Co-Relation of Forward Head Posture and Dependent Head Posture Dizziness Syndrome in Desktop Workers

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Abstract:- **Background: The study attempted to find the co-relation of forward head posture and dependent head posture dizziness syndrome in desktop workers in both male and female with age group of 35-45 years. Dependent Head posture Dizziness Syndrome is characterized by symptoms such as dizziness and postural instability, often attributed to abnormal head posture. Forward head posture, a frequent postural distortion, has been hypothesized to contribute to the development of this syndrome. Methodology- Study investigated the co-relation between forward head posture and dependent head posture dizziness syndrome among 61 participants who met the inclusion and exclusion criteria. Participants were assessed for forward head posture using standardized measures, and symptoms of dependent head posture dizziness syndrome was self-reported.**
Statistical analysis, including co-relation coefficients and to ascertain the association between the variables, hypothesis testing was done using a 0.05 p-value threshold. Data was analyzed using MS Excel software. Result- The study involved comparing the means of all variables, where Fisher's exact test and proportion test were employed for analysis. To determine statistical significance, a criterion of p>0.05 was established. The results indicated that none of the variables exhibited a significant co-relation, as all values exceeded the threshold, signifying a lack of statistical significance. Conclusion- There is no substantial relation between forward head posture and dependent head posture dizziness syndrome.

Keywords- Forward head posture, desktop users, Craniovertebral angle.

INTRODUCTION

The cervical spine positions the special sense organs, primarily the eyes, for perceiving the world.
The upper cervical spine accounts for a substantial portion of total cervical flexion, extension and rotation.[1] The cervical spine enables the head and neck to move and maintain stability.[2] The neck musculature has two primary functions; First it offers voluntary head motions or orientation during external disruptions, and stabilizes the head during such movements.[3]

In normal posture, a lordotic curve is formed by cervical vertebrae, providing structural support and facilitating biomechanical function in the neck region. This natural curvature is maintained and accentuated by the coordinated action of several muscles, including the semispinalis capitis, splenius capitis and cervicis, trapezius and levator scapulae. These muscles work synergistically to stabilize the cervical spine and contribute to the maintenance of proper head and neck alignment. By providing dynamic support and controlled movement, these muscles help distribute forces evenly along the vertebral column, reducing the risk of strain or injury. [4]

By promoting a more symmetrical load-bearing pattern, the lordotic curve has a pivotal function in supporting the weight of the head and facilitating smooth, efficient movement of the neck. [11] The Centre of gravity of the head shifts with changes in posture, altering the movement produced by its weight in relation to the cervical spine's point of rotation. The muscles used to work on a computer are affected by the posture assumed during the task. The head is characterized as being positioned forward in the sagittal plane relative to the neck in forward head posture. In this posture the upper cervical vertebrae extend more than normal, the occiput extends backward on C1 and lower cervical vertebrae and upper thoracic regions flex more than usual. Forward head posture can result from prolonged periods of

sitting in front of a computer. [5] The upper cervical spine experiences an altered alignment and an increased load due to forward head posture. The sub-occipital muscles undergo structural and functional modifications in response to these changes. The central nervous system receives abnormal proprioceptive inputs due to these alterations, leading to incongruities with vestibular and visual cues. Symptoms of mismatched information integration include dizziness, pain, light headedness, and headache.[6]

A large percentage of population is afflicted by forward head posture which can cause severe neck discomfort. In this position the skull is borne in front of the body's centre of gravity, resulting in a chronic condition that places additional strain on the postural musculature of the entire spine, particularly the cervical spine.[7] The screen and keyboard on most laptops are integrated, preventing independent adjustments of screen height and distance, as well as keyboard height and distance.[8] The cervical spine experience prolonged flexion, resulting in increased activity in the erector spinae and upper trapezius muscles. This posture includes a slightly backward incline of the trunk. The forward head and trunk flexion creates a permanent postural habit, leading to consequent flexion. Lately, health professionals have been noticing the physical effects of poor posture, most notably in individuals who spend extended periods using computer.[8] Kenneth Ashok et.al conducted a study which suggested that individuals spending longer hours on electronic gaming devices had a high risk of developing FHP due to static loading on the cervical spine.[9]

In a typical situation, a clear visual image is maintained during head and eye movements through the cooperative action of afferent information from the vestibular and cervical systems. The vestibular system, housed in the inner ear, is vital because it senses shifts in the head's orientation and motion. It communicates to the brain where the body's is in respect to gravity, helping to stabilize gaze during movement. At the same time, cervical system, which involves the sensory information from the neck, contributes by providing feedback on the head's position and motion relative to the body.[1] Together, these systems integrate the sensory inputs to ensure that even when the head and eye move, the visual image remains stable and clear, preventing disorientation and maintaining balance. This coordination involves intricate mechanism within vestibular, visual and proprioceptive systems, which work together to provide accurate information about body's position and motion in space. This integration of sensory information is essential for preserving spatial orientation, minimizing the risk of falls, and facilitating smooth, coordinated movement in everyday life.

The above study was done to evaluate co-relation between forward head posture and dependent head posture dizziness syndrome in desktop workers.

MATERIALS AND METHODS

The observational cross-sectional investigation was done for six months at the Physiotherapy Out Patient Department of D.Y. Patil Hospital and Research Centre Kadamwadi, Kolhapur after getting approval from the institutional ethical committee. 61 participants were screened according to the inclusion and exclusion criteria. The participant was informed of the study's purpose, and formal consent was acquired.

Inclusion Criteria- Participants aged between 35-45 years, belonging to both the genders, working more than 6 hours 5 days a week having 5 or more years of work experience in front of computer and willing to participate.

Exclusion Criteria-Participants with history of vestibular deficits, cerebellar deficits.

Demographic data of the patient including name of the subject, age, gender, address, occupation and their work experience was collected. Various assessment was done on the participants such as analysis of posture such as forward head posture in lateral view, measurement of cervical range of motion including all ranges such as Flexion, Extension, Lateral flexion and Rotation. craniovertebral angle measured with the help of universal goniometer to rule out severity of forward head posture in a sitting position.

The method involved the strategic placement of the universal goniometer, where the axis was positioned at the C7 spinous process, ensuring stability and accuracy. With the stable arm set horizontally at the C7 level and the movable arm was perfectly positioned near the ear's tragus. the resulting angle reflects the inclination of the head relative to the cervical spine. Further, the Dix Hallpike test was performed on a participant to assess for nystagmus. The participant was initially positioned in a long

sitting posture, followed by the rotation of the head to approximately 45 degrees to one side. Subsequently, the participant was instructed to lie down quickly with the head maintained at a 30-degree extension position. This position was maintained approximately for one minute and pupils were closely observed for any signs of nystagmus in which the direction and duration of the nystagmus was carefully noted. Then the severity of dizziness was assessed using Dizziness Handicap Inventory (DHI) scale a standardized measure designed evaluate the impact of dizziness on an individual's daily functioning. The DHI scale comprises a total of 25 questions, each targeting different aspects of dizziness-related disability. These questions encompass functional, physical and emotional domains, providing a comprehensive assessment of the extent to which dizziness affects an individual's quality of life. This scale of 25 questions was given to the participants to mark an appropriate answer. The scores were interpreted as mild handicap (16-34 points), moderate handicap (36-52 points) and 54+ (Severe handicap). The data were analysed using MS Excel 16 software.

FIG 1. Posture in Lateral View

FIG.2 Dix Hallpike Test

RESULT

Table no:1 Participants with and without forward head

Forward Head	No. of Participants	Percentage
Yes	27	44%
No	34	56%
Total	61	100%

In the above table, 44% of the 61 participants exhibited a forward head posture, while 56% did not. This distribution underscores the prevalence of this postural deviation within the sample population.

Table no.2 Genderwise Prevalence of Forward Head in Desktop Workers

Gender	Prevalence of Forward Head	P value
Female	50.00%	0.62
Male	42.55%	

The table no. 2 reveal intriguing insights into the gender prevalence of forward head posture, with females constituting 50.00% of the cases and males accounting for 42.55%. This distribution prompts further exploration into potential factors contributing to the observed gender differences in forward head posture prevalence. Additionally, the statistical significance of the difference in the prevalence of forward head posture between males and females is not supported by the p-value of 0.62.

Table No. 3. Dix-Hallpike test

Dix-Hallpike test	No. of Participants	Percentage
Negative	50	82%
Positive	11	18%
Total	61	100%

Out of the 61 participants, 50 (82%)showed negative result which indicated the absence of BPPV, while 11(18%) showed positive result suggesting BPPV.

Table no.4 Various physical parameters and their associated variability

Variable	Mean	SD
Age	39.29	4.26
Craniovertebral Angle	42.29	2.48
Flexion	37.92	4.40
Extension	40.21	8.01
Lateral flexion (Right)	31.79	6.86
Lateral Flexion (Left)	34.33	5.78
Rotation (Right)	54.04	13.25
Rotation (Left)	56.04	11.70
Dizziness Handicap Inventory	10.83	12.09

The age distribution was 4.16 years with a mean of about 39.29 years, indicates a relatively homogeneous but not entirely uniform age distribution. Similarly, the craniovertebral angle, with a mean of about 42.29 degrees and a standard deviation of 2.48 degrees, showcases the typical range of motion in the neck region. The flexion and extension angles, with means of approximately 37.92 degrees and 40.21 degrees respectively, along with their respective standard deviations, highlight the variability in forward and backward bending capabilities. Lateral flexion angles, both right and left, demonstrate asymmetries in the spine's lateral movement, with mean values of around 31.79 degrees and 34.33 degrees respectively. Moreover, the rotation to the right and left, with means of about 54.04 degrees and 56.04 degrees respectively, underscore the rotational flexibility of the spine. The Dizziness Handicap Inventory mean score of 10.83, with a standard deviation of 12.09, suggests a varying degree of dizziness-related impairments within the sample, indicated potential vestibular or balance issues among individuals.

Table no.5 Co-relation between forward head posture and dependent head posture dizziness syndrome

Dependent Head Posture Dizziness Syndrome	Forward Head Posture Noted	Forward Head Posture Not Noted	Total	P Value
Yes	2	1	3	0.58
No	25	33	58	
Total	27	34	61	

Among the 27 individuals with forward head posture, only 3 of them reported symptoms of dependent head posture dizziness syndrome. Statistical analysis, with a p-value of 0.68, indicated that there is no significant co-relation between forward head posture and dependent head posture dizziness syndrome within this same.

DISCUSSION

In the above study there was no statistically significant co-relation between FHP and DHPDS within the sample population. The findings challenge previous assumptions and some literature suggesting a potential link between forward head posture and dependent head posture dizziness syndrome, indicating that individuals with FHP are not necessarily more predisposed to experiencing DHPDS and vice versa.

In one study titled 'Relationship among asymptomatic computer workers between Flexion-Relaxation Ratio and Active Cervical Range of motion, usage exceeding 6 hours per day, and the development of musculoskeletal symptoms among asymptomatic computer workers. Specifically, they noted that individuals who spent more than 6 hours daily on computers were more likely to experience symptoms such as limited range of motion, highlighting the potential adverse effects of prolonged computer use on cervical health.[10] Also, regular exercise habits among some participants may have contributed to the lack of observed co-relation between forward head posture and dependent head posture dizziness syndrome, as individuals engaging in physical activity may exhibit different postural habits and musculoskeletal adaptations compared to sedentary individuals.

Its plausible that the beneficial effects of exercise on muscle strength, flexibility, and proprioception may mitigate the development or severity of DHPDS symptoms, regardless

of the presence of FHP, thus influencing the observed co-relation between the two variables. They may also exhibit different patterns of muscle activation, posture control, and proprioceptive feedback, which could potentially influence the manifestation and perception of symptoms associated with DHPDS, independent of their forward head posture status.

While the study did not directly assess the influence of specific type of exercise or exercise-related parameters on DHPDS symptoms, future research can explore whether certain forms of physical activity such as resistance training or balance exercises may have differential effects on postural alignment and vestibular function in individuals with FHP.

Also, people from upper socioeconomic origins frequently have easier access to healthcare services, such as specialized care and preventive interventions, which may mitigate the development or severity of DHPDS symptoms, irrespective of FHP. Therefore, the observed lack of significant co-relation between FHP and DHPDS in the study may be attributed to the advantageous healthcare access and management strategies associated with good socioeconomic status.

As a result, in above study individuals with good socioeconomic status may exhibit reduced susceptibility to DHPDS symptoms, irrespective of their FHP status, supporting the null hypothesis in our study. The findings revealed interesting insights into the relationship between the two phenomena. While both FHP and DHPDS are known to be associated with various musculoskeletal and vestibular issues, the study found no statistically significant co-relation between the two. This suggests that individuals with FHP are not necessarily more likely to experience DHPDS, and vice versa.

CONCLUSION

Based on the above data, forward head posture and dependent head posture dizziness syndrome don't seem to be significantly co-related.

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