Annals of R.S.C.B., ISSN:1583-6258, Vol. 25, Issue 6, 2021, Pages. 17385-17399
Received 25 April 2021; Accepted 08 May 2021.

Effectiveness of Janda's Approach in Upper Cross syndrome in Medical Students

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Abstract:

People with upper cross syndrome often face tightness of upper trapezius, pectoralis major, levator scapulae and weakness of rhomboid, serratus anterior, middle and lower trapezius and deep neck flexor muscles. The main goal of research was to see the effect of janda's approach in upper cross syndrome in medical students. The study involved 52 medical students diagnosed with upper cross syndrome. Students usually sit for prolong time in slouch posture for studying which leads to bad posture habits. This leads to abnormal posture in students like forward head posture, increase cervical lordosis, thoracic kyphosis, elevation and protraction of shoulder and winging of scapulae. Outcome measures like neck disability index questionnaire, cranio-vertebral angle, numerical rating scale was used. The result showed that warm up exercises prior to treatment and cool down exercises after treatment for 10 minutes each, with stretching and strengthening exercises (janda's approach) and ergonomic advice was effective in upper cross syndrome in medical students.

Keywords: medical students, upper cross syndrome, neck disability.

Introduction:

People with tightness of upper trapezius and levator scapula on the dorsal side crosses with tightness of pectoralis major and minor and Weakness of the deep cervical flexors, ventrally, crosses with weakness of the middle and lower trapezius is called as upper cross syndrome [1].

This pattern of variance produces joint dysfunction, mainly at atlanto-occipital joint, C4-C5 segment, cervicothoracic joint, glenohumeral joint and T4-T5 segment. Postural changes observed in upper cross syndrome are forward head posture, increased cervical lordosis and thoracic kyphosis, elevated and protracted shoulder, and rotation or abduction and winging of scapulae.

These postural changes reduce glenohumeral stability as the glenoid fossa becomes more upright due to serratus anterior fragility leading to abduction, rotation and winging of scapulae. The loss of strength requires levator scapulae and upper trapezius to increase activation to maintain glenohumeral centration. Such condition eventually leads to side effects such as pain and inflammation of the affected muscles.

Muscle balance can be defined as relative equality of muscle length or strength between as agonist and antagonist this balance is necessary for normal movement and function. This condition is caused by the change in elevation protraction and abduction of the shoulder by increasing the angle of forward head and hyperextension of upper part of cervical spine, which is often associated with forward head, round shoulder, protracted scapulae and thoracic kyphosis. Muscles that are weak are serratus anterior, infraspinatus, deep neck flexors. Muscles that are tight are upper trapezius, pectoralis major, pectoralis minor, levator scapulae.

Neck pain can occur due to muscular imbalance which can restrict daily living activities of an individual, and can lead to an upper cross syndrome. Students usually sit with position of head in different manners. It depends on various factors which includes musculoskeletal structure, body changes regarding age, cultural customs, motor performance and occupation [1]. The estimated incidence of neck pain from available studies range between 10.4% and 21.3% with higher incidence noted in office worker and computer worker [2].

Prevalence is usually higher in women, higher in high-income countries compared with low- and middle-income countries and higher in urban areas [2]. The upper cross syndrome is based on Dr. Vladimir Janda’s research work in understanding the body patterns of muscular compensation and postural imbalance. His observations led him to believe that a poor postural base creates faulty movement patterns that contribute to habitual overuse in isolated joints, while minimizing normal movement in others, thus creating a self-perpetuating cycle of dysfunction and eventual injury. Janda identified two group of muscles as tonic or flexors and phasic or extensor [3].

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Upper Crossed syndromes are characterized by alternating sides of inhibition and facilitation in the upper quarter and lower quarter. It was noted that tonic system muscles were more prone to tightness or shortness and phasic system muscle would usually undergo weakness or inhibition [3]. Patterns of tightness and weakness can be predicted in the sensorimotor systems attempt to reach homeostasis [3]. Prior evidences have shown that these changes in muscular tone create muscle imbalance, which leads to movement dysfunction. Muscles prone to tightness generally have a lowered irritability threshold and are readily activated with any movement, thus creating abnormal patterns that may have direct effect on joint surface, thus potentially leading to joint degeneration. Posture means disposition of the body at any one moment and is composite of the positions of the different joint of body at any one time. When minimum stress is applied to each joint is called correct position.

Any faulty posture is called when there is increase in stress to the joint. Vladimir Janda (2013) also describe this muscle imbalance as a condition in which some muscle become inhibit and weak and other become short and stiff. Such condition can eventually cause side effect such as pain and inflammation [4].

Janda attributes these predicted patterns to a large extent, due to the immobile conditions and repetitive tasks. Muscle balance can be defined as a relative equality of muscle length between agonist and antagonist, this balance is necessary for normal movement and function. Hence purpose of this study is to compare effectiveness of stretching and strengthening exercises in upper cross syndrome in medical students.

Methods:

Patients were selected using inclusion and exclusion criteria as study was carried over a period of 6 months. patient was treated for 5 days a week. Inclusion criteria were age group between 22-28 years, medical students only, only students with neck pain, both male and female are included, patients who are willing to participate in study. Sampling size included total 52 subjects. Material used were data collection sheet, consent form, questionnaire, notebook, pen, paper, foam roll, dumbbell, hot moist pack, towel. Detail assessment was taken of patient. The study protocol was explained to the participants. They were asked to read consent thoroughly and those participants willing to take part in study provided a written informed consent. warm up exercise like breathing

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exercises in which pursed lip breathing, diaphragmatic breathing was given for 10 minutes each. Free neck exercises like neck rotation, side bending of neck, flexion and extension of neck exercises was given for 10 minutes each. Hot moist pack was given to patients for 10-15 minutes. And then stretching exercises like modified levator scapulae stretch, upper trapezius stretches, pectoralis door way stretches and pectoralis towel stretch was given to patient for 3 sets and 30 seconds hold. Strengthening was given to middle and lower trapezius 10 repetitions 3 sets, exercises like dumbbell shrug, table push. Serratus anterior strengthening like wall slides and upper cut exercises for 10 repetitions and 3 sets. Infraspinatus strengthening exercises like isometric contraction, tubing pull were given to patients 10 repetitions 3 sets. Deep neck flexors strengthening given to patient 30 seconds hold 3 sets. And activations and release for deep neck flexors was also done. After all exercise protocol patient was given cool down exercises like breathing exercises and free neck exercises for 10 minutes. Patient was also given ergonomic advice. Outcome measures were calculated using numerical rating scale, cranio-vertebral angle and neck disability index. Numerical rating scare was marked from 0-10 and patient was asked to mark on the number to describe level of pain, prior to treatment and after treatment. Cranio-vertebral angle was examined using ON Protractor app. A mobile (one plus of 48 megapixel) was used and placed at distance of 150 cms on tripod stand and height was adjusted according to level of subject's shoulder. This method involves measuring the forward-facing angle at the base of neck formed by horizontal line and a line that goes up to ear. Draw an imaginary horizontal line that goes through the C7 spinous process, which is back of vertebra at the bottom of neck. Draw a second imaginary line from the C7 spinous process up to the tragus, which is the pointed part in front of the earhole. Where these two lines join together at C7 vertebra forms the craniovertebral angle. Normal cranio-vertebral angle is 49.9 degrees. Neck disability index questionnaire was given to patient which had 10 questions, if the first statement is marked then the score is zero, and if the last statement is marked then the score is five. Total score of tests is 50 and as per the actual score patient is categorized and post-test was done. 0 points or 0% means: no activity limitations,50 points or 100% means complete activity limitation. Higher score indicates more patient rate disability. Mean duration of the test: 3 to 7.8 minutes. Study design was pre- and post-study. Study was carried out in musculoskeletal out patient department of Krishna college of

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physiotherapy. Statistical analysis of the data collected was carried out by using SPSS-20 software with appropriate statistical tests.

Figure no1. Modified levator scapulae

Figure no.2) upper trapezius stretching

Figure. No 3) doorway stretching

Figure no.4) towel chest stretching

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Figure no.5) dumbbell shrug

Figure no.6) Table push

Figure no.7) wall slides

Figure no.8) upper cut

Figure no.9) isometric contraction

Figure no.10) tubing pull

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Figure no.11) side lying dumbbell strengthening

Figure no.12) deep neck flexors strengthening

Results:

Demographic profile of subjects studied was analyzed, and proportion of upper cross syndrome in medical students was assessed as per inclusion criteria that is age 22-28 years, medical student only and only students with neck pain were included. Statistical analysis of the recorded data was done by using the software SPSS version 20. Arithmetic mean & standard deviation was calculated for each outcome measure. Arithmetic mean was derived from adding all the values together and dividing the total number of values. MS Excel was used for drawing various graphs with given frequencies and the various percentages that were calculated with the software.

Dominance found in medical students was 35 students right-handed i.e., 67% and left-handed were 17 students i.e., 32%. Numerical rating scale the mean value was 6.327 and 0.8846 for pre- and post-treatment respectively with standard deviation 0.8794 and 0.5479 for pre- and post-treatment respectively after t value 42.82 and p value 0.0415 which is considered significant. Cranio-vertebral angle in right side affected students mean was 36.62 and 45.40 of pre- and post-treatment respectively, standard deviation was 4.77 and 2.74 of pre- and post-treatment respectively after t value was 10.39 and p value was 0.0046 which is significant. left side affected students in cranio-vertebral angle mean was 37.88 and 45.85 for pre- and post-treatment respectively, standard deviation was 4.27 and 2.22 for pre- and post-treatment respectively after t value 11.03 and p value

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0.0002 which is considered very significant. Both side affected students in cranio-vertebral angle the mean was 33.12 and 41.54 for pre- and post-treatment respectively, standard deviation was 3.43 and 3.012 for pre- and post-treatment respectively after t value was 9.34 and p value was 0.0291 which was considered significant. Neck disability index in right side affected students mean was 28.44 and 1.32 for pre- and post-treatment respectively, standard deviation 3.63 and 1.067 for pre- and post-treatment respectively after t value 40.23 and p value 0.0301 which is considered significant. In left side affected students, the neck disability mean value is 22.23 and 0.70 in pre- and post-treatment respectively, standard deviation is 2.13 and 0.77 in pre- and post-treatment respectively after t value was 47.34 and p value was 0.0206 which is considered significant. In both side affected students, the neck disability index mean value was 27.80 and 1.60 for pre- and post-treatment respectively, standard deviation was 2.97 and 1.26 for pre- and post-treatment respectively after t value was 35.29 and p value was 0.0198 which was considered significant.

1) <u>NUMERICAL RATING SCALE:</u>

Numerical rating scale	Mean ± SD	t value	P value	Significance
Pre treatment	6.327 ± 0.8794	42.826	0.0415	Significant
Post treatment	0.8846 ± 0.5479			

Table no. I numerical rating scale

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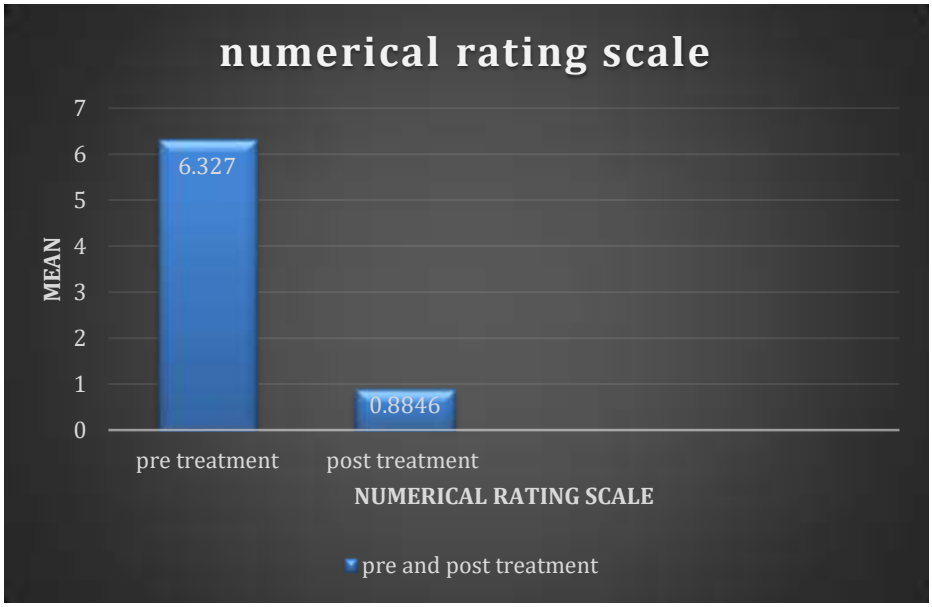

Graph no.1 numerical rating scale

1) DOMINANCE:

Dominance	Number of students
Right sided	35
Left sided	17

Table no. II Dominance

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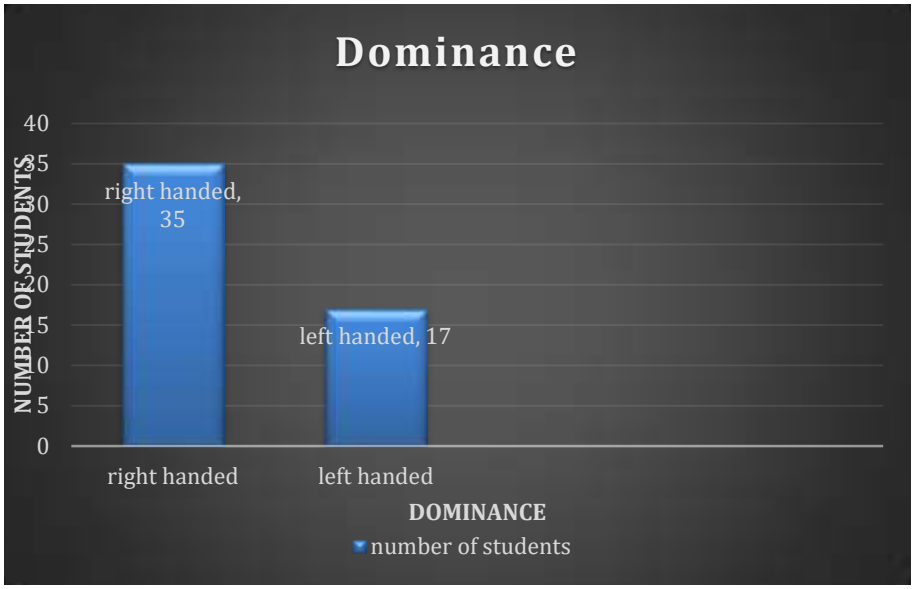

Graph no.2 Dominance

2) CRANIO-VERTEBRAL ANGLE:

	Right side affected		Left side affected		Both sides affected	
	Pre treatment	Post treatment	Pre treatment	Post treatment	Pre treatment	Post treatment
Mean ±SD	36.62±4.77	45.40±2.74	37.88±4.27	45.85±2.22	33.12±3.43	41.54±3.012
t value	10.39		11.03		9.34	
p value	0.0046		0.0002		0.0291	
Significance	Significant		Significant		Significant	

Table no. III cranio-vertebral angle

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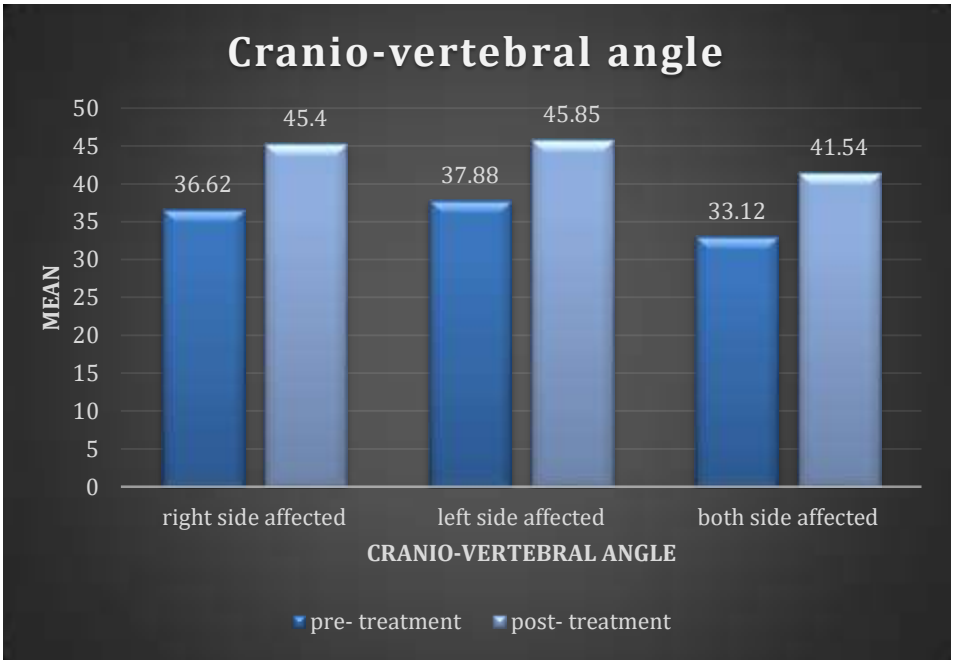

Graph no.3 cranio-vertebral angle

3) NECK DISABILITY INDEX:

	Right side affected		Left side affected		Both sides affected	
	Pre treatment	Post treatment	Pre treatment	Post treatment	Pre treatment	Post treatment
Mean ±SD	28.44±3.63	1.32±1.067	22.23±2.13	0.70±0.77	27.80±2.97	1.60±1.26
t value	40.23		47.34		35.29	
p value	0.0301		0.0206		0.0198	
Significance	Significant		Significant		Significant	

Table no. IV neck disability index

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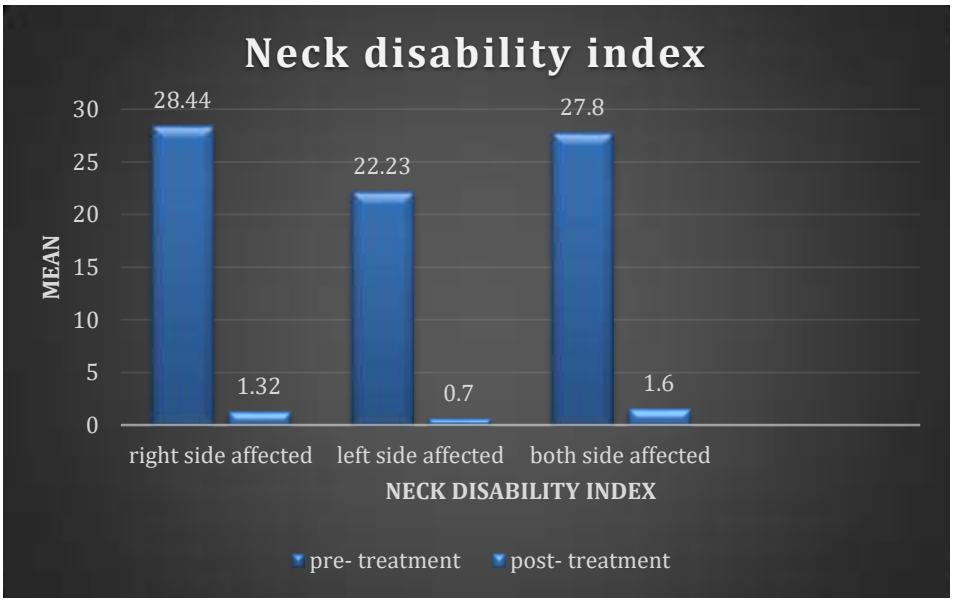

Graph no.4 neck disability index

Discussion:

This study is about the effect of janda's approach in upper cross syndrome in medical student. Upper cross syndrome is defined as the tightness of the upper trapezius and levator scapulae on the dorsal side cross with tightness of pectoralis major and minor muscles. Students usually sit in bad posture for longer time while studying and this leads to neck pain, tightness and weakness of muscles. Because of poor sitting posture patient may develop forward head posture, increased cervical lordosis and thoracic kyphosis, elevated and protracted shoulders and rotation or abduction and winging of scapulae. The objective of this study was to find the effect of janda's approach in upper cross syndrome in medical students by giving stretching and strengthening exercises. Study was carried on 52 medical students with neck pain and age group between 22-28 years, over 3 weeks stretching and strengthening exercise program was given and recorded. Students were be selected using inclusion and exclusion criteria that is medical college going students. A brief history was taken about musculoskeletal assessment. The assessment took around 15- 20 minutes. The study protocol was

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explained to the participants. They were asked to read consent thoroughly and those participants willing to take part in study provided a written informed consent. Treatment protocol was conducted, pre- and post-treatment was done with the help of outcome measures. And it will be recorded and analyze to derive the conclusion. Patient will be asked to contract the agonist using maximum degree of effort for 5-10 seconds while the force is resisted by therapist. Patient is then asked to relax and release the effort, whereas the therapist applies stretch to new barrier and hold for 20 seconds. Patient relaxes for 20 seconds and the procedure is repeated for 3-5 times or more. Stretching was given to latissimus dorsi, pectoralis, levator scapulae, upper trapezius. Strengthening was given to serratus anterior, deep neck flexors, rhomboid. Also, the session concluded with explaining patient the process and applying hot moist pack prior the treatment. The participants were instructed if any exclusion criteria like Any trauma to neck region, Recent injury or fracture around shoulder, any serious pathological that may interfere with mobility of upper limb are excluded should tell prior the treatment.

Statistical analysis of the recorded data was done by using the software SPSS version 20. Arithmetic mean & standard deviation was calculated for each outcome measure. Arithmetic mean was derived from adding all the values together and dividing the total number of values. MS Excel was used for drawing various graphs with given frequencies and the various percentages that were calculated with the software. Thus, conclusion was done, and confirmed using statistical analysis by using “paired t-test” for within group comparison.

Dominance found in medical students was 35 students right-handed i.e., 67% and left-handed were 17 students i.e., 32%. Numerical rating scale the mean value was 6.327 and 0.8846 for pre- and post-treatment respectively with standard deviation 0.8794 and 0.5479 for pre- and post-treatment respectively after t value 42.82 and p value 0.0415 which is considered significant. Cranio-vertebral angle in right side affected students mean was 36.62 and 45.40 of pre- and post-treatment respectively, standard deviation was 4.77 and 2.74 of pre- and post-treatment respectively after t value was 10.39 and p value was 0.0046 which is significant. left side affected students in cranio-vertebral angle mean was 37.88 and 45.85 for pre- and post-treatment respectively, standard deviation was 4.27 and 2.22 for pre- and post-treatment respectively after t value 11.03 and p value 0.0002 which is considered very significant. Both side affected students in cranio-vertebral angle the

mean was 33.12 and 41.54 for pre- and post-treatment respectively, standard deviation was 3.43 and 3.012 for pre- and post-treatment respectively after t value was 9.34 and p value was 0.0291 which was considered significant. Neck disability index in right side affected students mean was 28.44 and 1.32 for pre- and post-treatment respectively, standard deviation 3.63 and 1.067 for pre- and post-treatment respectively after t value 40.23 and p value 0.0301 which is considered significant. In left side affected students, the neck disability mean value is 22.23 and 0.70 in pre- and post-treatment respectively, standard deviation is 2.13 and 0.77 in pre- and post-treatment respectively after t value was 47.34 and p value was 0.0206 which is considered significant. In both side affected students, the neck disability index mean value was 27.80 and 1.60 for pre- and post-treatment respectively, standard deviation was 2.97 and 1.26 for pre- and post-treatment respectively after t value was 35.29 and p value was 0.0198 which was considered significant.

This study was limited to a small geographic area and study duration was short and limited. A future study with large sample size and among upper cross syndrome in medical students can be done.

Conclusion:

Given all the results obtained in this study, it can be concluded that upper cross syndrome is a significant problem in medical student. The study concluded that there was significant improvement noted of janda's approach in upper cross syndrome in medical students. The data was assessed and a significant decline was found in pain, cranio-vertebral angle and neck disability index with study p value which was significant.

Acknowledgement:

Financial support for this study was provided by Krishna Institute of Medical Sciences "Deemed to Be University", Karad, Maharashtra. I sincerely thank my department of Physiotherapy, KIMSDU, all teaching and non-teaching staff for their valuable suggestions and guiding me throughout my research journey.

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