

ORIGINAL ARTICLE

A Correlational Study of Cranio-Vertebral Angle with Smartphone Usage Time in Progression of forward Head Syndrome among Postgraduate Students.

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ABSTRACT

FHS is either neglected or poorly considered as a problem until it shows severe appearance. Inadequate posture leads poor joint movements and may cause pain. Increased usage of smartphone is going to be a challenge of maintaining correct posture as concurrently there are increased reports of neck pains among small age groups. In present study we tried to establish a correlation between mobile usage time and craniovertebral angle. Total 60 PG students between age group 18-25 were participated in study. Mobile usage time and craniovertebral angle were measured in single blind study. Our results showed highly significant ($p < 0.001$) correlation between mobile usage time with cranio-vertebral angle (CVA) leading musculoskeletal discomfort in the participants.

Keywords: Craniovertebral Angle, CVA, Forward Head Posture, Smartphone Usage, Neck Pain

1. INTRODUCTION

Improper or bad posture is a serious health problem either concomitant with advance age or sometimes quite early causing more cervical musculoskeletal disorder. Forward head posture (FHP) is entitle to excessive anterior positioning of the occurs in relation to a vertical reference line.

Forward head posture (FHP) is characterized by increased flexion of the lower cervical spine and upper thoracic region also increased extension of the upper cervical spine [1]. FHP is commonly defined as the protrusion of the head in the sagittal plane so that the head is placed anterior to the trunk it means deviates from normal cranio vertebral angle (CVA). Thus, FHP may contribute to neck and shoulder pain [2,3] Once developed in childhood, the habit of an FHP can predispose the child to pain in early adulthood, well before degenerative changes are known

to be present [3]. Altered postures may accelerate the degenerative changes that take place later in life.

Besides calling, Smartphones are used for accessing music, video and social network services. Smartphones have become not only an example of modern high-tech equipment, but also a daily requisite. Long term continued usage of smartphone may results in slouched posture. Smart phones, unlike computers, feature a small screen that is likely to induce a more slouched posture toward a line of sight below eye level [5,6].

Studies have also shown students have strong flexion of the neck when using smartphones. "Text neck," a evident from onset of cervical -spinal degeneration resulting from the repeated stress of frequent forward head flexion; while looking down at the screens of mobile devices and "texting" for long periods of time [7] Sustained pressure on the neck joints [8] is causing disturbed signals to the brain that might cause balance problems and disturbed neck proprioception [9,10].

In a study carried out among Indian college students [11] headache was noted as commonest symptom seen in 51.47%, Milde-Busch et al reported headache in 2.9% of subjects who used mobile phones for more than 30 minutes a day [12] Although many studies conducted demonstrating use of smartphones and its relationship with backpain, neckpain, thumb disorder. The purpose of this study was to find the correlation of smartphones usage time with craniovertebral angle CVA in post graduate students.

2. MATERIAL AND METHODS:

60 Participants of average age 18-30 from PG departments of Jankidevi Bajaj College of science, Wardha (M.S.) India participated in Study. Participants having previously known trauma or neck/back accidental injury were excluded in study.

Only voluntarily participation criteria was followed. It was a single blind study so participants were not aware of the type of criteria used in study because both obile usage and craniovertebral angle (CVA) are much attention sensitive.

Students were asked to install 'Screen time' app in their smartphones, which gives data of previous 7 days

mobile usage subsiding possibility of false positive results about mobile usage. Mobile usage was recorded and average usage time per week was calculated.

There after students were asked to answer some dummy quizzes on screen in relaxed time. When participants were totally engaged in solving quizzes; their exact natural seating and neck posture angle was measured through another application 'FHS' freely available on playstore application of android phones without prior notice to participants.

3. RESULT AND DISCUSSION

Of the 60 participants data from only 31 participants found suitable for analysis as students having test exams and seminars at that times also excluded from study. Spearman correlation coefficient showed very high degree of positive correlation ($r=0.671$, $p<0.001$) the calculated 't' value 10.89 is higher than the tabulated "t' value both at 5%(2.04) and 1% (2.750) level of probability of Significance Therefore, the correlation coefficient between Mobile usage time and craniovertebral angle is highly significant.

TABLE 1:

Mobile Usage time in min/week	Cranio-vertebral angle
2499 ± 589.79	26.24 ± 6.44

Values represented as Mean ± Std. deviation

Our results showed, the extent of smartphone usage was significantly ($p<0.001$) correlated with vertebro-cranial angle (VCA) leading musculoskeletal discomfort in the participants.

The forward head posture leading to forward bending of frequent neck often leads flexion posture, which changes the natural curve of the cervical spine and increases the amount of stress on the cervical spine, leading to uncomforted and spasm in the adjacent skeletal structures and ligaments. [13] Excessive use of Smartphone can lead to habitual repetitive and continuous movements of the head and neck toward the screen throughout the day. Such movements are associated with a high risk of chronic neck pain. Text neck or FHS most commonly causes neck pain and tenderness [14].

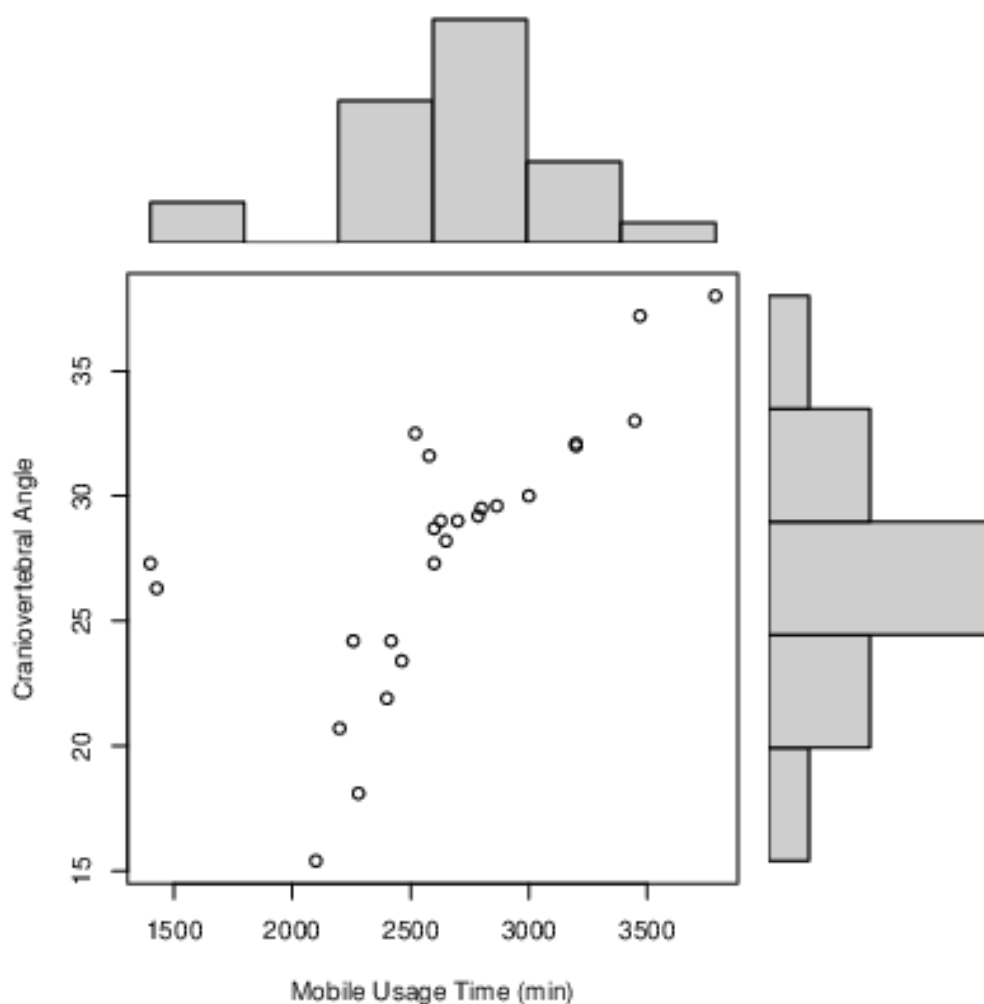


FIGURE 1 :

Graphical representation was prepared using Statistics Software (v1.2.1), Office for Research Development and Education, URL https://www.wessa.net/rwasp_correlation.wasp/

Hakala et al. [15] also reported that frequent use of mobile phones increases the risk of neck-shoulder and lower back pain in adolescents [15] and upper extremity pain [16]. However, some studies shown smartphone addiction has no effect on craniovertebral angle but could negatively affect a person's depression status [17] and might affect the proprioception input of the neck posture affecting overall balance [18,19,20,21]. In addition, looking down at smart phones too much can lead to upper back pain, also Shoulder pain and tightness ranging from chronic, nagging pain to sharp and severe muscles spasm. [22]. Bending head forward substantially increases relative weight of head with respect to its normal counterpart at straight position. Increased weight unnecessary makes overstaining of neck and back muscle to hold it.

Since children's has proportionally large heads in relation with body size they have an increased risk for text neck and subsequent neck pain [23, 24] by their predisposition to use mobile phones. Serious permanent damage of untreated text neck can be the result and be quite similar to occupational overuse syndrome or repeated stress/strain injury [25].

The most common symptom observed in this study was cervical pain, which was reported from 71.2 % of subjects [10]. So in conclusion, our study showed a progressive or highly correlation extent of FHS with reference to craniovertebral angle with that of smartphone usage timing. These studies are carried on a very small group of population but still it rings alarm for FHS. Thus there is extensive need of students orientation about the physical risks associated with excessive use of smartphone.

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