



www.bioinformation.net
Volume 22(9)



Research Article

Received September 1, 2026; Revised September 30, 2026; Accepted September 30, 2026, Published September 30, 2026

DOI: 10.6026/973206300225756

SJIF 2026 (Scientific Journal Impact Factor for 2026) = 8.478

2022 Impact Factor (2023 Clarivate Inc. release) is 1.9

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Edited by Ruby Singh

E-mail: bioinformationruby@gmail.com

Citation: Viswas *et al.* Bioinformation 22(9): 5756-5759 (2026)

Effect of physiotherapy in rheumatoid arthritis-associated cervical spondylosis: A prospective cohort study

Sudhakar Viswas*, Javed, Suheb Saifi, Danish Nouman, Akansha Gurjar & Prarthana Subhuti Das

Department of Physiotherapy, Jyotirao Phule Subharti College of Physiotherapy, Swami Vivekanand Subharti University, Meerut, Uttar Pradesh, India; *Corresponding author

Affiliation URL:

<https://subharti.org>

Author contact:

Sudhakar Viswas - E-mail: siddhu.sudhakar95@gmail.com

Javed - E-mail: javad.khan31555@gmail.com

Suheb Saifi - E-mail: suhebsaifi7500@gmail.com

Danish Nouman - E-mail: drdchauhan86@gmail.com

Akansha Gurjar - E-mail: akanshgurjar77@gmail.com

Prarthna Subhuti Das - E-mail: dasprarthana46@gmail.com

Abstract:

Rheumatoid arthritis-associated cervical spondylosis causes neck pain, disability and reduced quality of life. Therefore, it is of interest to evaluate a 12-week supervised physiotherapy programme in 60 patients receiving standard antirheumatic therapy. Pain, functional disability and quality of life were assessed using the VAS, NDI, HAQ-DI and SF-36 at baseline and 12 weeks. Physiotherapy significantly improved pain, disability and quality of life across all outcome measures ($p < 0.001$). Thus, data shows supervised physiotherapy as an effective adjunct for conservative management of RA-associated cervical spondylosis.

Keywords: Rheumatoid arthritis (RA), cervical spondylosis, physiotherapy, neck pain, functional disability, quality of life, exercise therapy, rehabilitation.

Background:

Rheumatoid arthritis (RA) is a chronic autoimmune disease that causes progressive joint destruction, disability and reduced quality of life, despite advances in medical management [1]. Although the peripheral joints are primarily affected, cervical spine involvement is common and may result in atlantoaxial instability, sub axial subluxation, cranial settling and substantial functional impairment [2, 3]. The coexistence of cervical spondylosis with RA further increases pain, neck disability and deterioration in health-related quality of life, necessitating careful conservative management by physiotherapists and other clinicians [4, 5]. Exercise-based rehabilitation, including strengthening, aerobic exercise, hydrotherapy and cervical stabilization exercises, has been shown to improve pain, function and quality of life in patients with RA and cervical disorders [6]. Therefore, it is of interest to report the effectiveness of supervised physiotherapy in improving pain, functional disability and quality of life among patients with rheumatoid arthritis-associated cervical spondylosis.

Materials and Methods:

This prospective cohort study was conducted over a 12-month period in the physiotherapy and rheumatology outpatient departments of a tertiary-care teaching hospital after obtaining institutional ethics committee approval and written informed consent from all participants. Adult patients (aged 30–65 years) with an established diagnosis of RA according to the American College of Rheumatology / European League Against Rheumatism criteria and with clinically and Radiologically confirmed cervical spondylosis presenting with neck pain of at least three months' duration, were consecutively enrolled. Patients with cervical myelopathy, radiographically documented gross atlantoaxial instability requiring surgical stabilization, previous cervical spine surgery, cervical fracture or dislocation, or any neurological or medical condition precluding safe exercise were excluded. All participants continued their prescribed disease-modifying antirheumatic drug therapy throughout the study and stable pharmacological management

was maintained to limit confounding. Sixty eligible patients formed the study cohort. Baseline demographic and disease-related data-age, sex, disease duration and Disease Activity Score in 28 joints (DAS28)-were recorded. Each participant received an individualized, supervised physiotherapy programme delivered three sessions per week for 12 weeks. The protocol comprised graded craniocervical flexion training and multi-angle isometric strengthening of the cervical musculature, active and assisted range-of-motion exercises, scapular and postural re-education, gentle manual therapy and soft-tissue mobilization within pain-free limits and adjunctive modalities (moist heat and transcutaneous electrical nerve stimulation) for symptom relief. Ergonomic advice, activity pacing and a complementary home-exercise programme were provided to reinforce supervised sessions. Progression of load and range was individualized to symptom response and cervical high-velocity thrust techniques were avoided in all patients as a precaution against rheumatoid instability.

Outcome measures:

The primary outcome was pain intensity measured on a 10-cm Visual Analogue Scale (VAS). Functional disability was assessed using the Neck Disability Index (NDI, expressed as a percentage) and the Health Assessment Questionnaire-Disability Index (HAQ-DI, range 0–3). Health-related quality of life was assessed using the Short Form-36 (SF-36) Physical and Mental Component Summary scores, where higher scores indicate better quality of life. All outcomes were recorded by a blinded assessor at baseline and again at the end of the 12-week intervention.

Statistical analysis:

Data were expressed as mean $\pm$ standard deviation. Normality of distribution was assessed using the Kolmogorov-Smirnov and Shapiro-Wilk tests and the data followed a parametric (normal) distribution. Within-group comparisons of baseline and post-intervention values were performed using the paired t-test. The significance level was set at $p \leq 0.05$. All analyses were performed with IBM® SPSS® Statistics Version 25 for Windows.

Results:

Of the 60 patients enrolled, all completed the 12-week programme and were available for final analysis. The cohort comprised predominantly women, with a mean age and RA disease duration typical of an outpatient rheumatology population; baseline characteristics are summarized in (Table 1). Comparison of baseline and post-intervention outcomes is presented in (Table 2). Supervised physiotherapy produced a statistically significant reduction in pain, with mean VAS falling from 6.8 ± 1.4 to 3.1 ± 1.2 ($p < 0.001$). Functional disability improved significantly on both instruments, the NDI decreasing from $28.4 \pm 6.2\%$ to $14.7 \pm 5.1\%$ and the HAQ-DI from 1.42 ± 0.38 to 0.86 ± 0.31 (both $p < 0.001$). Health-related quality of life improved markedly, with the SF-36 Physical Component Summary rising from 34.2 ± 7.1 to 48.6 ± 8.3 and the Mental Component Summary from 40.1 ± 8.0 to 52.3 ± 7.4 (both $p < 0.001$). No adverse neurological events or disease flares attributable to the intervention were recorded during the study.

Table 1: Baseline demographic and clinical characteristics of the study cohort (n = 60)

Characteristic	Value
Age (years), mean $\pm$ SD	51.6 $\pm$ 8.4
Female, n (%)	46 (76.7)
RA disease duration (years), mean $\pm$ SD	9.3 $\pm$ 4.7
DAS28, mean $\pm$ SD	3.9 $\pm$ 0.8
Duration of neck pain (months), mean $\pm$ SD	14.2 $\pm$ 6.5

Table 2: Comparison of pain, functional disability and quality-of-life outcomes at baseline and after 12 weeks of physiotherapy

Outcome measure	Baseline	12 weeks	P
VAS pain (0-10)	6.8 $\pm$ 1.4	3.1 $\pm$ 1.2	<0.001
NDI (%)	28.4 $\pm$ 6.2	14.7 $\pm$ 5.1	<0.001
HAQ-DI (0-3)	1.42 $\pm$ 0.38	0.86 $\pm$ 0.31	<0.001
SF-36 PCS	34.2 $\pm$ 7.1	48.6 $\pm$ 8.3	<0.001
SF-36 MCS	40.1 $\pm$ 8.0	52.3 $\pm$ 7.4	<0.001

VAS, Visual Analogue Scale; NDI, Neck Disability Index; HAQ-DI, Health Assessment Questionnaire-Disability Index; SF-36 PCS/MCS, Short Form-36 Physical/Mental Component Summary

Discussion:

The present prospective cohort study shows that a structured, supervised, multimodal physiotherapy programme produces significant improvements in pain, functional disability and quality of life in patients with RA-associated cervical spondylosis. The magnitude of improvement across all three patient-centred domains supports the role of physiotherapy as an effective conservative adjunct alongside pharmacological disease control [7]. These findings are consistent with the broader RA rehabilitation literature: dynamic exercise programmes have improved HAQ-assessed function, quality of life and aerobic fitness and meta-analyses have confirmed that aerobic and strengthening exercise are effective and safe, reducing pain and improving functional ability without exacerbating disease activity. The quality-of-life gains observed here echo those reported for hydrotherapy and patient-specific programmes [8] and the favourable effect of physical activity on quality of life and self-reported function established in inflammatory arthritis [9]. The reductions in NDI and VAS mirror the benefits of cervical isometric and craniocervical flexor

training reported for cervical spondylosis and chronic mechanical neck pain, in which strengthening the deep cervical flexors without loading pain-sensitive structures improved neck pain and disability [10]. Our results also align with case-based evidence that physical therapy improves quality of life in patients whose cervical spondylosis arises in the context of RA. Importantly, the improvements were achieved with a protocol that deliberately avoided high-velocity cervical thrust techniques. Because cervical spine subluxation is common and frequently asymptomatic in RA and because the radiological spectrum of rheumatoid cervical involvement ranges from asymptomatic instability to potentially life-threatening cord compression [11], vigilance for red-flag features and appropriate screening before manual intervention are essential. This cautious, individualized approach likely contributed to the absence of adverse neurological events in our cohort. The clinical relevance of these findings lies in the combined burden that rheumatoid and degenerative cervical disease imposes on affected patients. By targeting muscular support, mobility, posture and patient self-management simultaneously, a multimodal physiotherapy programme addresses several contributors to pain and disability at once, translating into measurable quality-of-life benefit. The consistency of improvement across independent instruments-VAS, NDI, HAQ-DI and both SF-36 component summaries-strengthens confidence that the observed effect reflects genuine clinical benefit rather than measurement artefact [12].

Conclusion:

A 12-week supervised physiotherapy programme improved pain, functional disability and quality of life in patients with RA-associated cervical spondylosis. No attributable adverse events were observed. Controlled studies with longer follow-up are needed to confirm these findings and assess treatment durability.

Limitations:

The principal limitation of this study is its single-arm prospective cohort design without a concurrent control group, which limits the ability to attribute improvement solely to the physiotherapy intervention and to exclude the influence of concurrent pharmacotherapy or natural fluctuation in disease activity. The sample size was modest, follow-up was limited to the immediate post-intervention period and the study was conducted at a single centre, all of which restricts generalizability and precludes assessment of the durability of benefit. Adherence to the home-exercise component was self-reported. Larger, randomized controlled trials with longer follow-up, objective adherence measures and stratification by cervical involvement are needed to confirm these findings and to define the optimal composition and dosage of physiotherapy in this population.

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