

# Prevalence and Incidence of Upper Cross Syndrome in Paramedical Students Due to Electrical Learning: Cross Sectional Study

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## ABSTRACT

**Background:** Upper cross syndrome (UCS) refers to specific altered muscles activation and changed movement pattern along with some postural deviation in the upper quarter of the body. This syndrome contributes to the dysfunction of Craniovertebral angle, kyphotic angle, C7 shoulder angle, Deep flexor strength and Pectoralis minor length.

**Purpose of the Study:** The aim of study is to evaluate the prevalence and incidence of the upper cross syndrome among the paramedical students due to electrical learning.

**Objective:** This study shows the Prevalence and Incidence of the Upper Cross Syndrome among the various paramedical students of south Gujarat region due to electrical learning during this pandemic period.

**Subjects and Method:** The cross sectional study with 121 samples was with age of 18-22 years. With minimum online study duration of 2hrs.

**Statistical Analysis Used:** The data analysis was done by the Microsoft excel version and Acrobat reader.

**Result:** The result shows that the prevalence and incidence of UCS in paramedical students is 63% the prevalence of UCS in male was 15% and in female was 85%. The prevalence of UCS in nursing students was 29%, physiotherapy students was 62%, optometry 9%.

**Conclusion:** During this pandemic high prevalence of upper cross syndrome in paramedical students was found. It has been concluded that more use of electrical gadget can lead to adaptation of poor posture and so lead to upper cross syndrome. The results of the study suggest focusing more on postural awareness and proper use of electrical device in paramedical students.

**Keywords:** Upper cross syndrome; Prevalence; Electrical learning.

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## INTRODUCTION

Upper Cross Syndrome is the common postural dysfunctional pattern that describes the dysfunctional tone of the musculature of shoulder girdle / Cervicothoracic region of the body. The condition is given the name "X" in other words a cross, can be drawn across the upper body. One arm of cross the indicates the muscle that are typically tight and other arm shows the muscle that are typically weak.<sup>4</sup>

Upper Cross Syndrome is caused by weak lower and middle Trapezius, tight Upper Trapezius and Levator scapulae, weak Deep Neck Flexors, tight Suboccipital muscles and Sternocleidomastoid, weak Serratus anterior and tight Pectoralis Major and Minor. The syndrome arises as a result of muscular imbalance that usually develops because of tonic and weak muscle.

Individual present with Upper Cross Syndrome will show Forward Head Posture, hunching to thoracic spine, elevated and protracted

shoulder, scapular winging and decreased mobility of thoracic spine. The simultaneous occurrence of Forward Head Posture and rounded shoulder is nothing but Upper Cross Syndrome. One of the most common postural problems is forward head posture (FHP). Change in the posture at cervical region due to prolong use of electrical gadgets like Mobile phone, Laptops, Computer during their online classes in pandemic time lead to imbalance in musculature and restrict their daily activities.<sup>2</sup>

Due to this pandemic period, there has been increase in the use of the electronic gadgets for online studies which can lead to increase in the Incidence & Prevalence of the Upper Cross Syndrome and its complaints. Hence the study evaluate the postural deviation due to the Upper Cross Syndrome like forward head posture, rounded shoulder & kyphotic posture in order to find out the Upper Cross Syndrome.<sup>6</sup>

The point where lines (perpendicular to the skin surface) produced through T12 and C7 markers intersects each other forms the thoracic flexion angle. A horizontal line passing through the lateral shoulder meets the line drawn from C7 to the lateral shoulder; the point of intersection forms the sagittal shoulder C7 angle. Pressure biofeedback technique was used for measurement of deep neck flexor strength. Participant in a supine position, no pillow was used under the head, pressure biofeedback kept under the cervical region, pressure increased by 20mmhg and asked participants to pressed the neck and 3 readings were taken and average of three noted.<sup>1</sup> The investigation involves measuring of the linear distance from the treatment table to the posterior aspect of the acromion in subjects. Subjects were requested to lie supine on a standard treatment table and adopt their natural relaxed posture.<sup>9</sup>

## METHODOLOGY

- **Study design:** Cross sectional study
- **Study population:** Paramedical students of South Gujarat region
- **Sampling technique:** Convenient sampling
- **Sample size:** 121 samples (Time bound)
- **Study duration:** 6 months
- **Source of data collection:** From various paramedical colleges of south Gujarat.

### Tools and Material used

- Pen & paper
- Digital camera

- Tripod
- Consent form
- Acrobat software
- Measuring tape
- Plinth
- Towel
- Micro pore
- Sphygmomanometer

### Inclusion Criteria

- Age - 18 to 22 years
- Paramedical students of Physiotherapy, Optometry, BSC. Nursing, Pharmacy, DMLT/PGDMLT.
- Who are willing to participate.
- Students with or without neck pain, headache, tightness and pain in upper back since last 6 to 7 months.
- Online study duration - minimum 2 hours.

### Exclusion Criteria

- Student with recent trauma of cervical region.
- Congenital abnormalities of cervical region.
- Any malignancy related to soft tissue and joints.
- Who have under gone any previous surgeries in cervical region .
- Phone use more than 6 to 8 hours.
- Height greater than 6 feet.

The study was done among 121 paramedical students of different fields, from which 110 were included in our study according to inclusion and exclusion criteria. From 110 students 15(14%) male and 95(86%) female and 68(62%) physiotherapies, 10(9%) optometry, 32(29%) nursing. From 110 students 43(39.44%) are positive for Upper Cross Syndrome.

**Table 1:** Distribution of Participants on the Basis of Gender and Fields.

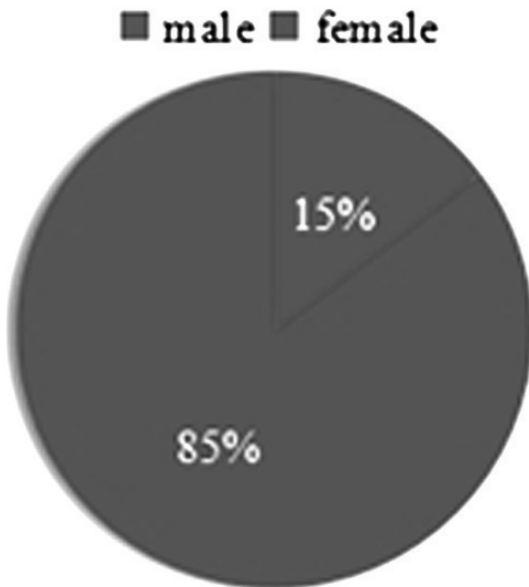
Field	Male	Female	Total
Physiotherapy	9	59	68
Nursing	3	29	32
Optometry	3	7	10
Total	15	95	110

Table 1 shows all 110 participants with Upper Cross Syndrome on the basis of their gender and field, in which 15 were male and 95 were female.

Shows all 110 participants with Upper Cross

Syndrome on the basis of their gender, in which 15 were male and 95 were female.

**Gender Distribution**



**Graph 1:** Distribution According to Male\Female Participants.

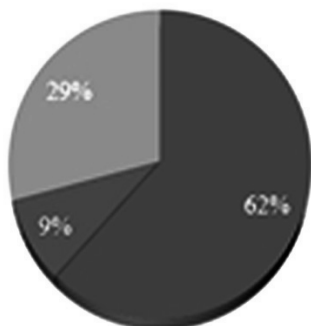
**Table 2:** Distribution on the Basis of Field

Field	Students
Physiotherapy	68
Optometry	10
Nursing	32

Table 2 shows total number of participants on the basis of field, in which 68 are of physiotherapy, 10 are of optometry and 32 are of nursing.

**Field Distribution**

■ PHYSIOTHERAPY ■ OPTOMETRY ■ NURSING



**Graph 2:** Distribution According to Field.

**Table 3:** Distribution of Participants on the Basis of all Five Parameters.

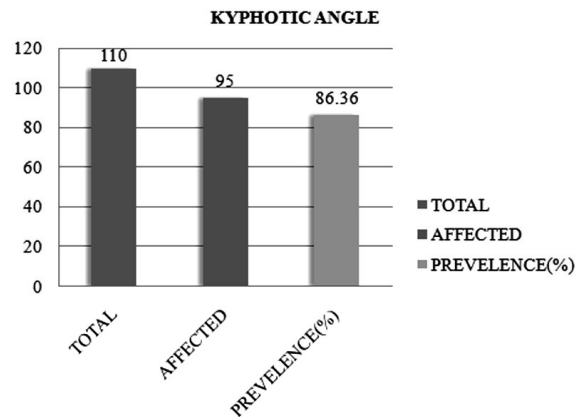
Parameters	Affected Value	Mean Value
Craniovertebral Angle	<50°	55.3°
C7 Shoulder Angle	<52°	44.39°
Kyphotic Angle	>49°	51.2°
Deep Flexor Strength	<26 mmHg	29.06mmHg
Pectoralis Minor Length	<2.6cm	2.91cm

Table 3 shows all five parameter with their normal and mean values.

**Table 4:** Prevalence of Kyphotic Angle.

Total	Affected	Prevalence (%)
110	95	86.36

Table 4 shows the Prevalence of Kyphotic angle 86.36% in which total sample size is 110 in which affected samples are 95.



**Graph 3:** Distribution of Kyphotic Angle.

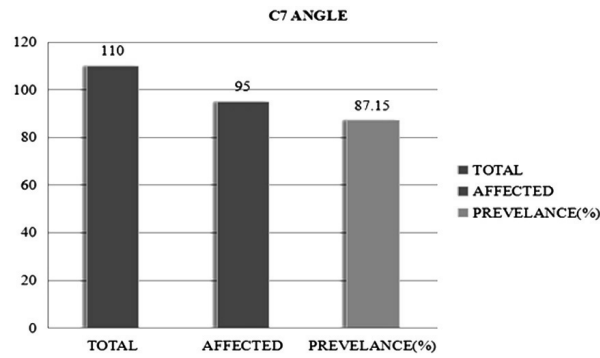
Shows the Prevalence of Kyphotic angle in which the total sample size is 110 in which affected samples are 95 with Prevalence of 86.36%.

**Table 5:** Prevalence of C7 Angle.

Total	Affected	Prevalence (%)
110	95	86.36

Table 5 shows the Prevalence of C7 angle 86.36% in which total sample size is 110 in which affected samples are 95.

Shows the Prevalence of C7 angle in which the total sample size is 110 in which affected samples are 95 with prevalence of 86.36%.

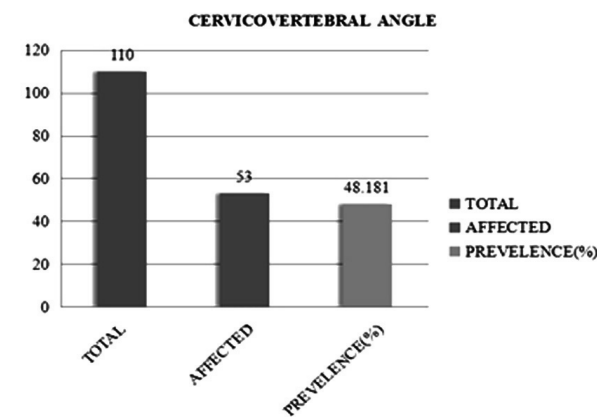


Graph 4: Distribution of C7 Angle.

Table 6: Prevalence of Cervicovertebral Angle

Total	Affected	Prevelance (%)
110	53	48.181

Table 6 shows the Prevalence of Cervico-vertebral angle 48.181% in which total sample size is 110 in which affected samples are 53.

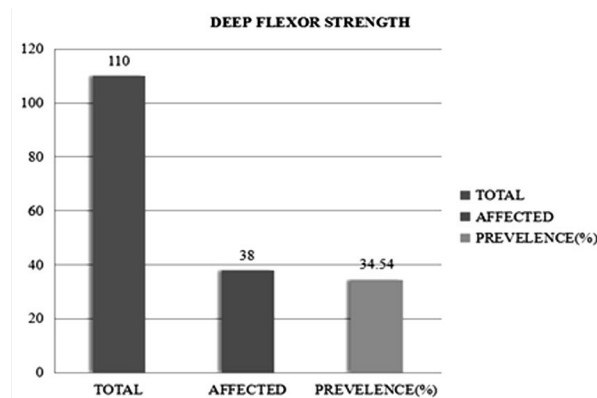


Graph 5: Distribution of Cervicovertebral Angle.

Table 7: Prevalence of Deep Flexor Strength.

Total	Affected	Prevelance (%)
110	38	34.54

Table 7 shows the Prevalence of Deep Flexor strength 34.54% in which total sample size is 110 in which affected samples are 38.



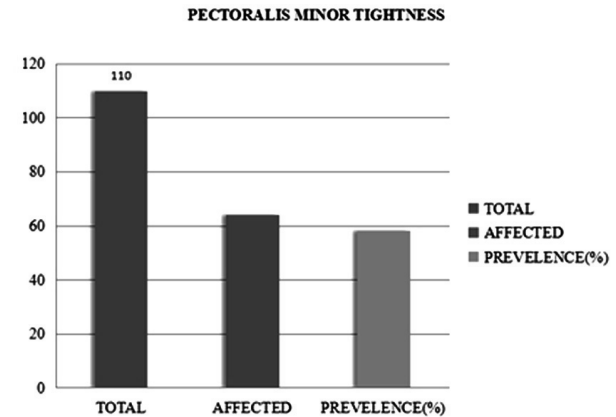
Graph 6: Distribution of Deep Flexor Strength

Shows the Prevalence of Deep Flexor Strength angle in which the total sample size is 110 in which affected samples are 38 with Prevalence of 34.54%.

Table 8: Prevalence of Pectoralis Minor Tightness.

Total	Affected	Prevelance (%)
110	64	58.18

Table 8 shows the Prevalence of Pectoralis minor tightness 58.18% in which total sample size is 110 in which affected samples are 64.



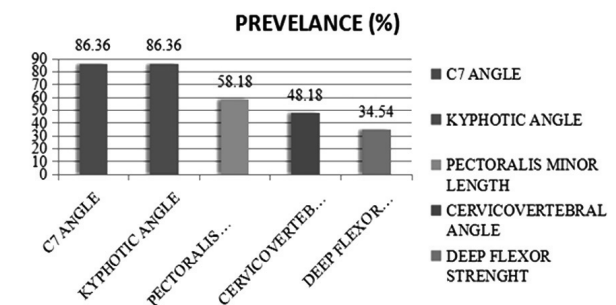
Graph 7: Distribution of Pectoralis Minor Length.

Shows the Prevalence of Pectoralis minor tightness 58.18% in which total sample size is 110 in which affected samples are 64.

Table 9: Prevalence of All Parameters.

Upper cross syndrome	Prevelance (%)
C7 angle	86.36
Kyphotic angle	86.36
Pectoralis minor tightness	58.18
Cervicovertebral angle	48.18
Deep flexor strenght	34.54

Table 9 shows the Prevalence of all five parameters of Upper Cross Syndrome which is C7 angle, Kyphotic angle, Pectoralis minor tightness, Cervico-vertebral angle, Deep flexor strength.



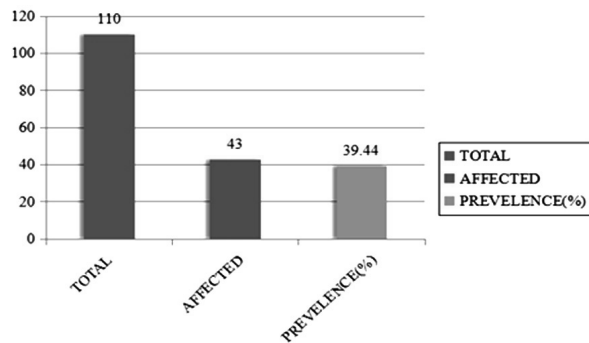
Graph 8: Prevalence of All Parameter.

Shows the Prevalence of all five parameters of Upper Cross Syndrome which are C7 angle, Kyphotic angle, Pectoralis minor tightness, Cervico-vertebral angle, Deep flexor strength.

**Table 10:** Prevalence of Upper Cross Syndrome.

Total	Affected	Prevalence (%)
110	43	39.44

Table 10 shows Prevalence of Upper Cross Syndrome in which total Prevalence is 39.44% and affected data are 43.



**Graph 9:** Prevalence of Upper Cross Syndrome

Shows Prevalence of Upper Cross Syndrome in which total Prevalence is 39.44% and affected data are 43.

## DISCUSSION

In the current study we found that the Prevalence of Upper Crossed Syndrome paramedical college students are 39.44%. The Prevalence of upper crossed syndrome in male was 14% and in female was 86%. The Prevalence of Upper Crossed Syndrome in nursing students was 29%, in physiotherapy student was 62%, and in optometry students was 9%. The prevalence of Cranio-vertebral angle found was 48.18%, C7 angle was 86.36%, Kyphotic angle was 86.36%, Deep Flexor strength was 34.53% and Pectoralis Minor length was 58.18.

The study duration was 0-2hrs and the students were.<sup>14</sup> The study duration was 2-4hrs and the students were 33, the study duration was 4-6hrs and the students were 63 and the study duration was 6-8hrs and the students were 0. Our study shows that students who attended classes for 4-6hrs are more prone to have Upper Cross Syndrome. Dr. Pooja Dhage, Dr. Deepak Anap et.al. Studied in 2019 that the Prevalence of Upper Cross Syndrome in physiotherapy students was 30.43%. Bad postural habit is one of the common reasons for this.<sup>1</sup>

This flexed neck posture can increase the moment of the cervical spine and induce muscle strain in adjacent portions of the cervical spine.<sup>12</sup> Various disorders of cervical region like-Upper Cross Syndrome, cervical spondylosis kyphotic posture, prolapsed intervertebral disc and scoliosis can affect the surrounding musculature leading to postural changes in cervical region.<sup>1</sup>

Upper crossed syndrome is caused by musculature imbalance that usually develops between tonic and weak muscles. Individuals who present with upper crossed syndrome will show forward head-and-neck posture. Study shows that many paramedical students are having postural alterations.<sup>3</sup>

Due to this pandemic period all the students are at home and the use of electronic gadget has increased. Students spend more time using smart phone, tablets, and laptops in call, text e-reading and using social media. It is responsible for neck and shoulder pain and headache.<sup>5</sup>

Student may use Smartphone's with the head shifted forward and the smart phone placed near the waist or lap while in a sitting position. This flexed neck posture can increase the moment of the cervical spine and induce muscle strain in adjacent portions of the cervical spine which may cause permanent damage to their cervical spines that could lead to lifelong neck pain.

Long term use of electronic gadget causes muscular imbalance and can lead to increase in kyphotic angle. As the result 58.18% students have increased kyphotic angle.

Prospective associations were found between text messaging on mobile phones and musculoskeletal disorders. The results imply mostly short-term effects, and to a lesser extent, long-term effects on musculoskeletal disorders in neck and upper extremities.<sup>1</sup>

## CONCLUSION

During this pandemic high prevalence of upper cross syndrome in paramedical students was found. It has been concluded that more use of electrical gadget can lead to adaptation of poor posture and so lead to upper cross syndrome. The results of the study suggest focusing more on postural awareness and proper use of electrical device in paramedical students.

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