

## Research Paper

## The Association Between Cervical Radiculopathy and Quality of Life in Patients With Cervical Spondylosis

Rafia Sultana<sup>1</sup>, Zohaib Shahid<sup>2</sup>, Faryal Safdar<sup>3</sup>, Hafiz Sheraz Arshad<sup>4</sup>

1. DPT Medical Center, Lahore, Pakistan.

2. Department of Neurology, Superior University Lahore, Lahore, Pakistan.

3. DPT Department, Superior University Lahore, Lahore, Pakistan.

3. OMPT Avicenna Medical College, Punjab, Pakistan.



**Citation** Sultana R, Shahid Z, Safdar F, Arshad HS. The Association Between Cervical Radiculopathy and Quality of Life in Patients With Cervical Spondylosis. *Iranian Rehabilitation Journal*. 2023; 21(1):177-184. <http://dx.doi.org/10.32598/irj.21.1.1548.1>

**doi** <http://dx.doi.org/10.32598/irj.21.1.1548.1>

**Article info:****Received:** 19 Oct 2021**Accepted:** 23 Nov 2022**Available Online:** 01 Mar 2023**Keywords:**

Spurling test, Cervical radiculopathy, Quality of life (QoL), Activities of daily living

**ABSTRACT**

**Objectives:** To determine the association between cervical radiculopathy and quality of life (QoL) in patients with cervical spondylosis.

**Methods:** This analytical cross-sectional study was conducted on 273 patients in five hospitals in Lahore within 3 months from April to June 2021. The Spurling test was used to measure cervical radiculopathy. The participants were selected according to the inclusion criteria. The Spurling test was used to measure cervical radiculopathy and its symptoms. The World Health Organization quality of life scale (WHOQoL) was used to evaluate the QoL of patients suffering from cervical spondylosis.

**Results:** Of 273 patients, 42.9% were male and 57.1% female. Their Mean±SD age was 42±11.9 years. Also, 70.3% had positive Spurling test, and 29.7% had negative results. Their Mean±SD physical health score was 11.70±1.74 (out of a total of 20), and their Mean±SD psychological health score was 11.75±1.78 (out of a total of 20). The Mean±SD social relationships score was 11.19±2.98 (out of a total of 20), and their Mean±SD environment health score was 11.13±3.08 out of a total of 20. P indicates a significant difference in the QoL between patients with positive and negative Spurling tests. Patients with negative Spurling tests had higher QoL scores. Greater scores denote a higher QoL

**Discussion:** There is a significant association between cervical radiculopathy and QoL in patients with cervical spondylosis. These results will help us in the future to design educational programs or modify the lifestyle of those patients with cervical radiculopathy. This research concluded that there is a significant difference in the QoL among patients with positive and negative Spurling tests. Patients with negative Spurling tests have higher QoL scores. Hence there is a significant association between diagnosed cervical radiculopathy and QoL.

**\* Corresponding Author:****Rafia Sultana****Address:** DPT Medical Center, Lahore, Pakistan.**E-mail:** [rafyaamwar66@gmail.com](mailto:rafyaamwar66@gmail.com)

## Highlights

- Cervical spondylosis may result in cervical radiculopathy.
- Cervical spondylosis affects the quality of life (QoL).
- Cervical spondylosis affects the QoL and cervical radiculopathy.

## Plain Language Summary

Cervical spondylosis is a degenerative disease of the intervertebral disks and facet joints that produce neck pain and motor or sensory dysfunction in elderly and middle-aged people. Cervical radiculopathy is the subdivision or the main symptom of cervical spondylosis with severe neck or shoulder pain. Due to these circumstances, this study was conducted in the clinical setting of Azra Naheed Medical College. The study samples were recruited based on criteria proved by the research committee of the Superior University, Lahore. The patients who were diagnosed with cervical spondylosis were recruited. After diagnosis, expert physiotherapists performed the Spurling tests to diagnose cervical radiculopathy and used a questionnaire to evaluate the QoL in patients with degenerative changes in the cervical area. The results under ethical consideration were analyzed using SPSS, and the effect of cervical spondylosis on the QoL was investigated. Also, we determined the association between cervical radiculopathy and QoL in patients with cervical spondylosis.

### 1. Introduction

Cervical spondylosis is a degenerative disease of the intervertebral disks and facet joints which causes neck pain and motor or sensory dysfunction in elderly and middle-aged people. The pain of this disease usually is triggered by physical activity, neck mobilization, or exercises [1]. Mainly, it affects the intervertebral disk or vertebral bodies, which leads to ligament hypertrophy or osteophytes. It also causes compression of the spinal cord or nerve roots. Cervical spondylosis is most commonly identified in people older than 40 [2]. According to recent studies, pain, numbness and tingling, and other major symptoms of cervical spondylosis are related to depression and insomnia, headache, abdominal cramps, nausea, vertigo, palpitations, and blurred vision [3].

Neck pain is the second most common complaint after back pain. The most common symptoms of cervical spondylosis are neck pain, muscle stiffness, pain radiating to the arm and fingers, tingling, and numbness of the hands [4]. It is reported that 50% of people over the age of 50 are suffering from cervical spondylosis or have common radiographic changes of cervical spondylosis [5]. The main factors responsible for cervical spondylosis are forward head posture, stress, neck strain, depression, occupational activities, and sports [6]. The prevalence of neck pain is 23.1%, and about 21.3% in office or computer workers [7].

Cervical radiculopathy is the subdivision or the main symptom of cervical spondylosis with severe neck or shoulder pain [8]. It is also identified as the objective motor or sensory loss function due to the blockage of conduction of nerve roots [9]. Mostly cervical radiculopathy occurs due to nerve root compression, which causes pain, muscle weakness, abnormal numbness, atrophy of muscle, and decreased reflexes of the tendon of the upper limb. In the case of cervical radiculopathy, conservative treatment shows good results, whereas, in myelopathy, surgical treatment is mostly required [10].

The main causes of cervical spondylotic radiculopathy are mostly prolapse of the nucleus pulposus, post-facet joint bone hyperplasia or traumatic arthritis, hook joint bone spur formation, displacement and loosening of three adjoining joints, etc. which cause spinal nerve root repression and stimulation. The treatment of cervical spondylosis included surgical and non-surgical treatment. Conservational treatment has continuous head and neck traction, a fixed neck circumference, and abnormal postural correction. Manual massage is also effective in avoiding trauma, but it should be performed carefully and gently. Non-conservative treatment is appropriate for anterior decompression of the cervical spondylosis; it is efficient and affects cervical spine stability. For patients with instability of the vertebral body, stenosis of the root canal, internal fixation with the inter-vertebral interface can be used to fix and expand the vertebral segment [11].

A recent report found associations between cervical pain, radiculopathy, and a person's physical and mental well-being. They discovered that cervical pain with or without cervical radiculopathy had a negative impact on the patient's physical and mental health. Also, it imposes a significant negative impact on their well-being, personal life, their families, and their societies. According to this research, the prevalence of cervical radiculopathy or cervical spine pain lies between 10.4% and 21.5%, which ultimately causes cervical spine disability [9]. A recent study, it is also revealed the relationship between intense pain and disability in patients who are suffering from cervical radiculopathy. The relationship between pain or disability in cervical radiculopathy depends on many factors of the population, so recent studies have determined the significant relationship between pain and disability. Another study revealed the relationship between pain intensity and work status. After completing the survey, it is concluded that the pain is significantly more severe in patients with a sedentary lifestyle and who do not work compared to those with full-time jobs or part-time work [12].

Many research studies mentioned that cervical spine surgery is the treatment of cervical radiculopathy. After the surgery, pain, disability, satisfaction, and quality of life (QoL) are measured to find out the outcome of the surgery. Identification of major factors to improve the communication gap between patients or surgeons helps a lot in managing the situation or the condition of the patient after surgery [12]. Another retrospective cohort study was conducted in 2018 to determine the relationship between cervical spondylosis and migraine. Migraine is the most widespread neuromuscular disorder, which affects the QoL of people and also exerts a socioeconomic burden [13].

There are many studies on cervical radiculopathy or cervical spondylosis, but all co-relate radiculopathy with anxiety, depression, and psychosocial factors or determine the prevalence of cervical radiculopathy, which is also performed in many countries [14]. Yet no study has been conducted in Pakistan determining the exact frequency of cervical radiculopathy and its association with QoL in patients with cervical spondylosis. This study investigates the QoL and health status of patients in the betterments in future concerning their disease.

## 2. Materials and Methods

The research is a cross-sectional study. The study data were collected from Chaudhary Muhammad Akram Research and Teaching Hospital, AL Mustafa Trust Medical

Center, Fuqraj Sharif Hospital, and National Hospital. This study was conducted from May 2021 to December 2021, so the duration of our research, after the approval of the synopsis was 6 months. A convenient sampling technique was used to recruit 273 patients. The study population comprised people aged 30 to 65 who suffered from cervical pain or neck pain and had poor QoL with a diagnosis of cervical spondylosis. The included patients with cervical spondylosis volunteered for the study and met the inclusion criteria. Patients were excluded if they were mentally and physically ill, pregnant, patients diagnosed with depression and anxiety, and those who had undergone cervical spine surgery. After data collection, they were entered into SPSS for analysis. The Spurling test was used for the assessment of cervical radiculopathy. The test was described in 1994 to measure cervical radiculopathy and its symptoms. It has 30% sensitivity and 93% specificity [15]. The test was performed by the following procedure [16].

The patient in a sitting position was asked to bend his neck laterally, then apply the axial compression, and after the complete the procedure, the patient was assessed by the World Health Organization quality of life (WHO-QoL) scale. The scale is highly reliable, and its reliability ranges from 0.41 to 0.78, and its validity ranges from 0.53 to 0.71 [17]. The instrument is supposed to assess the QoL in those patients with different diseases or in the post-operative phase. WHOQOL is defined as the individual's perception of their QoL. It consists of 24 questions which cover 4 categories plus 2 questions related to scale and health satisfaction [17]. The statistical analysis was done by the Chi-square test in SPSS.

## 3. Results

Percentages of male and female participants were almost equal (42.9% men and 57.1% women) (Table 1), and their Mean±SD age was 42.22±11.94 years (Table 2). Out of the 273 patients, 70.3% had positive Spurling test, and 29.7% had negative results (Table 3).

Their Mean±SD physical health score was 11.70±1.74 out of a total of 20, and the Mean±SD psychological health score was 11.75±1.78 out of a total of 20. Their Mean±SD social relationships score was 11.19±2.98 out of a total of 20, and the Mean±SD environment health score was 11.13±3.08 out of a total of 20, with greater scores indicating higher QoL (Table 4).

**Table 1.** Gender description

Gender	No. (%)
Male	117(42.9)
Female	156(57.1)
Total	273(100.0)

Iranian Rehabilitation Journal

**Table 2.** Age description

Variable	No.	Minimum	Maximum	Mean±SD
Age (y)	273	18.00	70.00	42.22±11.94

Iranian Rehabilitation Journal

P indicate a significant difference between the positive or negative Spurling tests regarding the QoL. Patients with Spurling test negative have a higher QoL scores. Greater scores indicate higher QoL (Table 4).

#### 4. Discussion

This study evaluated the association between cervical radiculopathy with QoL in patients with cervical spondylosis. Based on the findings, there is an association between cervical radiculopathy and QoL in patients diagnosed with cervical spondylosis.

Yanwei Lv et al. performed cross-sectional research to determine the prevalence and associated factors of cervical spondylosis in Chinese students. The data were collected through questionnaires or face-to-face interviews with 3899 Chinese adults. They concluded that 13.71% is the prevalence of cervical spondylosis, and menopause was the main factor for women [13]. But this study showed that out of the total 273 patients (42.9% male and 57.1% female with a Mean±SD age of 42±11.9 years), 70.3% had positive Spurling test and 29.7% negative results. Their Mean±SD physical health score was 11.70±1.74 out of 20. It is concluded that there is a significant difference between patients' QoL with posi-

tive and negative Spurling tests. Patients with negative Spurling tests have a higher QoL. Hence there is a significant association between diagnosed cervical radiculopathy and QoL.

Diebo conducted a retrospective study in 2018 to measure the effect of mental health on patients' reported outcomes in cervical radiculopathy or myelopathy surgery. Data were collected through the neck disability index, health-related life questionnaire, and SF-36 questionnaire. He concluded that after the surgery for cervical radiculopathy, the patients with low mental status showed less improvement than those with normal or high mental status [18]. The purpose of this study was to the QoL in patients with cervical spondylosis. In this study, the association between cervical radiculopathy and QoL was determined because it is very important to know the positive or negative relationship between these factors to make awareness or good health-related programs for the betterment of their life.

Wang-Sheng Lin conducted a recent study in 2018 to find the relationship between cervical spondylosis and migraine. A total of 27933 patients with cervical spondylosis were in the case group, and 111723 participants were in the control group. Univariate and multivariate

**Table 3.** Spurling test of the participants

Variables	No. (%)
Positive	192(70.3)
Negative	81(29.7)
Total	273(100.0)

Iranian Rehabilitation Journal

**Table 4.** Mean physical health, psychological, social relationships and environment score of the participants

Variables	No.	Minimum	Maximum	Mean±SD
Domain 1: Physical health	273	8.60	17.70	11.7084±1.74224
Domain 2: Psychological	273	8.00	17.33	11.7523±1.78013
Domain 3: Social relationships	273	6.70	20.00	11.1901±2.98799
Domain 4: Environment	273	7.50	20.00	11.1319±3.08146

Variables	Spurling test	No.	Mean±SD	P
Domain 1: Physical health	Positive	192	11.2401±1.52628	0.000
	Negative	81	12.8185±1.72758	
Domain 2: Psychological	Positive	192	11.3737±1.76608	0.000
	Negative	81	12.6498±1.47239	
Domain 3: Social relationships	Positive	192	10.4125±2.91124	0.000
	Negative	81	13.0333±2.28681	
Domain 4: Environment	Positive	192	10.1823±2.78329	0.000
	Negative	81	13.3827±2.54862	

analyses were used to measure the relationship between cervical spondylosis and migraine. After 10 years of follow-up, it was concluded that patients with cervical spondylosis are at greater risk of developing migraine other than the non-cervical spondylosis participants, and the rate of migraine is greater in the patients who suffered from cervical myelopathy [19]. However, this study showed the relationship between cervical radiculopathy and QoL in patients with cervical spondylosis. Because in recent studies, there is no study in which the relationship between these two variables was found. If we know the QoL of such patients, we can make better strategies for their healthy lifestyles.

Recently, a descriptive cross-sectional study was conducted in the Department of PT, Azra Naheed Medical School, Lahore Advanced Institute, from September 2015 to February 2016, and included patients aged 20-50 (both genders) with chronic neck pain lasting more than 6 months [20]. The data were collected using a 14-point self-reported questionnaire. The Spurling test was used to determine the occurrence of chronic cervical radiculopathy, and the visual analog scale was used to evaluate the pain intensity. SPSS software, version 21 was used to analyze the data. It was found that cervical spondylosis of radiculopathy is related to chronic neck pain [20]. But

this study associates the two variables of cervical radiculopathy and QoL. After the completion of the study, we concluded that there is a significant association between cervical radiculopathy and QoL in patients with cervical radiculopathy, and these results will help us in the future for the awareness programs or help in lifestyle modification of those patients who suffer from cervical radiculopathy.

## 5. Conclusion

There is a significant difference between patients with positive and negative Spurling tests regarding the QoL. Patients with negative Spurling tests have higher QoL scores. Hence there is a significant association between diagnosed cervical radiculopathy and QoL.

### Weakness and strength of the study

The study's strong points included patients' cooperation, staff cooperation, using the same language, and focus of interest.

The study weak points included collecting the data from 2 to 3 hospitals due to pandemic lockdown, which does not represent the whole country, collecting data through a questionnaire, not by clinical examination or follow-

ups for quality-of-life assessment, non-random sampling technique due to pandemic and closing the institute, less accuracy in data collection due to online data collection, and collecting data only from the people of Lahore.

### Study limitations

Like other research studies, there are some limitations in this research, which future researchers can compensate for them. We collected the data from 2 to 3 hospitals due to the pandemic lockdown, which does not represent the whole country. The data were collected through a questionnaire, not by clinical examination or follow-ups for quality-of-life assessment. We could not use the random sampling technique for data collection because the university was closed due to the pandemic. There was less accuracy in data collection due to online data collection or surveys. The current study covers only the people of Lahore.

### Recommendations

This study should be conducted all over Pakistan. There should be an experimental study on cervical radiculopathy in Pakistan. Further research must be focused on a healthy diet and adaptive techniques to avoid the negative impact of cervical radiculopathy on the QoL of patients.

### Ethical Considerations

#### Compliance with ethical guidelines

Consent of the patients was taken for participation in this study. They were assured of the privacy of their data; all the religious perspectives of the patients were addressed. The written consent form was signed by the patients. Ethical approval was obtained from the Ethics Committee of [Lahore University](#) before the study. All data were kept confidential. Patients remained anonymous throughout the study. The patients were informed that there were no dangers in the study process. They were also known that they would be free to leave at any time during the process of the study.

#### Funding

This research did not receive any grant from funding agencies in the public, commercial, or non-profit sectors. The researchers collected data from their workplace after the permission of the Head of the Department of Physiotherapy at [Azra Naheed Medical College](#).

### Authors' contributions

Analysis and interpretation: Hafiz Sheraz Arshad; Critical revision and final approval: Faryal Safdar; conceptualisation, study design, drafting the manuscript: Zohaib Shahid; Data collection: Rafia Sultana.

### Conflict of interest

The authors declared no conflict of interest in this study.

### Acknowledgments

We appreciate the participants, friends, and group members who helped us to complete my study.

### References

- [1] McCormack BM, Weinstein PR. Cervical spondylosis. An update. *Western Journal of Medicine*. 1996; 165(1-2):43-51. [PMCID] [PMID]
- [2] Wang C, Tian F, Zhou Y, He W, Cai Z. The incidence of cervical spondylosis decreases with aging in the elderly, and increases with aging in the young and adult population: A hospital-based clinical analysis. *Clinical Interventions in Aging*. 2016; 11:47. [DOI:10.2147/CIA.S93118] [PMID] [PMCID]
- [3] Stoffman MR, Roberts MS, King Jr JT. Cervical spondylotic myelopathy, depression, and anxiety: A cohort analysis of 89 patients. *Neurosurgery*. 2005; 57(2):307-13. [DOI:10.1227/01.neu.0000166664.19662.43] [PMID]
- [4] Singh S, Kumar D, Kumar S. Risk factors in cervical spondylosis. *Journal of Clinical Orthopaedics and Trauma*. 2014; 5(4):221-6. [DOI:10.1016/j.jcot.2014.07.007] [PMID] [PMCID]
- [5] Ahmed SB, Qamar A, Imram M, Fahim MF. Comparison of neck length, relative neck length and height with incidence of cervical spondylosis. *Pakistan Journal of Medical Sciences*. 2020; 36(2):219. [DOI:10.12669/pjms.36.2.832] [PMID] [PMCID]
- [6] Sun ZR, Yue JH, Zhang QH. Electroacupuncture at Jing-jiaji points for neck pain caused by cervical spondylosis: A study protocol for a randomized controlled pilot trial. *Trials*. 2013; 14(1):1-6. [DOI:10.1186/1745-6215-14-360] [PMID] [PMCID]
- [7] Choi BW, Song KJ. Current concept on the surgical treatment by anterior approach in degenerative cervical radiculopathy. *Journal of Korean Society of Spine Surgery*. 2011; 18(1):34-41. [DOI:10.4184/jkss.2011.18.1.34]
- [8] Mansfield M, Spahr N, Smith T, Stubbs B, Haig L, Thacker M. Association between psychosocial factors and mental health symptoms to cervical spine pain with or without radiculopathy on health outcomes: Systematic review protocol. *Pain Reports*. 2021; 6(1):e870. [DOI:10.1097/PR9.0000000000000870] [PMID] [PMCID]



- [9] Choi BW, Kim SS, Lee DH, Kim JW. Cervical radiculopathy combined with cervical myelopathy: Prevalence and characteristics. *European Journal of Orthopaedic Surgery & Traumatology*. 2017; 27(7):889-93. [DOI:10.1007/s00590-017-1972-2] [PMID]
- [10] Lam K, Peolsson A, Soldini E, Löfgren H, Wibault J, Dederling Å, et al. Larger pain extent is associated with greater pain intensity and disability but not with general health status or psychosocial features in patients with cervical radiculopathy. *Medicine*. 2021; 100(8):e23718. [DOI:10.1097/MD.00000000000023718] [PMID] [PMCID]
- [11] Wang P, Zuo G, Du SQ, Gao TC, Liu RJ, Hou XZ, et al. Meta-analysis of the therapeutic effect of acupuncture and chiropractic on cervical spondylosis radiculopathy: A systematic review and meta-analysis protocol. *Medicine (Baltimore)*. 2020; 99(5):e18851. [DOI:10.1097/MD.00000000000018851] [PMID] [PMCID]
- [12] Weber C, Behbahani M, Baardsen R, Lehmsberg J, Meyer B, Shiban E. Patients' beliefs about diagnosis and treatment of cervical spondylosis with radiculopathy. *Acta Neurochirurgica*. 2017; 159(12):2379-84. [DOI:10.1007/s00701-017-3356-0] [PMID]
- [13] Lv Y, Tian W, Chen D, Liu Y, Wang L, Duan F. The prevalence and associated factors of symptomatic cervical Spondylosis in Chinese adults: A community-based cross-sectional study. *BMC Musculoskeletal Disorders*. 2018; 19(1):1-12. [DOI:10.1186/s12891-018-2234-0] [PMID] [PMCID]
- [14] MacDowall A, Robinson Y, Skeppholm M, Olerud C. Anxiety and depression affect pain drawings in cervical degenerative disc disease. *Uppsala Journal of Medical Sciences*. 2017; 122(2):99-107. [DOI:10.1080/03009734.2017.1319441] [PMID] [PMCID]
- [15] Anekstein Y, Blecher R, Smorgick Y, Mirovsky Y. What is the best way to apply the Spurling test for cervical radiculopathy? *Clinical Orthopaedics and Related Research*. 2012; 470(9):2566-72. [DOI:10.1007/s11999-012-2492-3] [PMID] [PMCID]
- [16] Yao G, Chung CW, Yu CF, Wang JD. Development and verification of validity and reliability of the WHOQOL-BREF Taiwan version. *Journal of the Formosan Medical Association*. 2002; 101(5):342-51. [Link]
- [17] Lucas-Carrasco R. The WHO quality of life (WHOQOL) questionnaire: Spanish development and validation studies. *Quality of life Research*. 2012; 21(1):161-5. [DOI:10.1007/s11136-011-9926-3] [PMID]
- [18] Diebo BG, Tishelman JC, Horn S, Poorman GW, Jalai C, Segreto FA, et al. The impact of mental health on patient-reported outcomes in cervical radiculopathy or myelopathy surgery. *Journal of Clinical Neuroscience*. 2018; 54:102-8. [DOI:10.1016/j.jocn.2018.06.014] [PMID]
- [19] Lin WS, Huang TF, Chuang TY, Lin CL, Kao CH. Association between cervical spondylosis and migraine: A nationwide retrospective cohort study. *International Journal of Environmental Research and Public Health*. 2018; 15(4):587. [DOI:10.3390/ijerph15040587] [PMID] [PMCID]
- [20] Shahid Z, Mouzam H, Subhani A, Maqsood U, Sheraz H. Frequency of cervical radiculopathy among patients with chronic cervical pain in Lahore, Pakistan. *JPMA*. 2020; 70(1720). [DOI:10.5455/JPMA.6815] [PMID]

This Page Intentionally Left Blank