

Original Research Article

Prevalence of upper-cross syndrome in college going students-a cross sectional study

Chithra P. V., Sneha Vishwanath*

Alva's College of Physiotherapy, Moodabidri, Karnataka, India

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***Correspondence:**

Dr. Sneha Vishwanath,

E-mail: snehapt@gmail.com

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ABSTRACT

Background: Upper cross syndrome is becoming more prevalent in today's population. Upper crossed syndrome refers to overactive and underactive muscles group in the neck and shoulder girdle. Our aim in this study is to check the tightness and weakness of shoulder and scapular muscles.

Methods: 100 adults with age group between 18-23 years were randomly selected for the study. All the students were selected based on inclusion and exclusion criteria. Tightness for pectoralis major, trapezius weakness and neck disability index (NDI) was measured. Data was analysed using SPSS version 20. Mean and SD was analyzed. Frequency was assessed with percentage.

Results: Frequency of tightness of pectoralis major was 8% and weakness of trapezius was 59% respectively. NDI values with mean values 36.66 (30.89) was measured.

Conclusions: Upper cross syndrome is found to be prevalent in college going students.

Keywords: Upper cross syndrome, Muscular tightness, Muscular weakness

INTRODUCTION

The world health organization defines work related musculoskeletal disorders as 'an appropriate nomenclature for constellation of disorders that have been shown to have strong association with one or more place exposure.'¹

Upper crossed syndrome is caused by weak lower and middle trapezius, tight upper trapezius and levator scapulae, weak deep-neck flexors, tight sub occipital muscles and sternocleidomastoid, weak serratus anterior, and tight pectoralis major and minor.² This syndrome otherwise known as proximal or shoulder girdle crossed syndrome. This syndrome mainly arises as a result of improper posture which leads to muscular imbalance. Individuals who present with upper crossed syndrome will show a forward head posture (FHP), hunching of thoracic spine (rounded upper back), elevated and protracted shoulders, scapular winging and decreased

mobility of the thoracic spine.

The simultaneous occurrence of FHP and rounded shoulder is nothing but upper cross syndrome. In upper cross syndrome, forward head is usually correlated with posterior cervical extensor muscles shortening, upper trapezius tightness as well as tightness of the sternocleidomastoid muscle. Scapular changes and shoulder are linked to each other. Any type of change in natural direction of scapula leads to change in local presentation, position and movement chain.³

An analysis of the frequency of upper crossed syndrome and the extent of neck disability among IT professionals and found that 38.3% of those with upper cross syndrome had positive results for the pectoralis major contracture test and 41.7% had good results for the trapezius weakening test.⁴ In college going students, tightness of the pectoralis minor and neck extensors was 9.30 (1.92) cm and 10 2.42 (2.70) cm, respectively. Neck flexor and

scapular retraction weakness was 6.57(3.14) kg and 7.11 (2.70) kg, respectively.⁵The incidence of stiffness in neck extensors was 65 percent when examining the diagonal pattern (Neck extensors and pectoralis minor tight or Neck flexors and scapular retractors weak). The prevalence of parallel pattern (Neck flexors are weak and neck extensors are tight or Pectoralis minor is tight and scapular retractors are weak) was 2.8%. Mujawar et al reported the impact and extent of upper cross syndrome. He found a significant prevalence of upper cross syndrome in laundry workers. Neck pain presents as the main symptom, these patients also present with forward head and neck posture.²

Upper crossed syndrome (UCS) is characterized by muscle imbalances in the head and shoulder areas. This imposing unevenness is frequently found in people who work at computers or who sit for the majority of the day and consistently exhibit terrible carriage. Szeto et al examined the effects of angled position of computer display screen on muscle activities of the neck- shoulder stabilizers and reported that higher muscle activities with angled screen position may indicate greater biomechanical exposure that may in turn contribute to musculoskeletal disorders, especially with prolonged computer use. Karimian et al reported prevalence of upper cross syndrome is 11-60% in different societies and ages.¹⁰

Individuals with upper crossed syndrome will have a FHP, thoracic spine hunching, and altered function in the shoulder girdle, elevated and protracted shoulders, scapular winging, and decreased thoracic spine mobility. Postural deviations such as FHP, round shoulder, and kyphosis include excessive neck protraction and thoracic spine flexion, anterior tilt and downward rotation of the scapula with an inclining tendency, and internal rotation of the shoulder. FHP and thoracic kyphosis are linked. Furthermore, there is a link between the FHP and round shoulder, as well as round shoulder as well as the kyphosis.

Most of the study shows prevalence of neck disability and shoulder discomfort but the evidence of upper cross syndrome is not shown in college going students, so the need of the study is to find out the prevalence and functional disability of neck in upper crossed syndrome which is used for further study and ergonomic intervention. College going students generally assume variety of postures during their lectures and examinations. So, there is a need to know whether these abnormal postures are acquired or inherited. Even there is a need to know that whether they have any of the components of muscular imbalance present at this stage and determine the cause for alteration in upper back posture. Thus, the purpose of the study was to find the prevalence of the upper cross syndrome in the college going students of the different colleges of the Alva's institution.

METHODS

A cross sectional was conducted in the period of 3 months (June-Aug 2022), a total of 100 students including 50 males and 50 females from different colleges of Alva's i.e., Alva's college of physiotherapy, Alva's college of MLT, Alva's college of BAMS, Alva's college of nursing and Alva's college of BHA volunteered to participate in the study. Convenient sampling technique was used. Ethical clearance was taken from institutional ethical committee. College students of age between 18 to 23 years with sound physical and mental state were included. Students with any neck pain, cervical spine surgery, severe kyphosis or scoliosis, any pathology related to cervical spine, vertebral artery insufficiency, malignancy and with any neuromuscular disorders were excluded from the study.

All the volunteers signed written consent and were informed about purpose, nature, possible risks, and benefits of the present study.

Subjects were introduced to the procedure of the study. Pectoralis major tightness, trapezius muscle weakness and neck disability was measured.

Pectoralis major tightness

Subjects were asked to lie in supine lying position with hands clasped together behind the head. Both the arms were then lowered until the elbow touches the examining table as shown in Figure 1. A positive test occurs if the elbows do not reach the table and indicates a tight pectoralis major muscle.



Figure 1: Pectoralis major tightness.

Trapezius weakness test

Middle trapezius muscle

Patient position: The patient position is prone lying with arms abducted to 90° and laterally rotated (Figure 2).



Figure 2: Middle trapezius weakness test.

Therapist position: The test involves the examiner resting horizontal extension of the arm watching for retraction of the scapula, which should normally occur.

Positive result

If scapular protraction occurs, middle fibers of trapezius are weak.

Lower trapezius muscle

Patient position: The patient position is prone lying with the arm abducted to 120-degree and shoulder laterally rotated (Figure 3).



Figure 3: Lower trapezius weakness test.

Therapist position: The examiner applies resistance to diagonal extension and watches for scapular retraction that should normally occur.

Positive test

If scapular protraction occurs, the lower trapezius is weak

NDI

Instructions to the client should be given to fill the questionnaire and scoring should be done by the

therapist. Clients choose one of six possible replies ranging from no disability (0) to entire disability (5). The total score is calculated by adding the ten items together, ranging from 0 (no disability) to 50 (disability) (maximum disability). This score is sometimes converted to a percentage by some authors. A score of less than 4 indicates no disability, 5-14 mild disability, 15-24 moderate disability, 25-34 severe disability, and scores greater than 35 full disabilities.⁸

RESULTS

The data was analyzed using SPSS version 20. The results are presented using descriptive statistics by calculating the arithmetic mean and standard deviation. Frequency was assessed with percentage.

Table 1 shows mean and standard deviation of age of selected samples.

From the above Table the number of samples taken was 100, among that 50 are female and 50 males. The age group taken is 18-23.

Table 1: Mean and standard deviation of age selected samples according to gender.

Gender	N	Age (Years)
Female	50	8.36 (5.24)
Male	50	8.43 (5.49)
Total	100	8.39 (5.36)

Table 2 shows the descriptive statistics mean, standard deviation, and standard error for NDI have been computed using the preceding Table 2. The mean value is 36.66, standard deviation with 30.89 and standard error with 17.83. The number of samples taken for NDI is 100 from different medical courses.

Table 2: Mean and standard deviation for NDI.

Mean	SD	SE
36.66	30.89	17.83

Table 3 shows the percentage of individuals showed positive result for pectoralis major contracture test. Only 8% of people had a positive test result for pectoralis major contracture, according to the descriptive data obtained from the Table 3 Evaluation of the pectoralis major contracture test revealed that 8 people had upper cross syndrome.

Table 4 shows the percentage of individuals showed positive result for trapezius weakness test. According to the descriptive data derived from the Table 4, 59% of patients tested positive for trapezius weakness. Upper cross syndrome was diagnosed in 59 people using the trapezius weakening test.

Table 3: Frequency and percentage for pectoralis major contracture test.

Pectoralis major contracture	N	Percentage (%)
0	92	92
1	8	8
Total	100	100

Table 4: Frequency and percentage for trapezius weakness test.

Trapezius weakness test	N	Percentage (%)
0	41	41
1	59	59
Total	100	100

DISCUSSION

The present study was conducted on college going students to assess the prevalence of upper crossed syndrome. The sample in this study with upper cross syndrome was evaluated with pectoralis major contracture test, trapezius weakness test and NDI.

According to the current study, only 8% of patients tested positive for pectoralis major contracture test. The trapezius weakening was found in 59% of patients. The mean value of NDI was 36.66, the standard deviation of NDI was 30.89, and the standard error of NDI was 17.83.

Seshan et al conducted a study on the frequency of upper crossed syndrome and the extent of neck disability among IT professionals. The study showed that 38.3% of those with upper cross syndrome had positive results for the pectoralis major contracture test and 41.7% had good results for the trapezius weakening test.⁴

Chandarana et al conducted observational research on the prevalence of upper crossed syndrome among college students. The pectoralis minor and neck extensors were 9.30 (1.92) cm and -2.42 (2.70) cm tight, respectively. Neck flexor and scapular retractors weakness was 6.57 (3.14) kg and 7.11 (2.70) kg, respectively. The prevalence of tension in the neck extensors was 65 percent, whereas the prevalence of tightness in the diagonal pattern (neck extensors and pectoralis minor tight or neck flexors and scapular retractors weak) was 2.8%. Prevalence was 2.8% when the corresponding pattern (neck flexors are weak and neck extensors are tight or pectoralis minor is tight and scapular retractors are weak) was considered.⁵⁻⁷

In the current study, only 8% of 100 participants had pectoralis major tightness, as measured by the pectoralis major contracture test, 59% had positive trapezius weakness test results, and 55% had positive results of NDI.

The results indicated that 59% of participants had the highest incidence of trapezius weakening, which might result in future hunching. Although it may not now appear to be a problem, if unattended to, it might have a serious impact. If proper precautions are not taken at an early stage, this condition may cause major problems. Therefore, it is important to take certain actions to increase postural awareness in individuals of all ages, but notably in students.

Limitations

Sample size was small. Population covered was just college going students. Subjects with neck pain were not included.

Future recommendations

People from various occupations like office workers, or dentists may be included in the study.

CONCLUSION

Finally, most of the college students are exposed to the risk of adopting poor postures which can eventually lead to upper cross syndromes in future. The results of this study suggest the importance of postural awareness among college students.

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Ethical approval: The study was approved by the Institutional Ethics Committee

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