



A STUDY ON CERVICAL SPINE POSTURE OF ASSISTANT PROFESSORS OF ENGINEERING FIELD IN DELHI

Physiotherapy

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ABSTRACT

Background: Musculoskeletal disorders (MSD) represent one of the most common and most expensive occupational health problems in both developed and developing countries. College teachers represent an occupational group among which there appears to be a high prevalence of MSD. **Aim:** To find out the deviation of the cervical spine posture in assistant professors of engineering field in Delhi.

Methodology: Assessment of the individuals was performed and the individuals who lying in our inclusion criteria were selected from. Anatomical landmarks were located, and marker (bindi) were applied over the canthus of the eye, tragus of the ear, over the seventh cervical spinous process and over the lower margins of both the ear lobes. Photographs were taken and three postural angles namely Craniovertebral Angle, Anterior Head Alignment and Craniohorizontal Angle were measured from the photographs using the UTHSCSA Image Tool Software to evaluate the cervical spine posture.

Results: The mean of CVA is 30.04 ± 6.23 . The mean of CHA is 24.66 ± 7.28 . The mean of AHA is 3.10 ± 2.08 .

Conclusion: There is significant deviation of the cervical spine posture of assistant professors of engineering field in Delhi.

KEYWORDS:

Posture, musculoskeletal disorders, UTHSCSA Image Tool Software.

INTRODUCTION

Posture is the perspective which is simulated by the body either with support all along when muscles are being lethargic, or by process of the organized action of many muscles functioning to preserve stability.¹

Posture is classified as inactive posture which are adapted for relaxing or sleeping and active postures which comprises unified action of many muscles, which may be either static or dynamic. Posture is poor when it is ineffective, that is, when it declines to deliver the principle of support or balance for which it was produced, or if redundant amount of muscular endeavour is used to maintain it.¹

Forward head posture is a head-on-trunk improper sequencing and is characterized as the exaggerated anterior positioning of the head in affiliation to a vertical reference line, increased cervical lordosis, and rounded shoulders with thoracic kyphosis positions the head ahead of centre of gravity.²

Musculoskeletal disorders (MSD) serve as one of the most universal and important occupational well-being complications in working populations, being subjected for a significant effect on quality of life, declines productivity at work due to sick leave, absenteeism and early retirement, and are also valuable in terms of treatment and individual suffering.³

The National Occupational Research Agenda (NORA) in USA states that work related musculoskeletal disorders (MSD) report for a primary component of the cost of work related disability in the USA. The US department of Labor defines a musculoskeletal disorder (MSD) as trauma or disorder of the muscles, nerves, tendons, joints, cartilage, and spinal discs.^{4,5}

MSD may occur because teachers frequently work in stressful situations with large classes, absence of educational resources, and definite reward for their work.⁶

Computer work has bring about a new category of occupational well-being problems namely stress, computer vision symptoms and musculoskeletal problems. Computer related stress and anxiety may have serious effects on an individual's health. Working on computers for 6-9 hours provoke symptoms which incorporate over a course of time resulting in debilitating injuries causing absenteeism and poor class performance.⁷

Therefore, through this study we would like to analyse whether there is any deviation present in cervical spine posture of Assistant Professors of engineering field in Delhi.

Inclusion criteria^{8,9,10,11,12}

1. Asymptomatic assistant professors of engineering field
2. 30-45 years of age
3. BMI (18.5-24.9 kg/m²)
4. Teaching since last five years

Exclusion criteria

1. Any diagnosed case of musculoskeletal, neurological, psychiatric and cardio respiratory disorder.
2. If subject had participated in a neck or back exercise program in last 6 months or are undergoing treatment at the time of testing.
3. Subjects wearing spectacles and who have undergone Lasik surgery.²
4. Any other hobby/activity that may affect the outcome of the study.

PROCEDURE

250 subjects were approached but only 100 subjects agreed for participating in the study.

The subject was seated erect on an adjustable stool with feet placed flat on the floor and arms resting comfortably on their thighs.

The subject's clothes were rearranged to allow skin and marker replacement. Anatomical marks were located, and marker was applied over the canthus of the eye, tragus of ear, over seventh cervical spinous process and over the lower margins of both the ear lobes. Photographs were taken and three postural angles namely Cranio-vertebral angle, Anterior Head Alignment and Cranio-horizontal angle were measured from photographs using the UTHSCSA Image Tool Software.

Cranio vertebral Angle^{8,13,14,15}

Markers were marked on the spinous process of C7 and the tragus of the ear. A line was drawn from tragus to C7 and another horizontal line through the spinous process of C7, and the angle was measured at the intersection point of the two lines.

Anterior Head Alignment^{8,14,15}

Markers were marked on the inferior margins of the both ears and another horizontal line was drawn in relation to the inferior margins of the ears. The angle formed by the intersection point of the two lines indicates the anterior head alignment. The eyes will level when the angle is zero.

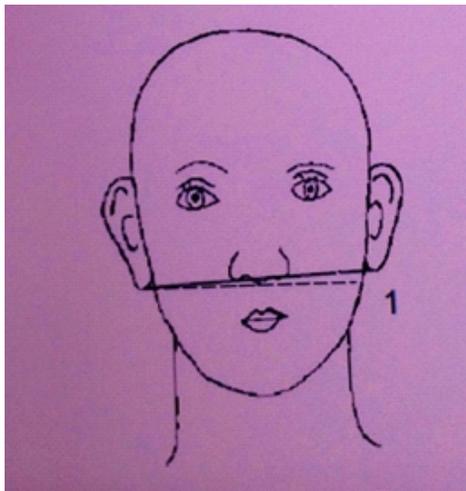
Cranio horizontal Angle^{14,15}

The angle formed at the intersection of a horizontal line through the

tragus of the ear and a line joining the tragus of the ear and the external canthus of the eye, was measured. It is believed to provide an estimation of head on neck angle or position of the upper cervical spine.



Angle 1: Showing CHA
Angle 2: Showing CVA



Angle 1: Showing AHA

RESULTS

Total sample of 100 subjects were taken who fulfilled the inclusion criteria.

A total of one hundred assistant professors of engineering field were studied. The mean age of study subjects was 36.47 ± 4.84 years with a range of

| Variables | Mean | S.D |
|--------------------------|--------|------|
| Age (yrs) | 36.47 | 4.84 |
| Height (cm) | 161.95 | 7.52 |
| Weight (kg) | 61.32 | 6.54 |
| BMI (kg/m ²) | 23.34 | 1.50 |

| Variables | Mean | S.D |
|-----------|-------|------|
| CVA | 30.04 | 6.23 |
| CHA | 24.66 | 7.28 |
| AHA | 3.10 | 2.08 |

30-45 years, mean height is 161.95 ± 7.52, mean weight is 61.32 ± 6.54 and mean BMI is 23.34 ± 1.50 (Table 1)

Table 1: Representing Mean and SD of demographic variables
The mean of CVA is 30.04 ± 6.23 degrees. The mean of CHA is 24.66 ±

| Variables | Normal | Altered | p-value |
|-----------|----------|------------|---------|
| CVA | 51.9±5.7 | 30.04±6.23 | <0.0001 |
| CHA | 18.8±4.2 | 24.66±7.28 | <0.0001 |
| AHA | 0.1±2 | 3.1±2.08 | <0.0001 |

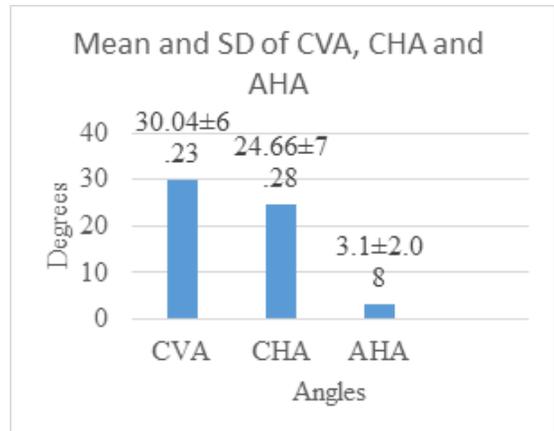
7.28 degrees. The mean of AHA is 3.10 ± 2.08 degrees (Table 2; Graph 1).

There is negative correlation between age and CVA i.e., -0.237 (Graph 2) and no correlation between age and CHA and AHA.

There is significant difference in the CVA, CHA and AHA with p-value less than 0.0001 (Table 3)

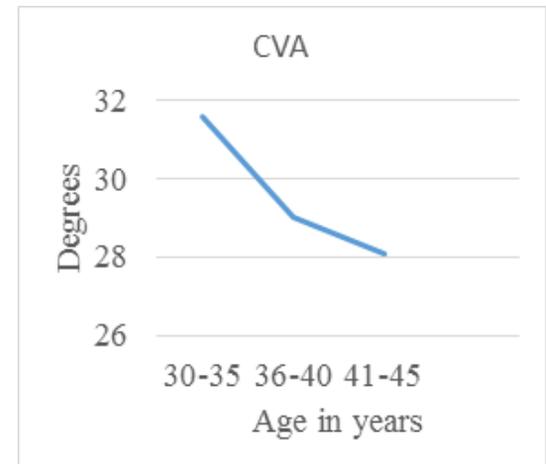
There is no significant difference in the CVA, CHA and AHA between males and females (Table 4).

Table 2: Representing Mean and SD of CVA, CHA and AHA



Graph 1: Showing mean and SD values of CVA, CHA and AHA

Table 3: Representing significant difference of CVA, CHA and AHA from normal



Graph 2: Showing correlation between age and CVA

| Variables | Females | Males | p-value |
|-----------|---------|-------|---------|
| Age | 36.39 | 37.75 | 0.2598 |
| CVA | 30.67 | 28.68 | 0.1365 |
| CHA | 25.17 | 23.56 | 0.3050 |
| AHA | 3.25 | 1.30 | 0.2835 |

Table 4: Representing comparison of CVA, CHA and AHA between Females and Males

DISCUSSION

Professors are among those suffering the most with disclosure to workplace hazard, since workplace is often clashing, associated to high professional requirements, which may raise stress load and impair physical and mental well-being of workers, bringing consequences to their health and working context. Prevalence of musculoskeletal symptoms among professors was very high, majority has described close relation of such symptoms with teaching activities, being inactive aspects of WRMD.¹⁶

College professors, for having managerial activities, teaching, research and expansion, are exposed to diverse pressures sources, high workload, short halt for rest, in- depth working speed and concern of attention and concentration are related to a high level of stress, quality of life is greatly impaired, inducing health disorders, such as musculoskeletal problems which are common among professors.¹⁶

Neck pain has been the most universal chief objection among working-aged women visiting their physicians. In a study in Canada, 54% of the general population had sensed neck pain during the past 6 months, and approximately 5% were exceedingly disabled by neck pain. The prevalence of chronic neck pain has been noted to be 7% in women and 5% in men in Finland. In our study, no significant difference has been found in posture between males and females as they have same profile, working hours, and teaching activities.¹⁷

The conversion from an acute to a chronic situation was explained by Travell's hypothesis that pain and dysfunction are mutually linked: dysfunction inducing pain which then build up dysfunction, setting up the vicious cycle that controls the condition.¹⁸

Continuous activation of low threshold motor units of the upper trapezius muscle all the while computer work is considered to result in repetitive strain injury and consequently muscle tenderness.¹⁹

Forward head and rounded shoulder posture contributes to altered scapular kinematics and muscle activity which elevates the stress on the shoulder, leading to shoulder pain and dysfunction.²⁰

As the age increases the consistent acceptance of a forward head posture causes abnormal compression on the posterior zygapophyseal joints and posterior portion of the intervertebral disks. The cervical extensor muscles become ischemic because of the consistent isometric contraction which is needed to counterbalance the larger than normal external flexion moment and control the head in its forward head position. In our study it is found that age is also negatively correlated with CV angle which results in increase in forward head posture. That is as the age increase there is increase in forward head posture. This result is persistent with the findings of a study by Dalton and Cottus (1994) who described that there was a continuous decline in the CV angle of natural head posture with increasing age.^{21,22}

Stress induced muscular activation may results in sensations of muscular tension and discomfort, which can be treated as early sign of the development of MSD. Some probable causes of work- related stress are overwork, lack of clear guidance, unrealistic deadlines, and lack of decision- making, job uncertainty, isolated working conditions, surveillance, and inadequate child care arrangements.^{23,24}

Poor postural habits preserved for a prolonged period can result in decreased flexibility and less range of motion of the neck and shoulders and increase loading to the non- contractile structures and abnormal stress on the posterior cervical structures and cause myofascial discomfort.²⁵

Awareness and knowledge of the relation between teaching and MSD are essential for preventing MSD and minimising their progression. Ergonomic education specific to MSD risk factors and prevention should be introduced into teaching training institution.²⁶

There is need to develop and implement effective intervention strategies which includes exercise, awareness and training of ergonomic care which includes ergonomically designed workplaces, proper equipment and training and reasonable job demands and exercise.

LIMITATION

Small sample size.

SCOPE OF FUTURE STUDY

The scope of future study could be:

- To compare the different streams of engineering field.
- To compare among different age groups.

CONCLUSION

There is significant deviation of cervical spine posture in assistant professors of engineering field in Delhi.

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