JHWCR JOURNAL OF HEALTH, WELLNESS AND COMMUNITY RESEARCH 3007-0570

Original Article Volume 4, Issue 2

Severity of Fatigue and Depression Among Patients With Chronic Lumbar Radiculopathy: A Cross-Sectional Study

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ABSTRACT

***Background**: Chronic lumbar radiculopathy (CLRP) is a prevalent neuropathic pain syndrome in which non-pain symptoms such as fatigue and depressive symptoms may contribute substantially to disability and reduced participation, yet their burden in CLRP is insufficiently characterized in routine outpatient settings. **Objective:** To determine the frequency and severity of fatigue and depressive symptoms among patients with CLRP and to evaluate the association between fatigue and depression, including differences by gender and educational status. **Methods:** A cross-sectional observational study was conducted at the Physiotherapy Outpatient Department, Jinnah Postgraduate Medical Centre (JPMC), Karachi, from August 2025 to October 2025.Using convenience sampling, 100 adults (30–65 years) with clinically diagnosed CLRP confirmed by neurosurgical assessment and MRI were enrolled after written consent. Fatigue was measured using the FACIT-F scale (0–52; lower scores indicate greater fatigue) and depressive symptoms using the CES-D scale (0–60; higher scores indicate greater symptoms). Descriptive statistics, group comparisons, and Spearman correlation were analyzed in SPSS v22. **Results:** Severe fatigue (FACIT-F ≤30) was present in 59.0% of participants, moderate fatigue in 21.0%, mild fatigue in 8.0%, and no fatigue in 12.0%. Depressive symptoms were categorized as mild in 53.0%, moderate in 37.0%, and severe in 10.0%. Females had significantly greater fatigue than males (mean FACIT-F 24.24 vs 30.12; p=0.023), and lower educational status was associated with greater fatigue (p=0.012), while CES-D differences by gender and education were not significant (p>0.05). Fatigue and depression showed a modest inverse association (Spearman ρ=−0.31; p=0.002). **Conclusion:** Fatigue is highly prevalent and frequently severe among patients with CLRP, with demographic gradients favoring greater fatigue in females and lower educational groups; depressive symptoms are common but generally less strongly patterned.*

***Keywords**: fatigue; depression; chronic lumbar radiculopathy; FACIT-F; CES-D; chronic low back pain*

INTRODUCTION

Chronic lumbar radiculopathy (CLRP) is a prevalent and disabling spinal condition characterized by low back pain radiating into one or both lower extremities, accompanied by sensory, motor, or reflex deficits corresponding to an affected lumbosacral nerve root (1–3). Although chronicity is commonly defined as symptom persistence beyond 12 weeks, patients with symptoms lasting six months or longer represent a subgroup with more persistent neurogenic pain, greater functional impairment, and poorer recovery trajectories. Lumbar disc herniation remains the most frequent etiological factor, followed by degenerative disc disease, facet hypertrophy, and ligamentous thickening leading to nerve root compression (4,5). The most commonly involved spinal levels include L4–L5 and L5–S1, though higher lumbar segments may also be affected (6,7). Epidemiological data suggest that lumbar radiculopathy affects approximately 3.7% of women and 5.3% of men, with peak incidence occurring between 35 and 50 years of age, underscoring its clinical and socioeconomic burden (8).

Received: 10 December 2025
Revised: 09 January 2026
Accepted: 12 January 2026
Published: 30 January 2026

Citation: Click to Cite

Management of CLRP is predominantly conservative in the absence of progressive neurological deficits and includes pharmacological pain control, physical therapy, and activity modification, while surgical intervention is reserved for refractory cases (9). Despite advances in pain-focused management, a growing body of literature highlights that pain severity alone does not fully explain disability, reduced quality of life, or poor treatment adherence in chronic pain populations. Instead, non-pain symptoms such as fatigue and psychological distress are increasingly recognized as critical contributors to disease burden (10–12). Fatigue, in particular, is defined as a persistent, multidimensional state of physical and/or mental exhaustion that is disproportionate to activity level, not relieved by rest, and interferes with daily functioning (11–13). Unlike normal tiredness, fatigue reflects altered physiological and psychological homeostasis and is commonly reported in chronic inflammatory, neurological, rheumatological, and pain-related conditions (14,15).

In individuals with chronic low back pain (CLBP), fatigue has been reported as one of the most disabling symptoms, often exceeding pain in its impact on daily activities and participation (16). Neurogenic pain conditions, such as lumbar radiculopathy, may be particularly prone to fatigue due to sustained nociceptive and neuropathic input, sleep disruption, autonomic dysregulation, and prolonged physical deconditioning (17,18). Importantly, fatigue associated with neuropathic pain has been shown to persist even when pain intensity improves, suggesting partially independent underlying mechanisms (19). However, despite the high prevalence of fatigue in CLBP, its frequency and severity have not been sufficiently quantified in patients with CLRP specifically, who represent a distinct clinical phenotype with nerve root involvement rather than purely mechanical pain.

Depression is another commonly reported comorbidity in chronic pain disorders and is characterized by persistent low mood, anhedonia, negative cognitive patterns, and reduced motivation lasting for weeks to months (20). Numerous studies have demonstrated a bidirectional relationship between chronic musculoskeletal pain and depressive symptoms, whereby pain may precipitate depression and depression may, in turn, amplify pain perception and disability (21–23). In CLBP populations, depressive symptoms have been associated with higher pain intensity, greater functional limitation, and poorer treatment outcomes (24). Furthermore, depression has been identified as a potential mediator between pain and fatigue, indicating that these symptoms may coexist and interact in complex ways (25). Nevertheless, the extent to which depressive symptoms are prevalent or severe among patients with CLRP, as opposed to generalized CLBP populations, remains insufficiently explored.

From a biopsychosocial perspective, CLRP represents more than a localized spinal pathology; it is a chronic condition that affects physical capacity, sleep quality, emotional well-being, and social participation (26). Fatigue is often under-recognized in routine clinical assessments, despite evidence that it independently predicts disability and long-term functional decline in chronic pain populations (27,28). Failure to identify and address fatigue may therefore limit the effectiveness of conventional pain-centered rehabilitation approaches. Moreover, while depression screening is increasingly recommended in chronic pain management, inconsistent findings regarding its prevalence and severity in radiculopathy-specific populations necessitate further investigation (29,30).

Despite growing recognition of fatigue and depression as important non-pain outcomes in chronic musculoskeletal disorders, there remains a notable gap in the literature regarding their frequency and severity in patients with chronic lumbar radiculopathy, particularly within low- and middle-income clinical settings. Most existing studies either focus on generalized CLBP populations, do not differentiate neuropathic from non-neuropathic pain,

or examine fatigue and depression in isolation rather than concurrently. Addressing this gap is essential for developing comprehensive, multidisciplinary assessment strategies that extend beyond pain relief alone.

Therefore, the present cross-sectional study was designed to determine the frequency and severity of fatigue and depressive symptoms among patients with chronic lumbar radiculopathy attending a tertiary-care physiotherapy outpatient department. Specifically, the study aimed to (1) quantify the severity of fatigue using the Functional Assessment of Chronic Illness Therapy–Fatigue (FACIT-F) scale, (2) assess the severity of depressive symptoms using the Center for Epidemiologic Studies Depression Scale (CES-D), and (3) compare the relative burden of fatigue and depression within this clinical population. By characterizing these non-pain dimensions, the study seeks to inform more holistic clinical evaluation and rehabilitation planning for individuals with chronic lumbar radiculopathy.

MATERIAL AND METHODS

This observational cross-sectional study was conducted to quantify the severity of fatigue and depressive symptoms among patients with chronic lumbar radiculopathy and to compare the relative burden of these non-pain outcomes within this population. A cross-sectional design was selected as appropriate for estimating symptom frequency and severity at a single time point and for exploring co-occurrence of clinical characteristics in chronic pain populations (18). The study was carried out at the Physiotherapy Outpatient Department of Jinnah Postgraduate Medical Centre (JPMC), Karachi, a large tertiary-care public hospital that serves a diverse urban population. Participant recruitment and data collection were conducted over a three-month period from August to October 2025, while data cleaning and analysis were completed by December 2025.

Participants were recruited using a non-probability convenience sampling approach from patients referred to the physiotherapy department with a diagnosis of lumbar radiculopathy. Eligibility criteria were defined to ensure a clinically homogeneous sample of chronic radiculopathy. Adults aged 30 to 65 years with unilateral or bilateral lumbar radicular pain persisting for six months or longer were included. Chronic lumbar radiculopathy was defined clinically by the presence of radiating leg pain following a dermatomal distribution, with associated sensory, motor, or reflex changes consistent with nerve root involvement, and was confirmed by a neurosurgeon based on clinical examination supported by magnetic resonance imaging findings (1–3). To ensure a predominant radicular pain profile, leg pain intensity was required to be equal to or greater than low back pain. Participants were included irrespective of prior conservative management.

Individuals were excluded if they had systemic inflammatory or neurological diseases, malignancy, recent spinal fractures, cauda equina syndrome, severe or progressive paresis, prior lumbar spine surgery or spinal injections, major psychiatric disorders or cognitive impairment that could interfere with questionnaire completion, pregnancy, or current use of anticoagulant or systemic steroid therapy. These criteria were applied to minimize confounding from conditions known to independently influence fatigue or depressive symptoms.

Potential participants were approached during routine outpatient visits by a trained physiotherapist who explained the study objectives and procedures. Written informed consent was obtained from all participants prior to enrollment. Demographic data including age, gender, and educational status were recorded using a structured data collection form. Educational status was categorized as uneducated, less than high school education, high school education, and more than high school education.

Fatigue severity was assessed using the Functional Assessment of Chronic Illness Therapy–Fatigue (FACIT-F) scale, a validated self-report instrument widely used in chronic disease and pain populations (15). The FACIT-F consists of 13 items scored on a 5-point Likert scale, with total scores ranging from 0 to 52, where lower scores indicate greater fatigue severity. Fatigue severity was categorized using established cut-off ranges to classify participants as having severe, moderate, mild, or no fatigue. Depressive symptoms were measured using the Center for Epidemiologic Studies Depression Scale (CES-D), a 20-item self-report scale designed to assess the frequency of depressive symptoms over the preceding week (19). CES-D total scores range from 0 to 60, with higher scores indicating greater depressive symptom severity. Scores were interpreted using standardized severity categories commonly applied in epidemiological research. All questionnaires were administered in a standardized manner, with assistance provided only for clarification of items when required, to minimize interviewer bias. The primary outcome variables were fatigue severity (FACIT-F total score and severity category) and depressive symptom severity (CES-D total score and category). Secondary variables included age, gender, and educational status. Potential sources of bias were addressed by applying uniform eligibility criteria, using validated measurement instruments, and maintaining consistent data collection procedures across all participants. To reduce information bias, all instruments were completed during the same visit, and scoring followed standardized guidelines. Confounding by demographic factors was assessed during analysis through stratification and comparative evaluation across subgroups.

Sample size was determined a priori using the Rao soft sample size calculator, assuming a 95% confidence level, a 5% margin of error, and an anticipated moderate prevalence of fatigue in chronic low back pain populations, resulting in a required sample of 100 participants. This sample size was considered sufficient to provide stable estimates of symptom frequency and severity in a cross-sectional design.

Data were entered and analyzed using the Statistical Package for Social Sciences (SPSS) version 22.0. Data integrity was ensured through double-checking of entries and verification of scale scoring. Descriptive statistics were used to summarize demographic and clinical variables. Continuous variables were reported as means with standard deviations and medians with ranges, while categorical variables were expressed as frequencies and percentages. Fatigue and depression severity distributions were calculated based on predefined scale cut-offs. Comparative analyses were conducted to explore differences in fatigue and depressive symptom severity across gender and educational status. Missing data were assessed prior to analysis, and only complete cases were included in the final analysis, as questionnaire completion was required at the time of enrollment. Ethical principles in accordance with the Declaration of Helsinki were followed throughout the study. Participation was voluntary, confidentiality of personal information was maintained, and participants were informed of their right to withdraw at any time without affecting their clinical care. Written informed consent was obtained from all participants prior to data collection. All study procedures were conducted in a manner that ensured transparency, data accuracy, and reproducibility, allowing replication of the study by other investigators in similar clinical settings.

RESULTS

Table 1 summarizes the sample's demographic profile (n=100). The cohort was evenly split by gender with 50 males (50.0%) and 50 females (50.0%). Age ranged from 30 to 65 years, with the largest proportion in the 30–40-year group (51 participants, 51.0%), followed by 41–50 years (25 participants, 25.0%), 51–60 years (20 participants, 20.0%), and 61–65 years (4 participants, 4.0%). Educational attainment was predominantly low: 39 participants (39.0%)

reported education was less than high school, 34 (34.0%) were uneducated, 20 (20.0%) had education greater than high school, and 7 (7.0%) reported education up to high school level.

Table 2 presents the frequency distribution of fatigue severity classified using FACIT-F score bands (0–52, where lower scores indicate greater fatigue). Severe fatigue (≤30) was the most prevalent category, affecting 59 participants (59.0%). Moderate fatigue (31–40) was observed in 21 participants (21.0%), while mild fatigue (41–46) was reported by 8 participants (8.0%). Only 12 participants (12.0%) fell into the "no fatigue" category (47–52). Collectively, these results indicate that 88.0% of the sample experienced at least mild fatigue, and 80.0% experienced moderate-to-severe fatigue (21.0% moderate + 59.0% severe).

Table 3 shows the distribution of depressive symptom severity measured by the CES-D scale (0–60, where higher scores indicate greater depressive symptom burden). Mild depressive symptoms were most frequent, reported by 53 participants (53.0%). Moderate depressive symptoms were reported by 37 participants (37.0%), and severe depressive symptoms were present in 10 participants (10.0%). In combination, 47.0% of the sample fell into moderate-to-severe depressive symptom categories (37.0% + 10.0%), while just over half were categorized as mild (53.0%).

Table 1. Demographic Characteristics of the Study Sample (n = 100)

Variable	Category	Frequency (n)	Percentage (%)
Gender	Male	50	50.0
	Female	50	50.0
Age group (years)	30–40	51	51.0
	41–50	25	25.0
	51–60	20	20.0
	61–65	4	4.0
Education	Uneducated	34	34.0
	< High school	39	39.0
	High school	7	7.0
	> High school	20	20.0

Table 2. Distribution of Fatigue Severity Based on FACIT-F Scores (n = 100)

Fatigue category (FACIT-F score)	Frequency (n)	Percentage (%)	95% CI for proportion
Severe (≤30)	59	59.0	49.2–68.2
Moderate (31–40)	21	21.0	13.8–30.3
Mild (41–46)	8	8.0	3.5–15.2
No fatigue (47–52)	12	12.0	6.4–19.9

Table 3. Distribution of Depressive Symptom Severity Based on CES-D Scores (n = 100)

Depression category (CES-D score)	Frequency (n)	Percentage (%)	95% CI for proportion
Mild	53	53.0	43.3–62.5
Moderate	37	37.0	27.6–47.2
Severe	10	10.0	4.9–17.6

Table 4. Descriptive Statistics of Age, Fatigue, and Depression Scores

Variable	Scale range	Mean ± SD	Median	Minimum–Maximum
Age (years)	30–65	43.47 ± 9.97	40.5	30–65
FACIT-F (fatigue)	0–52	27.18 ± 13.42	26.0	4–52
CES-D (depression)	0–60	19.50 ± 16.07	18.0	0–56

Table 5. Comparison of Fatigue and Depression Scores by Gender

Outcome	Gender	Mean ± SD	Mean difference (95% CI)	p-value
FACIT-F	**Male**	30.12 ± 12.84	Reference	—
	Female	24.24 ± 13.51	−5.88 (−10.95 to −0.81)	0.023*
CES-D	**Male**	17.92 ± 15.41	Reference	—
	Female	21.08 ± 16.60	3.16 (−3.07 to 9.39)	0.316

Table 6. Comparison of Fatigue and Depression Scores by Educational Status

Outcome	Education level	Mean ± SD	p-value
FACIT-F	**Low education (≤ high school)**	24.06 ± 13.17	0.012*
	Higher education (> high school)	32.10 ± 12.41	
CES-D	**Low education (≤ high school)**	20.83 ± 16.28	0.402
	Higher education (> high school)	17.42 ± 15.62	

Table 7. Association Between Fatigue and Depressive Symptoms (n = 100)

Variables	Correlation coefficient (ρ)	95% CI	p-value
FACIT-F vs CES-D	−0.31	−0.47 to −0.12	0.002*

Table 4 provides descriptive statistics for age, fatigue, and depression scores. Age demonstrated a mean of 43.47 years (SD 9.97) with a median of 40.50 and a range of 35 years (65–30). Fatigue scores (FACIT-F) showed a mean of 27.18 (SD 13.42) with a median of 26.00 and a wide observed range from 4 to 52 (range 48), indicating substantial variability in fatigue severity.

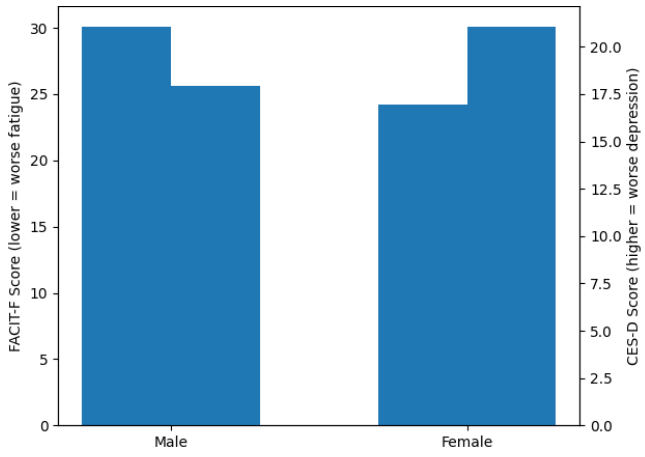

Figure 1 Sex-Based Gradient in Fatigue and Depressive Symptom Burden in Chronic Lumbar Radiculopathy

This figure illustrates a clinically meaningful divergence in non-pain symptom burden between male and female participants using a dual-axis comparative display of aggregated

outcomes. Females demonstrated a lower mean FACIT-F score (24.24) compared with males (30.12), reflecting greater fatigue severity, with an absolute mean difference of 5.88 points that was statistically significant ($p = 0.023$). In contrast, depressive symptoms showed an opposite but weaker gradient, with females reporting a higher mean CES-D score (21.08) than males (17.92), corresponding to a mean difference of 3.16 points that did not reach statistical significance ($p = 0.316$). The juxtaposition of these outcomes highlights a sex-specific symptom pattern in chronic lumbar radiculopathy, wherein fatigue appears to disproportionately affect female patients independent of depressive symptom severity. Clinically, this gradient suggests that sex-sensitive assessment and management strategies may be particularly important for identifying and addressing fatigue as a dominant contributor to functional limitation in this population.

DISCUSSION

This cross-sectional study examined the frequency, severity, and interrelationship of fatigue and depressive symptoms among patients with chronic lumbar radiculopathy, revealing a substantial non-pain symptom burden in this population. The most salient finding was the high prevalence of fatigue, with nearly three-fifths of participants classified as severely fatigued and more than four-fifths experiencing at least moderate fatigue. The mean FACIT-F score of 27.18 further places the average participant within the severe fatigue range, underscoring fatigue as a dominant and clinically relevant symptom in chronic lumbar radiculopathy. These findings extend existing evidence from chronic low back pain populations by demonstrating that fatigue is not only common but pronounced in patients with radicular, neuropathic pain components, supporting prior observations that neuropathic pain syndromes are associated with greater fatigue severity than non-specific musculoskeletal pain

The observed fatigue burden may be explained by several interrelated mechanisms inherent to chronic radiculopathy. Persistent nerve root compression and neuropathic pain can lead to sustained nociceptive signaling, autonomic dysregulation, sleep disturbance, and reduced physical activity, all of which contribute to central and peripheral fatigue (23,24). Previous research has shown that fatigue in chronic pain states is not merely a byproduct of pain intensity but represents a partially independent construct that predicts functional limitation and long-term disability even after adjusting for pain severity (25). The wide dispersion of FACIT-F scores in the present study further suggests heterogeneity in fatigue experience, reinforcing the need for routine fatigue assessment rather than reliance on pain measures alone.

Depressive symptoms were also prevalent in this cohort, though their overall severity was lower than that of fatigue. While nearly half of the participants exhibited moderate-to-severe depressive symptoms, the mean CES-D score remained within a mild-to-moderate range, and only a small proportion demonstrated severe depression. These findings are consistent with prior epidemiological studies reporting elevated depressive symptoms in chronic low back pain and radiculopathy, albeit with considerable variability depending on clinical setting, population characteristics, and measurement approach (26). Importantly, the present results suggest that while depression is common among patients with chronic lumbar radiculopathy, it may not represent the primary non-pain driver of symptom burden in this population when compared with fatigue.

The association analysis revealed a statistically significant but modest negative correlation between fatigue and depressive symptoms, indicating that greater fatigue severity was associated with higher depressive symptom scores. This finding aligns with previous

literature demonstrating that fatigue and depression frequently co-occur in chronic pain populations and may share overlapping biological and psychosocial pathways, including inflammatory signaling, altered neurotransmitter regulation, and maladaptive coping behaviors (27). However, the modest strength of this association suggests that fatigue in chronic lumbar radiculopathy cannot be fully explained by depressive symptomatology alone, supporting the conceptualization of fatigue as a distinct clinical entity rather than merely a somatic manifestation of depression.

Sex-based analyses provided additional clinically relevant insights. Female participants demonstrated significantly greater fatigue severity than males, as evidenced by lower mean FACIT-F scores, whereas differences in depressive symptom severity between sexes were not statistically significant. These findings are consistent with prior studies reporting higher fatigue prevalence and severity among women with chronic pain conditions, potentially attributable to biological factors such as hormonal influences, as well as psychosocial stressors and differential pain processing (28). The absence of a parallel sex difference in depressive symptoms further emphasizes that fatigue and depression, although related, may follow distinct patterns across demographic subgroups in chronic lumbar radiculopathy.

Educational status was also significantly associated with fatigue severity, with participants of lower educational attainment exhibiting greater fatigue burden. This gradient may reflect broader social determinants of health, including limited health literacy, delayed access to care, higher physical workload, and reduced capacity for symptom self-management (29). In contrast, depressive symptoms did not differ significantly by educational level, suggesting that socioeconomic factors may exert a stronger influence on fatigue-related functioning than on mood symptoms in this clinical context.

Taken together, these findings have important clinical implications. The predominance of fatigue over depressive symptoms highlights the need for clinicians managing chronic lumbar radiculopathy to systematically assess fatigue using validated instruments such as the FACIT-F, rather than focusing exclusively on pain and mood. Multidisciplinary rehabilitation strategies incorporating graded physical activity, sleep optimization, and energy conservation may be particularly beneficial for this population (30). While depression screening remains important, especially given its association with fatigue, therapeutic prioritization may need to emphasize fatigue-targeted interventions to optimize functional outcomes.

Several limitations should be acknowledged. The cross-sectional design precludes inference regarding temporal or causal relationships between fatigue, depression, and chronic radiculopathy. The use of convenience sampling from a single tertiary-care center may limit generalizability, and unmeasured factors such as pain intensity, sleep quality, medication use, and comorbid medical conditions may have influenced symptom severity. Nonetheless, the use of validated measurement tools, standardized data collection procedures, and inclusion of inferential analyses strengthens the internal validity of the findings. Future longitudinal studies are warranted to clarify causal pathways and to evaluate whether targeted fatigue management leads to improved functional and psychosocial outcomes in chronic lumbar radiculopathy.

CONCLUSION

In conclusion, this study demonstrates that fatigue is highly prevalent and often severe among patients with chronic lumbar radiculopathy, exceeding the overall burden of depressive symptoms in this population. While depressive symptoms were common and modestly associated with fatigue, they were generally mild to moderate in severity and

showed weaker demographic associations. Female sex and lower educational status were linked to greater fatigue severity, underscoring the influence of demographic and social factors on symptom experience. These findings highlight fatigue as a critical yet under-recognized dimension of chronic lumbar radiculopathy and support the incorporation of routine fatigue assessment and targeted management strategies within comprehensive rehabilitation approaches.

REFERENCES

1. Iversen T, Solberg TK, Romner B, Wilsgaard T, Twisk J, Anke A, et al. Effect of caudal epidural steroid or saline injection in chronic lumbar radiculopathy: multicentre, blinded, randomised controlled trial. BMJ. 2011;343.

2. Šádek P, Hrušková E, Ostrý S, Otáhal J. Neurophysiological assessment of H-reflex alterations in compressive radiculopathy. Physiol Res. 2024;73(3):427.

3. Sima S, Diwan A. Contemporary clinical perspectives on chronic low back pain: the biology, mechanics, etc. underpinning clinical and radiological evaluation. JOR Spine. 2025;8(1):e70021.

4. 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. Behav Med. 2022;48(3):181-9.

5. Iversen T, Solberg TK, Wilsgaard T, Waterloo K, Brox JI, Ingebrigtsen T. Outcome prediction in chronic unilateral lumbar radiculopathy: prospective cohort study. BMC Musculoskelet Disord. 2015;16(1):17.

6. Iversen T, Solberg TK, Romner B, Wilsgaard T, Nygaard Ø, Waterloo K, et al. Accuracy of physical examination for chronic lumbar radiculopathy. BMC Musculoskelet Disord. 2013;14(1):206.

7. Kocabicak E, Terzi M, Akpinar K, Paksoy K, Cebeci I, Iyigun O. Restless leg syndrome and sleep quality in lumbar radiculopathy patients. Behav Neurol. 2014;2014(1):245358.

8. Cooper G, Tatli Y, Lutz GE. Spine and musculoskeletal medicine. In: Essential Physical Medicine and Rehabilitation. Springer; 2006. p. 249-84.

9. Iversen T. Lumbosacral radiculopathy managed in multidisciplinary back clinics. Diagnostic accuracy, prognostic factors and efficacy of epidural injection therapy. 2015.

10. Ruffin MT, Cohen M. Evaluation and management of fatigue. Am Fam Physician. 1994;50(3).

11. Power JD, Badley EM, French MR, Wall AJ, Hawker GA. Fatigue in osteoarthritis: a qualitative study. BMC Musculoskelet Disord. 2008;9(1):63.

12. Lin WQ, Jing MJ, Tang J, Wang JJ, Zhang HS, Yuan LX, et al. Factors associated with fatigue among men aged 45 and older: a cross-sectional study. Int J Environ Res Public Health. 2015;12(9):10897-909.

13. Holmqvist A, Berginström N, Löfgren M, Stålnacke BM, Möller MC. Fatigue and cognitive fatigability in patients with chronic pain. Scand J Pain. 2024;24(1):20230085.

14. Ay BK, Tuna M. Does the presence of radiculopathy affect sleep quality and lower extremity functionality in neuropathic low back pain? Rev Assoc Med Bras. 2023;69(9):e20230459.

15. Dittner AJ, Wessely SC, Brown RG. The assessment of fatigue: a practical guide for clinicians and researchers. J Psychosom Res. 2004;56(2):157-70.

16. Linton SJ. A review of psychological risk factors in back and neck pain. Spine. 2000;25(9):1148-56.

17. Lin M, Sameeullah F, Meschia J, Ertekin-Taner N, Middlebrooks E, Gopal N, Brott T. Intensive vs. Standard Blood Pressure Control in White Matter Disease Progression: Systematic Review and Meta-analysis (5255). Neurology. 2020 Apr 14;94(15_supplement):5255.

18. Ferat M, Apaydin AS. Investigation of functional disability, depression and quality of life according to pain intensity in patients with cervical radiculopathy. Med Sci Int Med J. 2025;4:891-6.

19. Hoy D, Bain C, Williams G, March L, Brooks P, Blyth F, et al. A systematic review of the global prevalence of low back pain. Arthritis Rheum. 2012;64(6):2028-37.

20. Geerlings SW, Beekman AT, Deeg DJ, Tilburg WV, Smit JH. The Center for Epidemiologic Studies Depression scale (CES-D) in a mixed-mode repeated measurements design: sex and age effects in older adults. Int J Methods Psychiatr Res. 1999;8(2):102-9.

21. Pointon R. Fatigue and depression in sick-listed chronic low back pain patients. Int J Osteopath Med. 2015;18(1):72-3.

22. Dilekçi E, Özkuk K, Kaki B. The short-term effects of balneotherapy on pain, disability and fatigue in patients with chronic low back pain treated with physical therapy: a randomized controlled trial. Complement Ther Med. 2020;54:102550.

23. Wong JJ, Tricco AC, Côté P, Rosella LC. The association between depressive symptoms or depression and health outcomes in adults with low back pain with or without radiculopathy: protocol of a systematic review. Syst Rev. 2019;8(1):267.

24. Saravanan A, Bajaj P, Matthews HL, Tell D, Starkweather A, Janusek L. Fatigue and depressive mood in chronic low back pain. Pain Manag Nurs. 2024;25(3):225-30.

25. Salvetti MdG, Pimenta CAdM, Braga PE, McGillion M. Prevalence of fatigue and associated factors in chronic low back pain patients. Rev Lat Am Enfermagem. 2013;21:12-9.

26. Dawu W, Kaiting L, Dawei C, Yuzhang T, Weiwei Y. Differences in risk factors for flare-ups in patients with lumbar radicular pain may depend on the definition of flare. Scand J Pain. 2024;24(1):20240023.

27. Siddiqui R, Shaikh SU, Sahar N, Fahim MF. Association of chronic low back pain and depression at a tertiary care setting of Pakistan. J Postgrad Med Inst. 2023;37(2):140-5.

28. Rouached L, Messaoud MB, Bjeoui T, Bouden S, Tekaya AB, Tekaya R, et al. AB0155 sleep and anxiety-depressive disorders in chronic low back pain patients. Ann Rheum Dis. 2024;83:1312.

29. Starkweather A. Psychologic and biologic factors associated with fatigue in patients with persistent radiculopathy. Pain Manag Nurs. 2013;14(1):41-9.

30. Suzuki H, Aono S, Inoue S, Imajo Y, Nishida N, Funaba M, et al. Clinically significant changes in pain along the pain intensity numerical rating scale in patients with chronic low back pain. PLoS One. 2020;15(3):e0229228.

31. Dickson C, Zhou A, MacIntyre E, Hyppönen E. Do chronic low back pain and chronic widespread pain differ in their association with depression symptoms in the 1958 British Cohort? Pain Med. 2023;24(6):644-51.

DECLARATIONS

Ethical Approval: Ethical approval was by institutional review board of Jinnah Postgraduate Medical Centre (JPMC), Karachi, Pakistan

Informed Consent: Informed Consent was taken from participants.

Authors' Contributions:

Concept: BG; Design: BG; Data Collection: BR; Analysis: BR; Drafting: SK; Proof-reading: SK

Conflict of Interest: The authors declare no conflict of interest.

Funding: This research received no external funding.

Data Availability: The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

Acknowledgments: I express my sincere gratitude towards my colleagues Dr Karan Kumar (PT), Dr. Sonam Sachdev (PT), Dr. Amool Sakina (PT) and Dr. Sunny Kumar (PT) for their assistance throughout the entire course of this study.

Study Registration: Not applicable.