

Prevalence of Upper Crossed Syndrome in College Going Students - An Observational Study

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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 neck and scapular muscles.

Method: - 140 adults with age group between 17-23 years were randomly selected for the study. All the students were selected based on inclusion and exclusion criteria. Tightness for neck extensors & pectoralis major and minor were assessed with measure tape. Strength for neck flexors & scapular retractors were measured with hand held dynamometer.

Analysis: - Data was analysed using SPSS version 20. Mean and SD was analysed. Percentile method was used to find out the prevalence.

Results: - Tightness of pectoralis minor and neck extensors was 9.30(1.92)cms and -2.42(2.70)cms respectively. Weakness of neck flexors and scapular retractors was 6.57(3.14) Kg and 7.11(2.70) Kg respectively. Prevalence of tightness in neck extensors was 65% Considering diagonal pattern (Neck extensors and pectoralis minor tight or Neck flexors and scapular retractors weak) prevalence was 2.8%. Considering parallel pattern (Neck flexors are weak and neck extensors are tight or Pectoralis minor is tight and scapular retractors are weak) prevalence was 2.8%

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

Key Words: - Upper cross syndrome; Hand held dynamometer, Muscular Tightness, Muscular weakness.

INTRODUCTION

Upper Cross Syndrome (UCS) is described as a predictive pattern of alternative tightness and weakness of Upper Trapezius, Pectoralis Major, Levator Scapulae, Rhomboids, Serratus Anterior and Deep Flexors of the neck, particularly Scalene muscles caused due to poor working habits, inappropriate body ergonomics, or low self-esteem [1,2,3]. Upper Cross Syndrome is a characterized by muscular imbalance of skeletal muscles activation and inhibition rather than just single muscle involvement. Any failure of activation between tonic and phasic

muscles results in muscular insufficiencies [4]. Opposite group muscle imbalances in upper crossed syndrome give rise to postural disturbances [5]. Stress on cervico-cranial and cervico-thoracic junction is caused by the poor posture [6]. Some postural patterning of forward shoulders, increases kyphosis, forward head posture, and loss of cervical lordosis is created by this poor posture. These abnormalities lead to overall pattern changes in the upper quarter of the body [4,7]. Strain to the muscular attachments of the shoulder and shoulder blades that produces a rounded shoulder appearance is caused by this pattern change [8]. Although

this posture does not necessarily lead to pain, but when prolonged, individuals do often experience upper back and neck pain [4].

Various factors including musculoskeletal structures, body changes regarding age, cultural customs, motor performances and occupation affects the head position of the person while sitting [9]. The patients may develop forward head posture because of this poor sitting posture along with rounded shoulder which occurs due to the increased kyphosis in thoracic region [10].

While sitting, forward head position includes flexion of lower cervical region, extension of upper cervical region, and rounded shoulders, which in average reduces the length of muscle fibers, resulting in extensor torque around the joints of upper cervical region. Various musculoskeletal abnormalities including decreased scapular upward rotation, greater internal rotation and anterior tilt occurs due to this abnormal state which further results in difficulty to maintain upright posture [6]. The simultaneous occurrence of Forward head posture and rounded shoulder is nothing but upper crossed syndrome [5].

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 component 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 upper cross syndrome in college going students of different colleges of Jamnagar.

MATERIALS AND METHODS

A Cross sectional; observational study was conducted, a total of 140 students including 70 males and 70 females from different colleges of Jamnagar i.e., Govt. Physiotherapy college, Govt. Dental college, Govt. Nursing college volunteered

to participate in the study. Random sampling technique was used. Ethical clearance was taken from Institutional Ethical Committee. College students of age between 17 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 neuro muscular 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 and pectoralis major tightness, pectoralis minor tightness, scapular retractors strength, neck flexors strength, neck extensors tightness were measured. Pectoralis minor tightness was measured with the help of measure tape, Neck extensor tightness was measured with the help of Universal Goniometer and strength of scapular retractors and neck flexors was measured with the help of Handheld Dynamometer (Saehan Ce 2195).

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 fig.1. If the elbows don't touch the table, it shows the tightness of pectoralis major muscle [11].



Fig. 1 Pectoralis Major Tightness

Pectoralis Minor Tightness

Subjects were requested to lie supine on a standard treatment table and adopt their natural relaxed posture.

Distance of the acromion process from the examining table was measured using measuring tape on both left and right side as shown in the fig. 2 [12].



Fig.2 Pectoralis Minor Tightness

Scapular Retractors Strength

Subjects were asked to lie in prone lying position with shoulder in 90° abduction and elbow in 90° flexion. Then the subject was asked to lift the arm till the midrange. Hand held dynamometer was placed over lower aspect of the posterior arm. Maximum force generated by the subject at that point was noted down. Fig.3 shows the method of measuring Scapular retractors strength. The process was repeated for 3 times & average of 3 repetitions was used for analysis [13].



Fig. 3 Scapular Retractors Strength

Neck Extensors Tightness

Subjects were asked to stand against the wall in anatomical position. Fulcrum of the goniometer was superior to tragus, stable arm parallel to ground and movable arm was parallel to the canthus. Angle between the stable arm and movable arm was measured as shown in fig. 4 [14].



Fig. 4 Neck Extensors Tightness

Neck Flexors Strength



(A) Starting Position

(B) Ending Position

Fig. 5 Neck Flexors Strength

Subjects were asked to lie in Supine lying position on examining table. Hand held dynamometer was placed on the mandible. Subject was instructed to nod their head such that their jaw pushed down onto the handheld dynamometer and to hold the resistance in the cranio cervical flexion direction against the handheld dynamometer. Maximum force generated by the subject at that point was noted down. The process was repeated for 3 times & average of 3 repetitions was used for analysis. Fig. 5 A and B depicts the starting and ending position for measuring neck flexors strength [15].

STATISTICAL ANALYSIS

The data was analysed using SPSS version 20. The results are presented using descriptive statistics by calculating the arithmetic mean and standard deviation. Percentile method was used to find out the prevalence. 95th percentile was used for pectoralis minor tightness and neck extensors tightness. Whereas 5th percentile was used for rhomboid strength and neck flexors strength. Upper 5th percentile was considered abnormal for the tightness and lower 5th percentile was considered abnormal for the strength.

RESULTS

Table 1: - Descriptive data of subjects

	N	Age(yrs.)	Weight (kg)	Height (mt.)	Body Mass Index(kg/m ²)
Male	70	19.35(1.33)	58.47(10.72)	1.69(0.05)	20.31(3.73)
Female	70	19.04(0.78)	49.50(8.54)	1.57(0.05)	19.89(3.05)
Total	140	19.20(1.10)	53.98(10.65)	1.63(0.08)	20.10(3.40)

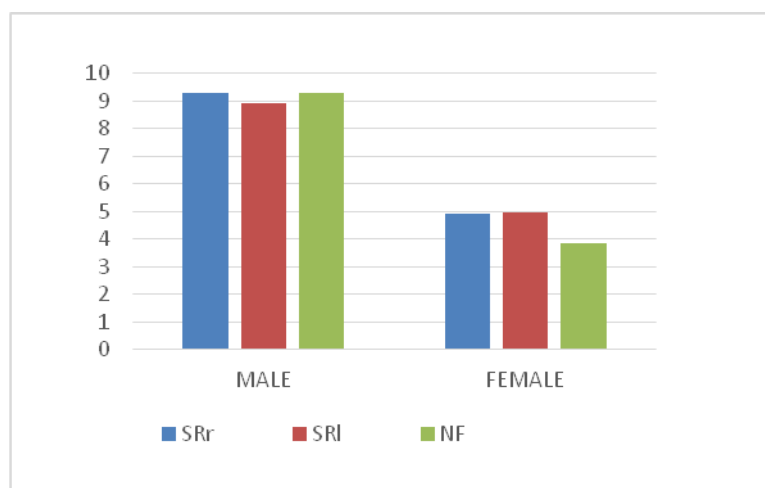
Table 1 shows the mean and standard deviation of the age, weight, height and BMI of the all participants.

Table 2: - Tightness of pectoralis minor and pectoralis major and neck extensors and strength of scapular retractors and neck flexors

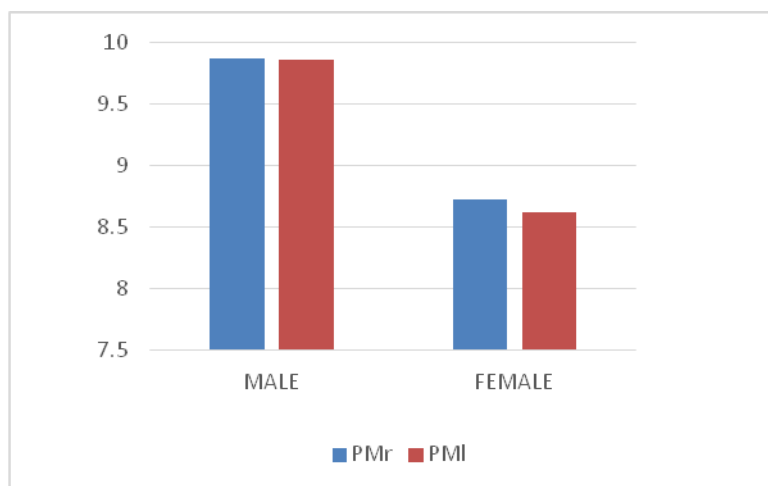
Gender	Pectoralis minor (cms)		Neck extensors (degrees)	Scapular retractors (kgs)		Neck flexors (kgs)
	Right	Left		Right	Left	
Male (n=70)	9.87(2.23)	9.86(2.24)	-3.30(2.86)	9.29(2.00)	8.94(1.81)	9.30(1.91)
Female (n=70)	8.72(1.35)	8.62(1.26)	-1.54(2.24)	4.93(1.04)	4.95(1.17)	3.84(1.04)
Total (n=140)	9.30(1.97)	9.24(1.92)	-2.42(2.70)	7.11(2.70)	6.94(2.51)	6.57(3.14)

Out of 140 total participants no one was found to have pectoralis major tightness. Table 2 shows the mean and standard deviation of the tightness of

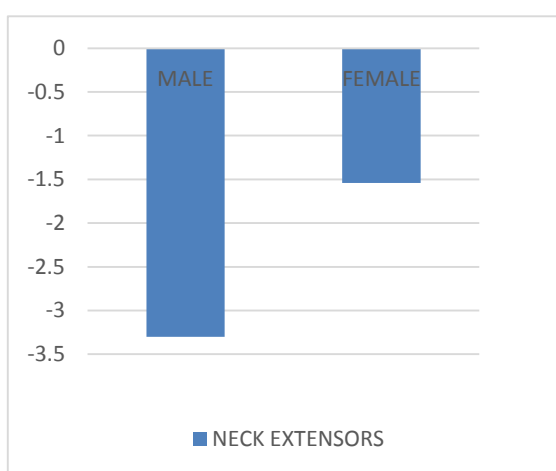
pectoralis minor and neck extensors and weakness of scapular retractors and neck flexors of all the participants.



GRAPH 1: Scapular Retractors and Neck Flexors strength



GRAPH 2: Pectoralis minor tightness



GRAPH 3: Neck Extensors tightness

Table 3: Prevalence of upper cross syndrome

Conditions	Prevalence
Diagonal pattern (Neck extensors and pectoralis minor tight OR Neck flexors and scapular retractors weak)	2.8%
Parallel pattern (Neck flexors are weak and neck extensors are tight OR Pectoralis minor is tight and scapular retractors are weak)	2.8%
Any four or more than four components are affected	5%
Neck extensors tightness	65%
Pectoralis minor tightness	2.8%
Scapular retractors weakness	7.1%
Neck Flexors weakness	5%

Table 3 shows the prevalence of 2.8% for both the diagonal and parallel patterns. Highest prevalence was found for the neck extensors tightness followed by scapular retractor weakness.

DISCUSSION

The present study was conducted on college going students to assess the prevalence of upper crossed syndrome. Results of the present study shows that

prevalence of upper cross syndrome is 2.8% in college going students. For analysis of prevalence, we had considered two diagonal muscles to be weak or tight i.e. –Neck extensors and pectoralis minor tight OR Neck flexors and scapular retractors weak

Muscle imbalance in any of the two diagonal muscles may lead to alteration in biomechanics of cervical spine and shoulder girdle. This may lead to postural alteration leading to changes in antagonist muscles i.e., analogistic muscles to tight muscles may go for weakness in long term and vice versa. Findings of the present study shows that tightness in neck extensors is most prevalent with 65%, second most common prevalence is of retractors weakness with 7.1%.

Findings of the present study differ from the findings of Mubeen et al and Mujawar et al because the subjects that they included were having neck pain and sample size was large [5, 6]. Mubeen I et al study showed that 48.7% population of the students have neck pain, 66.8% of the population was found to have poor studying posture and the prevalence rate found to be 37.1% [6]. Whereas Mujawar et al study showed the prevalence of 28% [5].

Results of our study showed highest prevalence of neck extensors tightness i.e., 65% which can lead to poor posture and can ultimately result into neck pain in near future. At present the situation does not seem to be troublesome, perhaps may have a devastating impact if left unresolved. If due

care is not taken at an early stage, this syndrome may result into huge problem. Above stated issue mainly attracts the working class people and the students but the people with luxurious lifestyle are not an exemption to this.

As a result, it is quite necessary to take some steps regarding postural awareness in people of all age groups especially students.

Limitations Of The Study:

- Small sample size.
- Population covered was just college going students.
- Subjects with neck pain were not included.

Clinical implication:

If any of the muscle function is altered that may lead to postural abnormality resulting in pain and impaired function activities of daily living in long term.

CONCLUSION

In conclusion most of the college student are exposed to the risk of adopting poor postures which can lead to upper cross syndromes in future. The results of this study suggesting the importance of postural awareness among college students.

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