the healthcare provider's gender on the answers (yes/no) (n = 132)	No (81.8%)	No (80.9%)	No (83.7%)

who were physically active and had higher education and income levels. As a result of the hierarchical cluster method in our study, age, longer disease duration, lower educational level and lower physical activity were correlated with the ODI total score. CLBP causes poor quality of life, affecting patients' daily lives and, consequently, their sexual life. Another similar subset in our cluster analysis was the relationship between the ODI sexual life score, PCS and decreases in sexual desire, sexual satisfaction and intercourse frequency. A decrease in sexual desire, sexual satisfaction and frequency of intercourse and libido was encountered in more than half of the patients. A decrease in sexual desire was found at 59.3% and 50%; a decrease in sexual satisfaction was 62.7% and 53.6%; a decrease in the frequency of intercourse was 57.6% and 71%; a decrease in libido was found at 59.3% and 50% of women and men, respectively. In a recent study that assessed how much LBP affected sexual satisfaction before and after treatment, sexual satisfaction was significantly higher after treatment in

women and men groups [13]. In our study, there is a decrease in sexual satisfaction of 62.7% in women and 53.6% in men.

Maigne *et al.* [9] conducted a questionnaire-based study that investigated the effect of CLBP on sexual activity and found that female patients were more affected than male patients, which is consistent with the results of our study.

Various studies have shown that sexual dysfunction is more common in patients with CLBP who have high levels of disability, depression, kinesiophobia and catastrophe. In our study, the average TSK, which was related to the BDI in the dendrogram, was found to be 24.79 ± 7.67 . As a result, sexual impairment seems to be related to fear of triggering pain during intercourse and psychological factors.

In our study, questionnaire results (BDI, TSK, ODI Sexual Life Score, PCS) are in the same cluster and there is a positive correlation between BDI and PCS, TSK and ODI scores. There are many studies that demonstrate a strong correlation and bidirectional association between CLBP and depression [14–

16]. There are studies that found the prevalence of depressive symptoms in patients with CLBP is 20–25% which is higher than the normal population [17, 18]. People with depression are more likely to develop chronic pain. In adults across observational studies, research suggests that people experiencing depression are approximately 60% more likely to develop back pain in their lifetime versus non-depressed people. In another study, chronic pain was present in 41% of patients diagnosed with major depressive disorder [19–21]. Several studies have demonstrated that CLBP and depression have similar neural mechanisms [22, 23]. Elevated pro-inflammatory cytokines, interleukin (IL)-1 β , IL-6 and tumor necrosis factor-alpha (TNF- α) have been identified in patients with depression and CLBP [24, 25]. Inflammation may be the key that why some patients with CLBP develop depression and people experiencing depression are more likely to develop pain. There is a strong relationship between depression and CLBP because of this, screening with inflammation markers and depression questionnaires can be recommended for patients with CLBP as an essential aspect of management.

In the literature, sexual problems that affect patients with CLBP were defined as the fear of increasing pain, decreased frequency of sexual intercourse, interruption of sexual intercourse and decreased sexual satisfaction [8, 9, 11, 26]. In our study, patients complained of similar problems. However, the literature regarding the most painful sexual intercourse positions and the most comfortable sexual intercourse positions is inconsistent. In our study, the most painful sexual intercourse positions were 46.6% prone, 25% other, 12.5% supine and 12.5% side-lying. The most comfortable sexual intercourse positions were 60.9% supine, 23% prone and 16.1% side-lying. Bahouq *et al.* [8] showed in their study that the most painful sexual intercourse position was supine for both men and women, and the most comfortable position was side lying. In contrast, Maigne *et al.* [9] reported that the most painful sexual intercourse position was prone, and the least painful coital position was supine, which is consistent with our study. Inconsistencies among studies may be due to the lack of analysis of the causes of CLBP because different causes of CLBP, such as lumbar herniated disc or facet joint dysfunction, have different biomechanical effects on the spine, which may cause pain in different intercourse positions.

Several studies have demonstrated that sexual concerns are prevalent among patients with CLBP. In our study, 50.7% of patients' sex lives were affected by CLBP. Decreases in sexual satisfaction, frequency of intercourse and libido were encountered in more than half of the patients (60%, 62.2% and 51%).

Although sexual concerns are prevalent among patients with CLBP, discussing sexual concerns with healthcare providers is difficult for patients. The barriers to discussing sexual concerns defined in the literature are patient shame, healthcare providers' reactions, lack of privacy, education level and lack of time [27]. Our results show that patient embarrassment is the main barrier to broaching sexual problems. In other studies, a low educational level was found to be a barrier to discussing sexual concerns. In our study, education level was not found to be a barrier. This may be due to the socio-cultural context.

Although most of the patients were open to broaching sexual

issues (91.3%), only 56.4% of patients asked for information about their sexual concerns. Although the preferred type of information is mostly face-to-face, patient embarrassment is the main barrier to broaching sexual issues, as noted in the literature. Most of the patients (78.4%) were comfortable with filling out a survey about sexual life, and the survey helped build awareness about discussing sexual concerns among most patients (71.6%).

Although disrupted sex life is frequent in patients with CLBP, discussion of this topic can be difficult for patients. Patients may hesitate even if they are willing to break sexual issues because of the barriers mentioned above.

In a recent study that investigated the relationship between LBP and sexual life from the patient's perspective, patients with CLBP were open to broaching sexual issues like our study. In the same study, patients declared that they had to modify their sexual habits due to LBP, which is consistent with our study [28].

The current study revealed that the supine position is the most comfortable sexual intercourse position in patients with CLBP; however, there is inconsistency in the literature regarding the most painful position. Further studies are needed to evaluate the relationship between the causes of CLBP and the most comfortable and painful intercourse position. Although the preferred type of information was mostly face-to-face in our study, patient embarrassment was the main barrier to broaching sexual issues. The patient may hesitate even if he or she is willing to broach sexual issues because of such barriers.

The limitations of this study include its being a single center-based study. The data obtained may not be a representation of the entire chronic low back pain population. Detailed analysis of psychological components of patients such as childhood trauma, depression cycles, *etc.* could be analyzed as a subgroup in a future study. The study was conducted in the Turkish population, therefore there may be inconsistency between other studies conducted in a foreign setting due to cultural differences.

5. Conclusions

Consequently, the sexual lives of patients with CLBP are affected both physically and psychosocially. Depression, kinesiophobia and catastrophic thoughts associated with CLBP are also related to sexual problems and concerns. Within the therapeutic context, our practical implications are during treatment planning, psychosocial conditions should also be evaluated in addition to physical, biomechanical and pain problems. It is important to encourage patients to discuss their sexual concerns and to provide information to help manage pain during sexual activity.

AVAILABILITY OF DATA AND MATERIALS

An analyzed version of the data is included in this article. Details of the data presented in this study and additional data are available upon reasonable request from the corresponding author.

AUTHOR CONTRIBUTIONS

DC, OOA, LO—designed the research study. DC, OOA, GK, SM, LO—performed the research. DC, YC, LO—analyzed the data. DC, GK, LO—wrote the manuscript. All authors read and approved the final manuscript.

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

Signed informed consent was obtained from one hundred forty (140) patients and the study was approved by the Demiroglu Bilim University Clinical Research Ethics Committee (02.03.2021/2021-05-03).

ACKNOWLEDGMENT

Not applicable.

FUNDING

This research received no external funding.

CONFLICT OF INTEREST

The authors declare no conflict of interest. We certify that the submission is original work and is not under review at any other publication.

REFERENCES

- [1] Agnus Tom A, Rajkumar E, John R, Joshua George A. Determinants of quality of life in individuals with chronic low back pain: a systematic review. *Health Psychology and Behavioral Medicine*. 2022; 10: 124–144.
- [2] Kinikli GI, Karaca NB, Sezer S, Keleşoğlu B, Kinikli G. POS1400-HPR comparison of body awareness, physical activity, Kinesiophobia, pain catastrophizing, and psychosocial status in individuals with rheumatoid arthritis and ankylosing spondylitis. *Annals of the Rheumatic Diseases*. 2023; 82: 1052–1053.
- [3] Alamam DM, Leaver A, Alsobayel HI, Moloney N, Lin J, Mackey MG. Low back pain-related disability is associated with pain-related beliefs across divergent non-english-speaking populations: systematic review and meta-analysis. *Pain Medicine*. 2021; 22: 2974–2989.
- [4] Katz H, Newton-John TRO, Shires A. Sexual difficulties in the population with musculoskeletal chronic pain: a systematic review. *Pain Medicine*. 2021; 22: 1982–1992.
- [5] Holmberg ST, Vangen-Lønne V, Gulati AM, Nygaard ØP, Solberg TK, Salvesen ØO, *et al.* Pain during sex before and after decompressive surgery for lumbar spinal stenosis. *Spine*. 2021; 46: 1354–1361.
- [6] Holmberg ST, Salvesen ØO, Vangen-Lønne V, Hara S, Fredheim OM, Solberg TK, *et al.* Pain during sex before and after surgery for lumbar disc herniation. *Spine*. 2020; 45: 1751–1757.
- [7] Panneerselvam K, Kanna RM, Shetty AP, Rajasekaran S. Impact of acute lumbar disk herniation on sexual function in male patients. *Asian Spine Journal*. 2022; 16: 510–518.
- [8] Bahouq H, Fadoua A, Hanan R, Ihsane H, Najia H. Profile of sexuality in Moroccan chronic low back pain patients. *BMC Musculoskeletal Disorders*. 2013; 14: 63.
- [9] Maigne J, Chatellier G. Assessment of sexual activity in patients with back pain compared with patients with neck pain. *Clinical Orthopaedics and Related Research*. 2001; 385: 82–87.
- [10] Flegge LG, Barr A, Craner JR. Sexual functioning among adults with chronic pain: prevalence and association with pain-related outcomes. *Pain Medicine*. 2023; 24: 197–206.
- [11] Berg S, Fritzell P, Tropp H. Sex life and sexual function in men and women before and after total disc replacement compared with posterior lumbar fusion. *The Spine Journal*. 2009; 9: 987–994.
- [12] Nikoobakht M, Fraidouni N, Yaghoubidoust M, Burri A, Pakpour AH. Sexual function and associated factors in Iranian patients with chronic low back pain. *Spinal Cord*. 2014; 52: 307–312.
- [13] Sobański D, Staszkievicz R, Gadzieliński M, Stachura MK, Czepko RA, Holiński M, *et al.* A study of 179 patients with degenerative stenosis of the lumbosacral spine to evaluate differences in quality of life and disability outcomes at 12 months, between conservative treatment and surgical decompression. *Medical Science Monitor*. 2023; 29: e940213.
- [14] Manning K, Kauffman BY, Rogers AH, Garey L, Zvolensky MJ. Fatigue severity and fatigue sensitivity: relations to anxiety, depression, pain catastrophizing, and pain severity among adults with severe fatigue and chronic low back pain. *Behavioral Medicine*. 2022; 48: 181–189.
- [15] Melloh M, Elfering A, Käser A, Salathé CR, Barz T, Aghayev E, *et al.* Depression impacts the course of recovery in patients with acute low-back pain. *Behavioral Medicine*. 2013; 39: 80–89.
- [16] Kao Y, Chen J, Chen H, Liao K, Huang S. The association between depression and chronic lower back pain from disc degeneration and herniation of the lumbar spine. *The International Journal of Psychiatry in Medicine*. 2022; 57: 165–177.
- [17] Leopoldino AAO, Diz JBM, Martins VT, Henschke N, Pereira LSM, Dias RC, *et al.* Prevalence of low back pain in older Brazilians: a systematic review with meta-analysis. *Revista Brasileira de Reumatologia*. 2016; 56: 258–269.
- [18] Yueming Hu, Zechuan Yang, Yong Li, Yong Xu, Mengge Tian, Nan Jiang, *et al.* Prevalence and associated factors of depressive symptoms among patients with chronic low back pain: a cross-sectional study. *Frontiers in Psychiatry*. 2022; 12: 820782.
- [19] Brown D, Schenk S, Genet D, Zernikow B, Wager J. A scoping review of chronic pain in emerging adults. *PAIN Reports*. 2021; 6: e920.
- [20] Pinheiro MB, Ferreira ML, Refshauge K, Maher CG, Ordoñana JR, Andrade TB, *et al.* Symptoms of depression as a prognostic factor for low back pain: a systematic review. *The Spine Journal*. 2016; 16: 105–116.
- [21] Kao Y, Chen J, Chen H, Liao K, Huang S. The association between depression and chronic lower back pain from disc degeneration and herniation of the lumbar spine. *The International Journal of Psychiatry in Medicine*. 2022; 57: 165–177.
- [22] Pinto EM, Neves JR, Laranjeira M, Reis J. The importance of inflammatory biomarkers in non-specific acute and chronic low back pain: a systematic review. *European Spine Journal*. 2023. [Preprint]
- [23] Ellul P, Boyer L, Groc L, Leboyer M, Fond G. Interleukin-1 β -targeted treatment strategies in inflammatory depression: toward personalized care. *Acta Psychiatrica Scandinavica*. 2016; 134: 469–484.
- [24] Milenkovic VM, Stanton EH, Nothdurfter C, Rupperecht R, Wetzel CH. The role of chemokines in the pathophysiology of major depressive disorder. *International Journal of Molecular Sciences*. 2019; 20: 2283.
- [25] Roman M, Irwin MR. Novel neuroimmunologic therapeutics in depression: a clinical perspective on what we know so far. *Brain, Behavior, and Immunity*. 2020; 83: 7–21.
- [26] Drummond HF, Farcic TS, Carvas N, Baldan CS, Bordello Masson IF, Perez Machado AF. Correlation between chronic low back pain and female sexual function. *Coluna/Columna*. 2020; 19: 277–81.
- [27] Bahouq H, Allali F, Rkain H, Hajjaj-Hassouni N. Discussing sexual concerns with chronic low back pain patients: barriers and patients' expectations. *Clinical Rheumatology*. 2013; 32: 1487–1492.
- [28] Ferrari S, Vanti C, Giagio S, Anesi M, Youssef S, Bortolami A, *et al.* Low back pain and sexual disability from the patient's perspective: a qualitative study. *Disability and Rehabilitation*. 2022; 44: 2011–2019.

How to cite this article: Dilek Cokar, Yusuf Celik, Ozge Ozdemir Ayla, Gulis Kavadar, Sadiye Murat, Levent Ozgonenel. Assessment of sexual dysfunction, the quality of life and difficulties in broaching sexual issues in patients with chronic low back pain by using cluster analysis. *Signa Vitae*. 2024; 20(1): 127-132. doi: 10.22514/sv.2024.008.