

Research article

Prevalence of forward neck posture and influence of smartphones in physiotherapy students

Annie Janet¹, Mohan Kumar G.², Rajalaxmi V.², Ramachandran S.², Priya C.³, Yuvarani G.⁴, Tharani G.⁴, Kamatchi K.⁴, Muthu Raj G.⁴

¹Physiotherapist, ²Professor, ⁴Assistant Professor, Faculty of Physiotherapy, ³Assistant Professor, Department of Biotechnology, Dr. MGR Educational & Research Institute, Velappanchavadi, Chennai, 600 077, Tamil Nadu, India

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Corresponding author: Mohan Kumar G. Email: mohankumar.physio@drmgrdu.ac.in

ABSTRACT

Introduction and Aim: In Asia, the prevalence of forward neck posture is 66%. Forward neck posture is the anterior positioning of cervical spine. This posture is sometimes called as “scholar’s neck. Forward neck posture can lead to musculoskeletal disorders such as injuries in muscles, tendons, and peripheral vessels, vascular vessels caused by repetitive or continuous use of certain body part. In forward neck posture, the sternocleidomastoid muscle and trapezius are largely responsible for turning and nodding the head. When the head moves front, the spine follows, pulling the shoulder blades forward as well. They make contact with the upper ribs and begin to drag it forward with them. Therefore, this study aims to quantify forward neck posture in prolonged smart phone users.

Methodology: An observational study was done in smartphone using student population comparing the control group students with forward neck posture students for the duration of 3weeks. This study has included 100 students with forward neck posture who were recruited from Dr. MGR Educational & Research Institute. Goniometer, Craniovertebral angle and Plumb line were used as the outcome measure.

Results: The findings of this research exhibit there is a statistically significant changes in forward neck posture students compared with control group and the mean difference is 14.97 in two groups students.

Conclusion: The present study concluded that 3 weeks after assessing the students. Forward neck posture students found to have decreased craniovertebral angle and range of motion compared to normal neck posture students and also found that forward neck posture students spent 5-6 hours using smart phones per day.

Keywords: Forward neck posture; craniovertebral angle; goniometer; plumb line.

INTRODUCTION

Forward neck posture is the type of postural abnormality where the anterior position of head is in relation to vertical line of the body’s centre of gravity (1). The weight of the head supported by the neck is increased by forward placing the head away from the midline of the body, with lower cervical vertebrae bent and higher cervical vertebrae stretched, and the weight of the head supported by the neck is increased (2). It is also defined as any alignment in which external auditory meatus positioned anterior to the plumb line through shoulder joint (3). The head’s bending moment puts pressure on the muscles and joints that surround the cervical vertebra (4). In forward neck posture the height of the eye sight becomes low which causes exaggerated anterior curve and exaggerated posterior curve in the upper thoracic vertebra (5). This turtle neck posture is becoming increasingly common in leaning forward posture particularly with the popularization of smart phone (6).

Prevalence of forward neck posture occurring in young and older adults is 66%. Kyphosis 38% occurring in older adults and it leads to neck dysfunction. Thoracic kyphosis affects indirectly on cervical flexion in 70% of the population (7) this imbalance in cervical muscles result in postural misalignment and excessive load in muscles and joints. Forward neck posture leads to lengthening and weakness of the anterior cervical muscles and shortening of posterior cervical muscles (8). Smartphone users in Korea usually spend an average of 4.1 hours a day on their Smartphone (9). The prevalence of Smartphone addiction is 84% the Smartphone penetration rate was greater in teenagers than in older adults’ groups (10). Individuals who use smart phones for an extended period of time are at risk of developing cumulative trauma disorder, which is produced by holding the same position for an extended period of time. Because the head weighs one-seventh of one’s body weight, sustaining a position with the head leaning forward needs 3.6 times more force than keeping the same position with a straight standing posture (11).

According to Kapandji, for every inch the head moves forward it gains 10 pounds in weight as far as the muscles in upper back and neck have to work much harder to keep the head from drooping unto the chest (12). Rene calliet, in his study found that forward head posture can add up thirty pounds of abnormal leverage on the cervical spine this can pull the entire spine out of alignment (13). Greigel-Morris stated that the forward head posture can affect not only the neck, but also the thoracic spine and shoulder blade, resulting in musculoskeletal system imbalance (14). Szeto and Moore stated that maintaining a forward head position for an extended period of time can lead to musculoskeletal problems such upper crossing syndrome, which involves a reduced lordosis of the lower cervical vertebrae along with kyphosis of the upper thoracic vertebrae (15). Burgess-Limerick suggested that shortening of muscular fibres at the atlantooccipitalis articulation and overstretching of muscles around joints result in chronic neck pain (16).

Forward neck posture is assessed by using Goniometer, craniovertebral angle and plumb line Craniovertebral angle is the angle formed by the line connecting the seventh cervical vertebra and tragus and a horizontal line Craniovertebral angle is the angle formed by the line connecting the seventh cervical vertebra and tragus and a horizontal line Moreover this posture accelerates the neck extensor activity because of upper cervical excessive extension (17). While heavy Smartphone users spend 5.4 hours a day. An adult head weights 10-12 pounds in the neutral position. As the head tilts forward the forces felt by the neck surge to 27 pounds at 15 degrees, 40 pounds at 30 degrees, 49 pounds at 45degrees and 60 pounds at 60 degrees (18).

Prolonged use of smart phones will affect both posture and respiratory function. it is important to correct the forward head posture to prevent the musculoskeletal disorders, joint degenerative disease, cervical osteoarthritis, cervical herniated disc, visual problems. The aim of this study is to analyse the prevalence of forward neck posture and influence of smart phones in physiotherapy students.

METHODOLOGY

This observational study was done in" Dr. MGR Educational Research Institute "for 100 students in duration of 3 weeks. Students with age group of 17-22 both male and female students who use smart phone for more than four hours per day, no congenital abnormalities either in cervical or lumbar spine were included in this study Student below 17 and above 22, Wry neck, Neck trauma, Fracture injury of cervical column, torticollis, cervical

spondylosis, severe kyphosis, scoliosis Temporomandibular disorders were excluded from this study. Goniometer, Craniovertebral Angle, Plumb Line were used as the outcome measure.

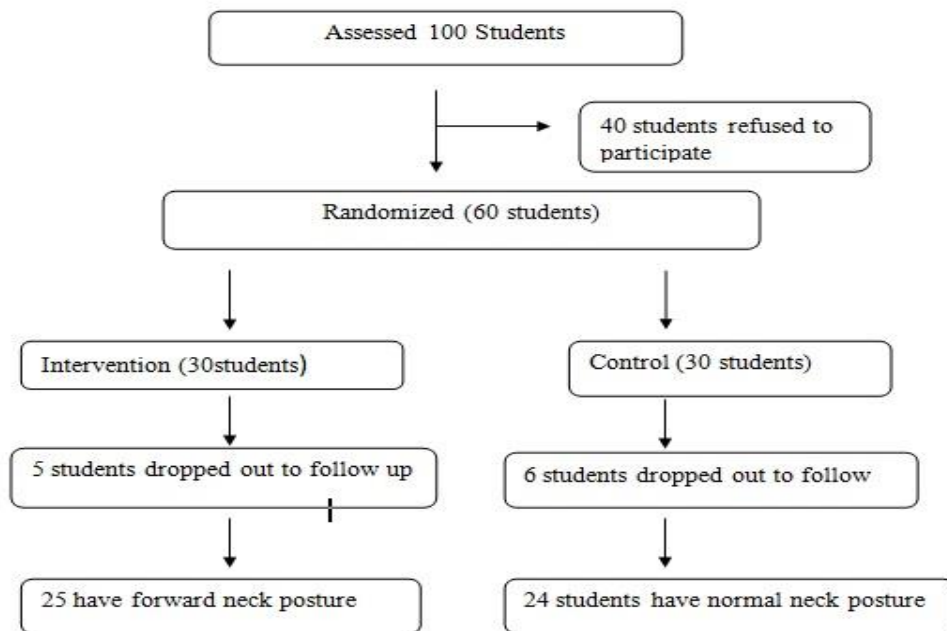
PROCEDURE

100 physiotherapy students were screened for forward neck posture. In. those 40 students refused to participate and the remaining 60 students were randomised. These Students were given consent form and screening questions and they are divided into two groups first group is forward neck posture students and second group is control group students who have normal neck posture. In forward neck posture group 30 students were assessed in that 5 students dropped out prior and remaining 25 students were assessed for forward neck posture and in control group 30 students were assessed in that 6 students were dropped out to follow up the data and the remaining 24 students were assessed and found to have normal neck posture in the control group students.

Forward neck posture was observed by making the student stand against the wall. Students who were observed to have forward neck posture were then assessed and the measurement was taken with the ruler between the external occipital protuberance of the skull bone and the wall. If the measurement was above 3 inches it is indicated as forward neck posture. The subjects were instructed to assume their natural standing position on bare foot. The necessity of standing bare foot and natural position was explained to the subject. The landmarks for craniovertebral angle were joined on participants left side using double sided tape the spinous process of C 7, The examiner located the C7 process by asking the individual to move the cervical spine into flexion and extension at the external corner of the eye, the tragus of the ear, the sternal notch of the manubrium, and the centre point of the chin. When the cervical spine is stretched, the C7 spinous process is more apparent, while the C6 spinous process is non-existent.

The subjects stood where the plumb line rope would pass through anterior the external auditory meatus, which was hanging from the ceiling. On digital photographs, the plumb line defined the true vertical line. In order to establish the eye level, subjects were asked to look forward at a point directly in front of them. Forward head posture was determined based on observing the participants head and neck by plumb line. Craniovertebral angle was measured to quantify the forward head posture the craniovertebral angle was measured at the intersection of horizontal line passing through C7 spinous process and line joining the point of tragus of the ear to the skin over lying the C7 spinous process.

Consort flow diagram



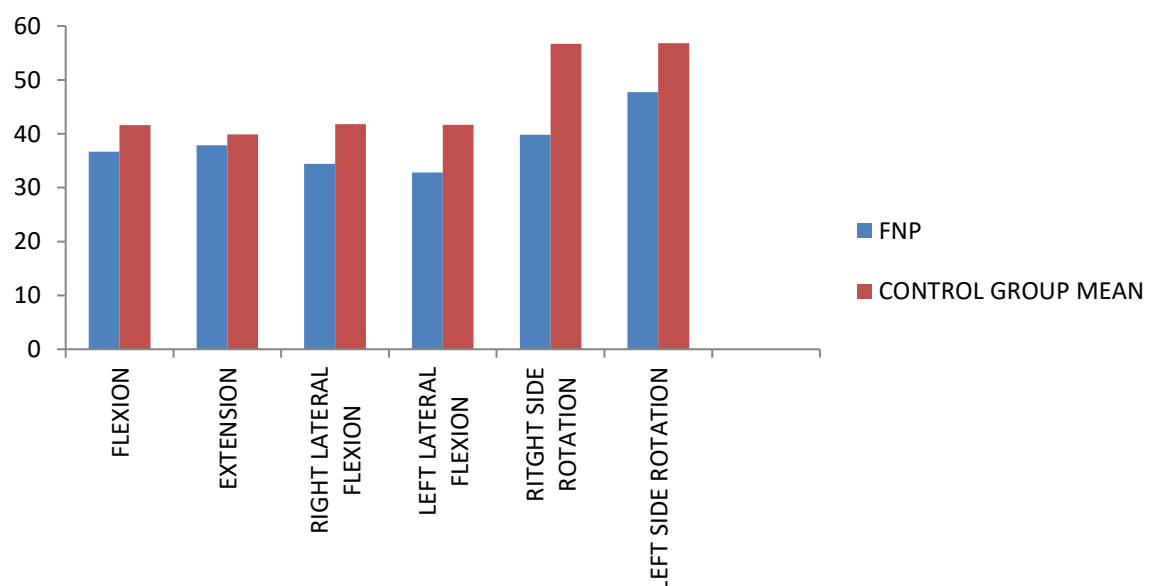
Data analysis

The collected data were tabulated and analysed using both descriptive and inferential statistics. Descriptive

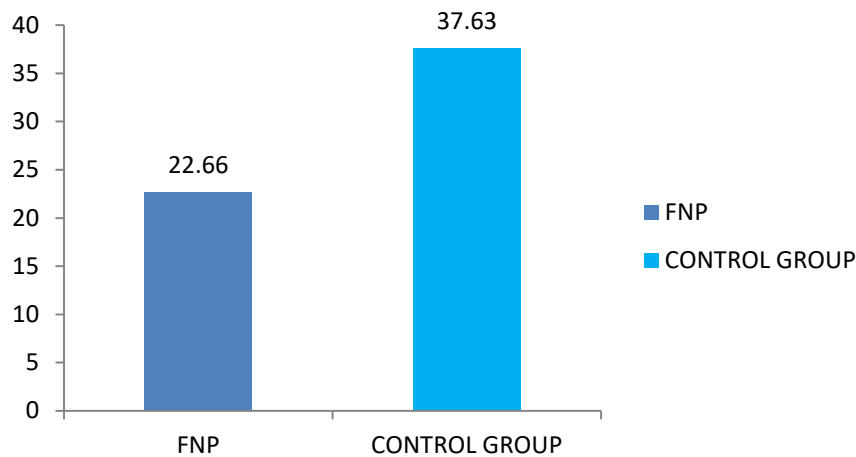
statistics was adopted to find mean, and standard deviation of craniovertebral angle and goniometry.

Table 1: ROM and CVA variables in the subjects

Measurements	Forward neck posture		Control group	
ROM	Mean	SD	Mean	SD
Neck Flexion	36.64	3.908	41.58	2.041
Neck extension	37.84	3.493	39.87	1.541
Right side rotation	34.40	4.406	41.79	1.444
Left side rotation	32.80	4.163	41.78	1.503
Right lateral flexion	39.80	12.72	56.08	1.282
Left lateral flexion	47.40	13.71	56.79	1.382
CVA	22.66	1.880	37.63	4.603



Graph 1: ROM variables for FNP students and control group students



Graph 2: CVA variables for FNP students and control group students

RESULTS

The results of this study revealed that there is a statistically significant difference in forward neck posture students than compared to control group students and the mean difference is 14.97 in two groups of students. In Forward neck posture students found to have a decreased craniovertebral angle and cervical range of motion. Most of the forward neck posture students spent 5-6 hours on using smartphone per day.

DISCUSSION

Smart phones are used regularly in daily life and have a physical and psychological impact on users. Millions of individuals throughout the world use smart phones, which can lead to poor posture. People who spend a lot of time on their phones have forward head syndrome and a slouched posture, according to research. Heavy smart phone users lose the natural curve of the cervical spine and instead place increased amounts of stress on the cervical spine. In this study we used range of motion, craniovertebral angle, and plumb line to detect the forward neck posture.

In some similar studies mentioned that head leads to flexion of the lower cervical spine and extension of upper cervical spine. The alignment has a negative correlation with the position of upper cervical spine which means increasing the lower cervical lordosis is associated with a reduction in the upper cervical spine curvature. Craniovertebral angle is a good indicator for measuring forward neck posture although it cannot reflect the upper cervical spine position. Previous research has found that smartphone users are more likely than non-smartphone users to have neck pain, muscle tiredness, and limited cervical range of motion. CVA implies a more forward head posture; in our study, participants who used their smartphone for more than 4 hours per day had a higher CVA. One of the previous studies showed an increase in flexion angle

of the cervical were significantly higher in the group of prolonged Smartphone users (19).

Another study found that 18.8% of people have experienced symptoms connected to a musculoskeletal disorder as a result of using a smartphone, and that pain levels rose with time spent using it (20). Previous research has found that using a smartphone for an extended period of time causes muscle weakness and exhaustion, which can easily lead to chronic cervical pain. One of the most prevalent cervical irregularities is forward neck posture, which predisposes people to pathological problems such as headaches, neck pain, temporomandibular disorders, and vertebral body disorders. Many studies have shown that persons who use their smartphones for an extended period of time have a greater ratio of FHP because they try to bend their necks more to look at the relatively small screen. This could be the explanation for the emergence of more serious issues.

Comparing the mean values and standard deviation proved that there is a statistically significant difference in forward neck posture students. Thus, as CVA accuracy has an undeniable role in detecting forward head posture. Plumb line is also applied to measure forward head posture and goniometer is used in detecting the cervical range of motion. Some similar studies mentioned that forward head leads to flexion of lower cervical spine and extension of upper cervical spine. The alignment of lower cervical spine has a negative correlation with the position of upper cervical spine which means increasing the lower cervical lordosis is associated with reduction in upper cervical spine curvature. In this study revealed that forward neck posture students have decreased ROM and CVA Angle compared to control group students.

CONCLUSION

The present study concluded those 3 weeks after assessing the students. Forward neck posture students found to have decreased craniovertebral angle and

range of motion compared to normal neck posture students and also found that forward neck posture students spent 5-6 hours using smart phones per day.

CONFLICT OF INTEREST

Authors declare that there is no conflict of interest.

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