

Relationship Between Cervical Pain and Hand Dominance in College Going Students: A Cross Section Study

Ajeet Kumar Saharan^{*1}; Manisha Saharan²; Mahesh Shou³; Dharmita⁴; Manoj Mathur⁵; Anuja Choudhary⁶

¹Vivekananda Global University, Jaipur, Rajasthan, India; ORCID ID: 0000-0003-4807-8715

²Shyam University, Dausa, Rajasthan, India; ORCID ID: 0009-0002-1422-1739

³Bombay Hospital, Jaipur, Rajasthan, India; ORCID ID: 0009-0000-0547-326X

⁴Nims University Rajasthan, Jaipur, India; ORCID ID: 0000-0001-8847-4857

⁵Vivekananda Global University, Jaipur, Rajasthan, India; ORCID ID: 0009-0003-5129-1178

⁶Vivekananda Global University, Jaipur, Rajasthan, India; ORCID ID: 0009-0008-1402-1319

Corresponding author: Ajeet Kumar Saharan, Email: ajeetphysio@gmail.com

Abstract

Background: 'neck pain' is a very common problem among students, during prolonged study duration. Sometimes neck problems become so difficult which disturbs the sleep, activity of daily living (ADL), the neck becomes stiff, dominance and pain radiate in the upper limb. 'neck pain' is closely related to postural habits and lifestyle of an individual. Objective - To find the reason between 'neck pain' & its impact on symptomatic upper limb 'neck pain' Questionnaire.

Methods: Study was done on 163 participants of Vivekananda Global University, Jaipur, Rajasthan, Jaipur. Data was collected by using google form for 'neck pain', dominance, activity of daily living (ADL), sleep disturbance and other parameters. Analysis was done to note the relation between 'neck pain' & hand dominance of the student participants.

Result: Total 163 students participated, (89 female & 74 male). The mean value of female participants was 21.0674; standard deviation was 2.29524 and mean value of male participants was 21.0405; standard deviation was 2.29018. 8 participants i.e. 66.66% said that they were suffering from 'neck pain' whereas 55 participants i.e. 36.42% complaint for 'neck pain'.

Conclusion: The participants who were left-handed complained of cervical 'neck pain' more than the right-handed.

Clinical Implications: This will become easy to understand the connection/relation between 'neck pain' & hand dominance, and also the 'neck pain' treatment will become specific and accurate, so patients will be benefited.

Keywords: Cervical 'neck pain', Activity of Daily Living (ADL), Hand Dominance, Neck Stiffness, Left-handed Students.

1. Introduction

The study was designed to know the relationship between "neck pain" and its relation to the ipsilateral or contralateral side upper limb. Hand Dominance is also known as Handedness. As per the survey 90% of the population are Right-handed while Left-handed account only 10%. Ambidextrousness (the ability to complete tasks equally with either hand) are uncommon. Handedness means use of hand by any individual as per their choice for writing and other functional/ ADL activity. It's an individual preference to use one hand, also known as 'Dominant Hand'. 'Dominant Hand' is always stronger than the non-dominant side in respect of overall activities.^{1, 2, 3}

College Going Students - In the Dartmouth Alumni Magazine, Richard Wellington said that the average age of college going students is 18.6 year. Some of the students who enter into the college are less than 18 years of age also.

Cervical Pain- 'neck pain' is one of the most common complaints nowadays. Due to the life style which includes excess use of gadgets viz Laptop and Smart phone, which causes excessive bending of neck (cervical) region continuously for prolong period; population going to clubs and disc which causes jerky movement of neck while dancing; in-house female uses excessive neck bending while chopping activity in kitchen; and bad posture which includes extra thick pillow, lying of sofa, crook lying position with head support on wall etc. Every individual experience 'neck pain' in their life.⁴

'Neck pain' can be caused by different factors like muscle, ligament, joint strain, arthritis, disc prolapse, impingement etc. Neck is made of small bones called vertebrae which are arranged on each other. Though the mobility is more in the cervical region in comparison with other regions like Thoracic and Lumbar, so the incidence of 'neck pain' is also high in this region. The top seven vertebrae form the cervical region. 'neck pain' may be due to many reasons viz nerve impingement, osteophyte formation,

malalignment, soft tissue injuries etc.⁵ There are many types of 'neck pain' mainly it is divided into Mechanical and Non-mechanical.⁶

Cervical pain can disturb your day-to-day life from mild to severe extent. Some of the studies have shown the correlation between 'neck pain' and hand eye coordination. In this study they noticed that 'neck pain' is associated with sensorimotor dysfunction. So, they divided two groups of 120 patients and measured them by using coordination exercises. Finally, they concluded that patients with 'neck pain' had slower hand-foot reaction, response times and also impaired hand-eye coordination.⁷

Yi Fen Shih and Yi Hsuan Kao had done a study on 30 participants with chronic 'neck pain' >3 month. The result showed that the location of pain did not show any significant influence on the scapular movement and muscular activities.⁸ The authors think that there may be relation between 'neck pain' and 'Dominant Hand', so, in this study we have done a survey to find any correlation between hand dominance and 'neck pain'. The study was done on the college going students of age group between 17 to 25 years at Vivekananda Global University, Jaipur, Rajasthan. Ni Nyoman Ryanti Wijayani et. al (2023) have studied and found a relationship between function of upper limb, functional activity and 'neck pain' in carpenters (carvers). After using the three-outcome measure namely rapid upper limb assessment (RULA), 'International Physical Activity Questionnaire' (IPAQ) and 'Numeric Rating Scale' (NRS) questionnaire on 31 woodcarvers (carpenter), they stated that there is a significant correlation between RULA with 'neck pain' and a strong correlation between functional activity of upper limb with 'neck pain'.⁹ Morten Waersted et. al (2010) had done a systematic review of working on computer and musculoskeletal disorder of neck and upper limb. After going through the 26 articles, they found that there are very few studies which match the relationship between working style on computer systems and hand, holding of mouse and wrist pain or forearm pain and 'neck pain'. They clearly stated that there is need of more studies in this area for better documentation.¹⁰

Tay Xin Le et al (2019) have done a study on Violinists to note the relation between their 'neck pain' and 'Dominant Hand' used for playing instruments. 34 violinists had 'neck pain' (23) while 11 had no pain. The tapping speed on the Index-middle-ring-little finger was measured on both sides by using HL Tapper V.1.0 application. They found that the efficiency of tapping speed of the dominant (right) middle ring finger may be reduced due to pain in neck.¹¹ Shiri R et al (2007) had worked on upper limb dominance associated with musculoskeletal disorders. This study was done on 6254 residents of Finland aged ≥ 30 year. The prevalence noted were 3.8% rotator cuff tendinitis, 3.8% CTS, 1.1% tennis elbow, 0.5% bicipital tendinitis, 0.3% medial epicondylitis noted in upper limb. CTS was not associated with the dominant side while rotator cuff, medial epicondyle and bicipital tendinitis were strongly associated with dominant side upper limb. Finally, they concluded that dominant upper limb is commonly affected by musculoskeletal disorders.¹²

Pallewar M et al (2021), had done a study on the neural mobilization alongwith cervical traction in cervical radiculopathy and stated that there is strong correlation between 'neck pain' and 'Dominant Hand'.^{13, 14} Taneja DD et al (2018) have researched on the influence of spinal mobilization with arm movement in cervicobrachial pain syndrome and stated that cervicobrachial pain is associated with dominant side.¹⁵ Taneja D et al (2023) had done a study on Effect of Mulligan's Srmwam among Subjects with Unilateral Cervical Radiculopathy and got the similar outcome like study done in 2018.^{16, 17}

Aim & Objective: To find the relationship between 'neck pain' and its impact on the dominant upper limb.

2. Materials & Methods

2.1 Study Design and Setting:

This is a cross-section study was conducted from June 2026 to July 2026 at Vivekananda Global University, Jaipur, Rajasthan. Data was collected using a questionnaire and non-probability, convenience sampling.

The study was approved by the Institutional Ethics Committee. Informed consent was signed by all the participants recruited in the study.

Study Setting:

The study was conducted among college going Undergraduate & Post-graduate students of Vivekananda Global University, Jaipur, Rajasthan, India.

2.2 Participants:

Undergraduate & post-graduate college students were recruited on the selection criteria.

2.2.1 Inclusion criteria

1. students complaining 'neck pain' since few weeks,
2. recurrent 'neck pain',
3. student willing to participate voluntarily
4. age between 17 – 28 years of any gender.

2.2.2 Exclusion criteria

1. Student undergone surgical procedure in neck region,
2. student on analgesic or related medication,
3. any neurological conditions
4. malignancy symptoms.

2.3 Sample and Procedure:

Total 164 undergraduate & post-graduate college students were recruited for the study through the official information sent to all department with dispatch register and further distributed among students via google form link to collect the data from them, between June 2024 to July 2024; one student did not reply the 'neck pain' Questionnaire but remaining 163 college going students participated and replied in allotted time frame. All the included students were between 17 to 28 years of any gender, have submitted their consent voluntarily.

2.4 Data Collection:

A questionnaire was developed & validated to find the relation between Cervical Pain & Hand Dominance. The core reason behind the use of questionnaire was to see the difference in dominance, students habit while sleeping, postural attitude. The 'neck pain' Questionnaire consist of total 25 questions with multiple choice key answers, which covers many aspects of a student's life like habit, posture, habit of ignorance and mainly dominance. The validation of the scale was done before the use.

2.5 Data Analysis & Outcome Measure:

Data was collected by using google forms; convenience sampling method was used to achieve the requires sample size. Descriptive data analysis was performed to summarize data, the 'neck pain' Questionnaire (NPQ) score. The variables were presented as mean & standard deviation (SD), categorical variables in absolute values and proportions (%). The primary finding was the relation between 'neck pain' and hand dominance in college going students.

The following independent variables were considered: age; sex (male or female), enrolled students of the college. A significance level of less than 5% ($p < 0.05$) was considered for all analysis.

Face Validity:

Face validity of "'neck pain' Questionnaire" was assessed with the help of 16 reviewers with the minimum 15-year Academic/Clinical experience, with the designation of Professor/HOD/Senior Consultant, Active Research Fellow and h-index should be 3 minimum. All the reviewer were selected from pan India. The outcome measures were evaluated for its language, understanding and administration. For the content validation all the experts were requested to score each item of scale from 1 to 3 where 1 indicate - rejected, 2 - accepted with modifications, 3 - accepted. After receiving the reply from 16 reviewer including partly amendment in the Questionnaire, final format was designed to circulate among participants.

3. Result

Total 163 students were recruited and participated very in the study. Out of 163 participant 89 were female and 74 were male. The mean value of female participants was 21.0674; standard deviation was 2.29524 and mean value of male participants was 21.0405; standard deviation was 2.29018.

Table 1: Mean and SD of Age

	Female	Male
Mean	21.0674	21.0405
N	89	74
Std. Deviation	2.29524	2.29018

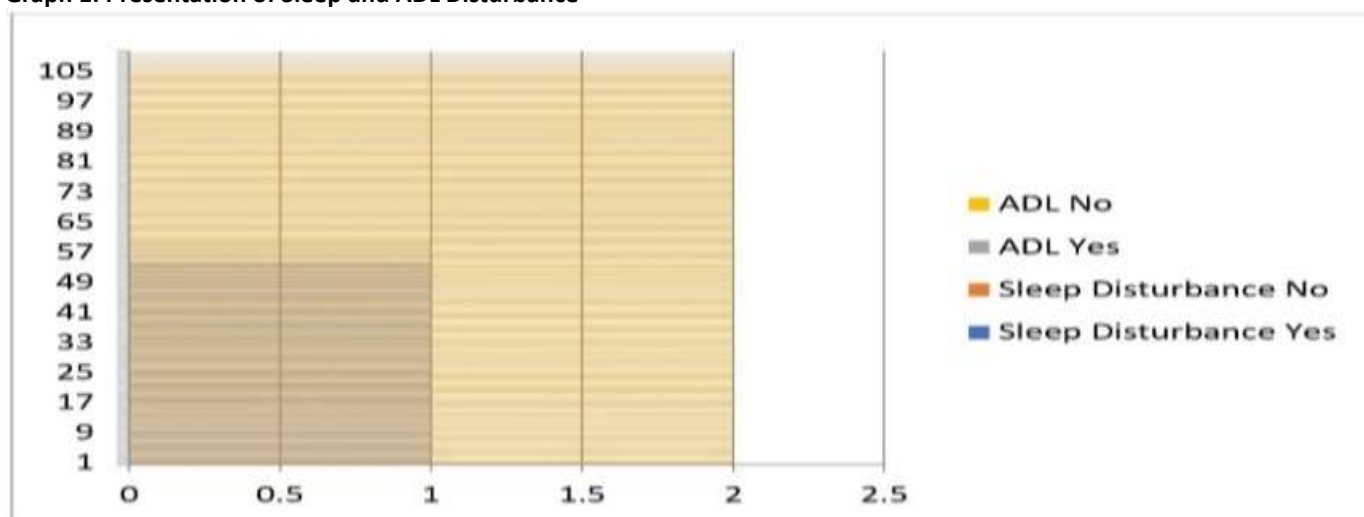
Among all the participants 93.25% were the Right-hand dominance whereas remaining 7.36% were Left-hand dominance including both genders.

Table 2: Mean and SD of Dominance

	Dominance Right	Dominance Left
N	151	12
%	93.25%	7.36%

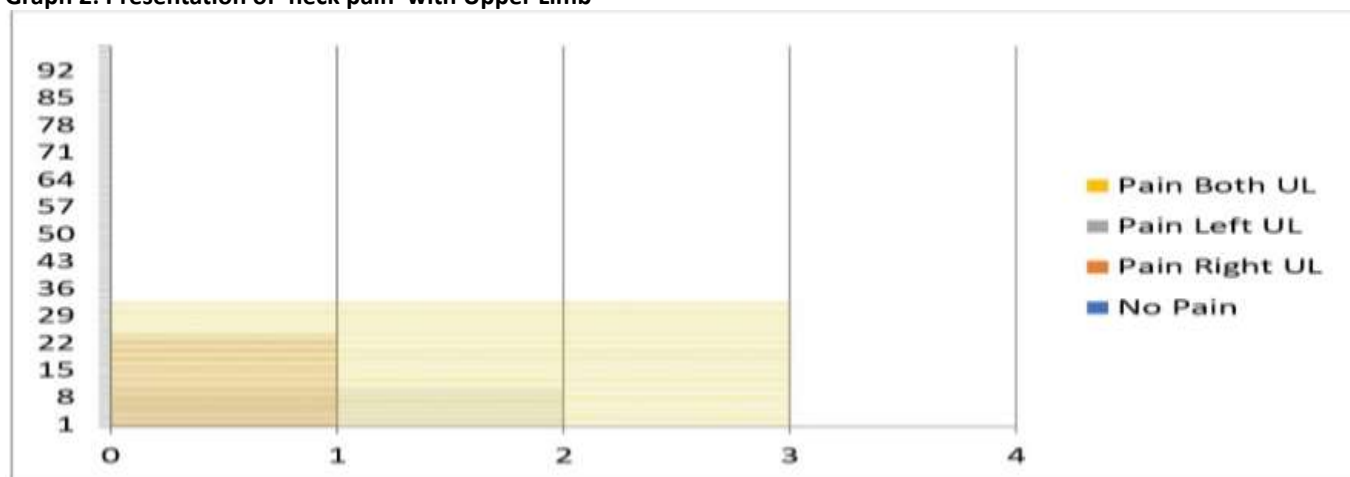
Out of 163 participants 62 students i.e. 38.03% were reported with 'neck pain' whereas 102 students i.e. 62.57% were stated that they do not have 'neck pain'. 54 students (33.12%) noted disturbance in sleep who were having 'neck pain' whereas 110 students (67.48%) reported no disturbance in sleep. Total 59 participants (36.19%) accepted that their activity of daily living (ADL) gets affected due to cervical 'neck pain', while 105 participant (64.41%) reported that their ADL never ever gets disturb due to cervical 'neck pain'.

Graph 1: Presentation of Sleep and ADL Disturbance



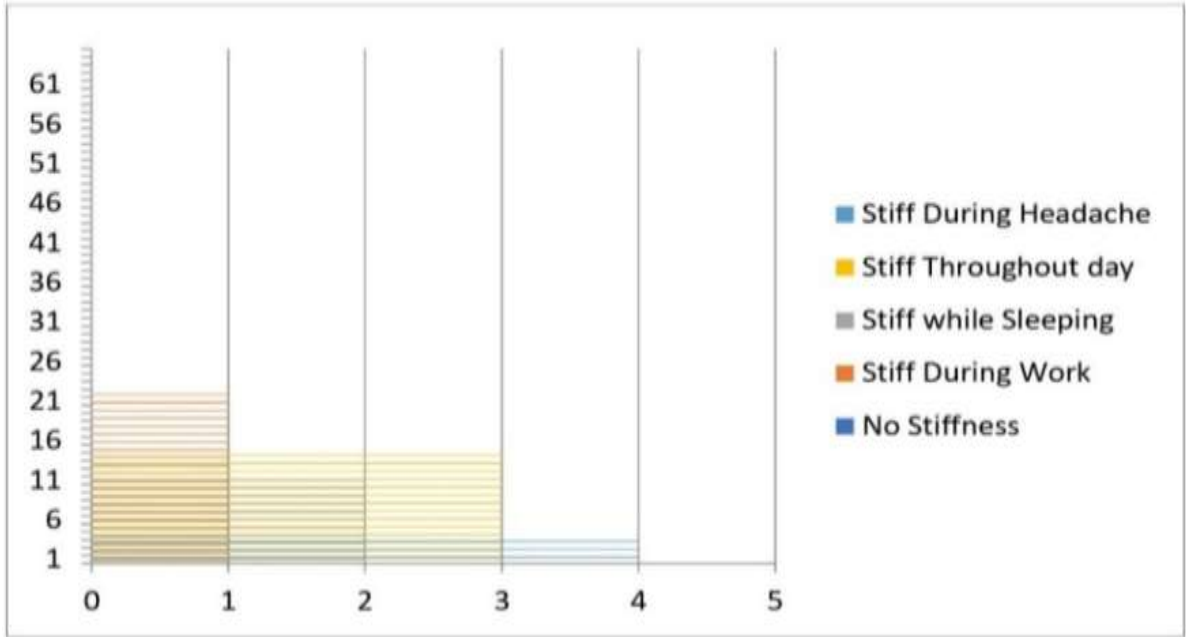
98 participant (60.12%) accepted that during the cervical 'neck pain', they never felt pain in either side of upper limb, 24 participants (14.72%) stated that during such episode they feel pain in right side of upper limb, 10 participants (6.13%) said they feel pain in their left upper limb along with cervical 'neck pain' whereas 32 participants (19.63%) said that they feel pain in both side upper limb during cervical 'neck pain'.

Graph 2: Presentation of 'neck pain' with Upper Limb



65 Participants (39.87%) stated that they never feel stiffness in neck during cervical ‘neck pain’, while 22 participants (13.49%) said during work they feel stiff neck, 11 participants (6.74%) said they feel stiff neck while sleeping, 14 students (8.58%) said that throughout day they feel stiffness in neck region and only 3 participant (1.84%) complaint about stiffness during headache.

Graph 3: Presentation of Neck Stiffness During Different Activities

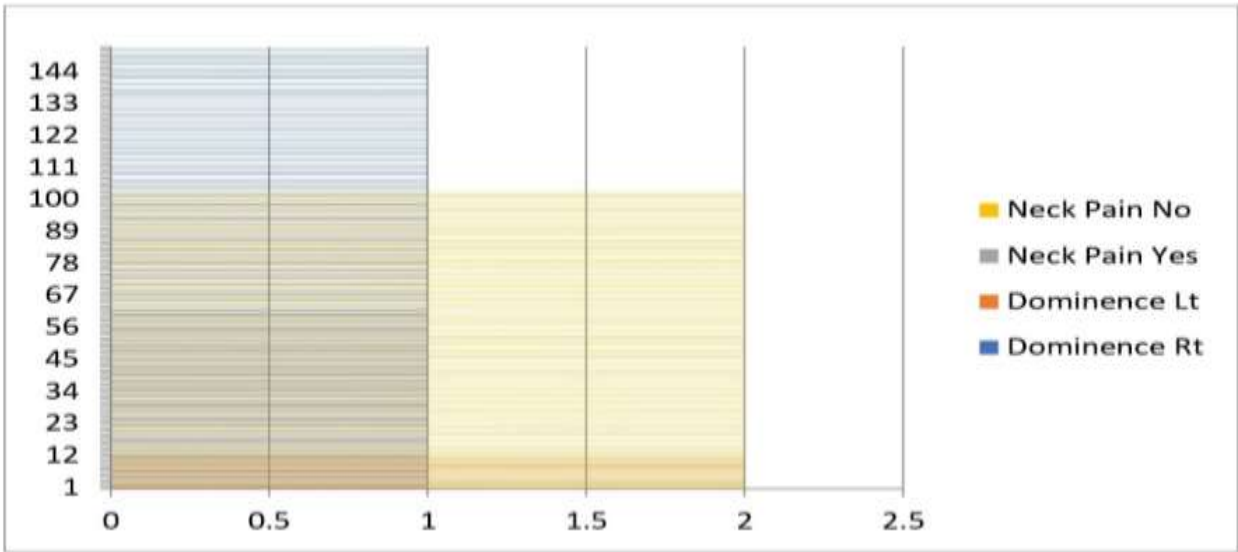


Among 12 left-handed participants, 8 participants i.e. 66.66% said that they were suffering from ‘neck pain’ whereas among 151 right-handed participants only 55 participants i.e. 36.42% complaint for ‘neck pain’.

Table 3: Cervical ‘neck pain’ & of Dominance

Participant Students	Number	Cervical ‘neck pain’ (Yes)	
		N	Percentage
Left-handed	12	08	66.66%
Right-handed	151	55	36.42%

Graph 4: Presentation of Dominance and ‘neck pain’



4. Discussion

Present study has been done to find the relationship between cervical pain and dominance in college going students. There are very few studies have been done to find such relationship, though many studies have done on Cervical 'neck pain' and hand grip, grip strength, grip coordination, but rarely studies have been done on cervical 'neck pain' and hand dominance.

Key Finding: The Right-hand participants were 93.25%, whereas remaining 7.36% were Left-handed. Among final participant i.e. 163, only 62 students (38.03%) were reported with 'neck pain', so it shows that 'neck pain' is very common among students. 54 students (33.12%) noted disturbance in sleep. Total 59 participants (36.19%) accepted that their activity of daily living (ADL) got affected.

Maximum positive finding was recorded from left-handed participants.

Discussion of Key Finding: Yi Fen Shisa Yi Hsuan Kao 2011, have done a study on 'pain location' and 'hand dominance', it was done on scapular kinematic and activities of electromyography. 30 subjects (male – 10, female – 20) with the complain of chronic pain in neck more than 90 days. They noted kinematics of scapula and EMG activity recorded from trapezius and sternocleidomastoid during both arms were elevated. They used ANOVA for the examination of 'neck pain' location and 'Dominant Hand'. Their result revealed that 'pain location' has no effect on 'scapular motion' but 'hand dominance' could have influence on scapular motion. The study concluded that 'hand dominance' could have an influence on 'scapular kinematics', and this should be considered before diagnosing and describing chronic 'neck pain'.¹⁸

Michael O. Egwu, 2009, had done a study on 'isometric grip strength' & 'endurance' of patient diagnosed with cervical spondylosis and healthy subjects. The study compared the 'grip strength' and 'endurance' in 40 patients with cervical spondylosis with healthy individuals and determined the effect of hand dominance on these variables. They concluded that strength and endurance of grip is low in patient with cervical spondylosis including equal dominant and non-dominant limb in comparison with healthy subject.¹⁹

Strength: The First strength of this study was the formation & Validation of 'neck pain' Questionnaire' which consist of total 25 questions with multiple choice key answers, it covers many aspects of a student's life like habit, posture, habit of ignorance and mainly dominance. The Second strength was the close relation of cervical 'neck pain' and hand dominance. Third strength was the percentile finding of symptoms in left-handed participants were higher than in right-handed, which never noted in previous studies.

Limitations: Small geographical area and small population.

Future Recommendations: The study may be conducted on larger population, larger geographical area and mainly the collection of data after providing the furniture to the left-handed participants as per their need.

5. Conclusion

Among 12 left-handed participants, 8 participants i.e. 66.66% said that they were suffering from 'neck pain' whereas among 151 right-handed participants only 55 participants i.e. 36.42% complaint for 'neck pain'. The cervical 'neck pain' ratio is too high in left-handed participants which can be due to the Chair with Right side writing pad and left-handed participant need to be rotate towards right side for the written purpose. Apart from above said reason there may be other issues like postural, life style etc.

Consent form: The Participants signed consent form before the participation.

Ethical Approval: The study was approved by the Ethical Committee of Vivekananda Global University, Jaipur, Rajasthan (Ref. No.: VGU/PT/June/2026/ 86, dated 3.6.2026).

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Competing Interests: The authors have no financial or personal relationship(s) which influenced the article.

Data Availability: Data will be always available if needed.

Disclaimer: This article belongs to the authors mentioned in the article and the work is done equally by everyone. None of the data has copied from anywhere.

Conflict of interest: No conflict of interest.

What is already known in this topic: Several studies have been done on 'neck pain' and radiation on either side of upper limb, affecting ADL and disturbing sleep pattern.

What this article adds: This study has been done to find the relationship between cervical 'neck pain' and hand dominance along with other parameters.

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