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ORIGINAL ARTICLE

STUDY ON PREVALENCE OF FORWARD HEAD POSTURE AMONG YOUNG INDIVIDUALS WEARING EYE GLASSES

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ABSTRACT

Background: Wearing eyeglasses have a greater influence on adapting to abnormal head and neck posture. As our sensory system is created so efficiently where any obstruction to the visual field will be compensated by body posture. Using an eyeglass provide a smaller visual field leading to a chronic postural adjustment of the neck causing deep neck flexor weakness and eventually adapting to forward head posture. Aim of the study was to spot the prevalence of forward head posture on people wearing eyeglasses. **Methodology:** The study was conducted among 106 eyeglass wearing populations of age groups 19-38. The subjects were assessed subjectively by giving a self-designed questionnaire and objectively the Craniovertebral angle was measured using the photographic method at KG College of physiotherapy outpatient department, Coimbatore. **Result:** The study found that 75% of the population was affected by forward head posture and there is a moderate correlation (r value= 0.64) of hours of wearing eyeglasses and craniovertebral angle. **Conclusion:** Supported the result obtained, it is found that there is a high prevalence of forward head posture in people wearing eyeglasses and it depends on the duration of wearing eyeglasses. Thus, the finding of this study revealed that it is important to comprehend that wearing eyeglasses harms head and neck posture and also the importance of assessing visual devices when patient complaints of neck pain and disability.

Keyword: Forward head posture; Eyeglasses; Craniovertebral angle.

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INTRODUCTION

Proper posture is the state of absolute balance with a negligible amount of stress and strain. Although it is desirable people are unsuccessful in achieving it¹. This is probably due to muscle elongation or shortening which leads to inefficiency of movement, disability and pain².

Forward head posture (FHP) is one of the increasingly prevalent postural deviations. It is the main potential risk factor for various musculoskeletal and neurological problems even when there is no pain or disability at the present. The prolonged placement of the head anterior to the body's centre of gravity is one of the main etiologies for forward head posture³. Forward head posture is generated due to shortness of the cervical extensors and pectoralis muscles and weakness in the deep cervical flexor muscles and mid-thoracic scapular retractors⁴. One of the common methods to assess head posture is by measuring craniovertebral angle (CVA)⁵.

In most of the low and middle-income countries eyeglasses are still widely used, even after the arrival of latest treatment because it is effective, safe and economically feasible¹. Lately, it had been found that wearing an eyeglass alters viewing distance and gaze angle which influences the body posture resulting in future risk factors⁶. An activity that requires eyeglasses like reading will be done efficiently, only by adapting to small compensatory postures. This is done for making the line of vision perfectly aligned to the focusing object⁷.

Deep neck flexors (DNF) muscles of the neck play a crucial role in maintaining a stable position of head over cervical spine⁸. Most of the time the biomechanical movement of the joint is interrupted by prolonged exposure to

load on craniovertebral extensor muscles and the surrounding non-contractile structure and this increased stress can cause postural changes and eventually edge onto musculoskeletal damage or pain⁹.

Previously, there were many studies done to find out the risk factor of forward head posture like long time usage of smart phones or long time desktops working with poor posture. However, in India only few studies have been aimed to find out the relation between the usage of eyeglasses and posture. Hence this study is to find out the proportion at which a very simple and unavoidable material employed in day to day life is affecting one's body posture which leads to greater expenditure of money and time for the rehabilitation purpose.

Objective of the study: The objective of the study is to identify the prevalence of forward head posture on the person wearing eyeglasses and to find the correlation of craniovertebral angle with hours of wearing eyeglasses.

METHODOLOGY

This is a cross-sectional study design conducted by accessing subjects from the KGISL campus for duration of 3 months. The sampling method for this study is random sampling. The sample size was calculated by using an app named epi info statistical calculator and 106 participants fulfilling inclusion criteria were included.

Inclusion criteria: Voluntary participants of the age group of 19-38 years who use any form of eyeglasses for more than 2 years¹⁰.

Exclusion criteria: Any history of prevailing neck pain or congenital abnormality of neck and participant who do regular exercise are excluded. Participants who are not regular

users of eyeglasses or who have language or cognitive deficits were also excluded³.

Outcome measure: The outcome measure used here is a self-designed questionnaire for collecting demographic data and the photographic method for accessing craniovertebral angle.

Procedure: The participants were asked to assemble at the physiotherapy outpatient department at the KGISL campus and the following procedure was done. All the subjects were informed about the procedure and written consent were obtained before taking photographs for accessing CVA.

A self-designed questionnaire was created, the first part of which focused on demographic details and details about the work, the second part included questions of social factors and the third part included details about wearing eyeglasses.

This Questionnaire was validated by 3 senior physiotherapists who are involved in occupational health research. The questionnaire was distributed to every individual participant, the questionnaire was explained and participants were given two days to complete the same.



Figure 1. Photographic method

This method is used to assess forward head posture by finding the craniovertebral angle which is normally 49.9 degrees. Photographic method is used in this study to find CVA, which has a reliability of > 0.972 . It is also cost-effective, gives accurate angle measurement and has fewer errors.

First, adhesive markers were placed on the tragus of the ear, and the 7th cervical spinous process. A mobile (iPhone of 12 megapixels) was placed at a distance of 100 cm on a tripod stand. Participants were made to stand in such a way their side faces the camera and were asked to focus on an object in front of them. The subjects were asked to do the neck movements a few times before achieving the

standing neck resting position and focusing on the target object. The necessity of maintaining a natural position before the photography was explained to the participants. Then, three sagittal plane photos were taken by the camera. Repeated photographs aimed at reducing bias due to participant's tension during photography capturing as well as to overcome the difference between measurements because of postural swaying.

The photos are then transferred to an application; angle measure and then the C7 spinous process was marked as the vertex of the angle. Two lines were drawn one joining the C7 spinous process and tragus of the ear, another line passing horizontally through the C7 spinous process. The angle formed by these two lines was marked as CVA.

Appropriate information collected was entered in the data collecting sheet for purpose of statistical analysis. Once the procedure was over a 'thank you' note along with postural advice and an awareness pamphlet was given to everyone.

Statistical analysis: MS-excel were used to enter the data and find the result. Descriptive statistics, Pearson coefficient correlation and prevalence calculation was done and result obtained.

RESULT

By careful examination of 106 participants, descriptive statistics of participants were analyzed and expressed in the table given below.

| Demographic information | N=106 | % |
|---------------------------|-------|-----|
| AGE GROUP | | |
| 19-23 | 40 | 38% |
| 24-28 | 28 | 26% |
| 29-33 | 28 | 26% |
| 34-38 | 10 | 10% |
| GENDER | | |
| Male | 25 | 24% |
| Female | 81 | 76% |
| YEARS OF WEARING EYEGLASS | | |
| 0-10 | 66 | 63% |
| 11-20 | 40 | 37% |
| HOURS OF WEARING EYEGLASS | | |
| 8-10 | 23 | 22% |
| 11-13 | 58 | 55% |
| 14 and above | 25 | 23% |

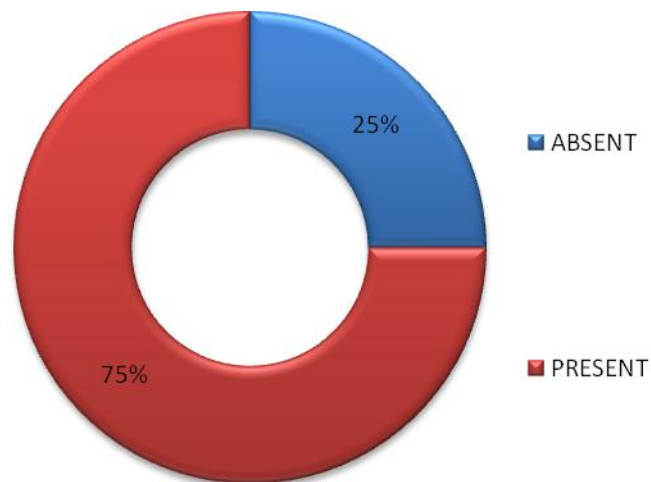
Table 1: demographic details of the subjects

Prevalence calculation of forward head posture is done, which shows that there is a greater prevalence of forward head posture in

participants wearing eyeglasses such that 70 people i.e, 75% of participants were affected with forward head posture.

| FORWARD HEAD POSTURE | (N=106) | % |
|----------------------|---------|-----|
| ABSENT | 27 | 25% |
| PRESENT | 70 | 75% |

Table 2: Prevalence of forward head posture



Graph 1: Prevalence of FHP

Correlation of hours of wearing eyeglasses with craniovertebral angle was calculated, the result reveals that there is a moderate positive correlation between them with r value is 0.64 which indicate that the longer the duration of

eyeglass usage worst the FHP is. This finding reveals that a widely used eye correction device will eventually become the cause of sustained pain in the future.

| CORRELATION VARIABLE | MEAN | STANDARD DEVIATION | R 'VALUE' |
|-----------------------------|------|--------------------|-----------|
| CVA VALUE | 45.2 | 0.33 | 0.64 |
| HOURS OF WEARING EYEGLASSES | 13.3 | 0.12 | |

Table 3: Correlation OF FHP with Hours of Wearing Glasses

DISCUSSION

The purpose of this study is to find the prevalence of forward head posture in people wearing eyeglasses. In this study 106 regular eyeglass users were selected, they were accessed to find the development of forward head posture.

Risk factor identification is an important factor while accessing a person with neck pain or any other postural deviation¹¹. Forward head posture has been linked with neck pain and dysfunction, cervicogenic headache, carpal tunnel syndrome and even an increased falling risk in the elderly¹².

Vision problem is a global health concern, especially in children and adolescents¹³. As depicted by the Vision Council of America, some sort of vision correction is used by 75% of adults. In which 64% prefer eyeglasses, whereas only 11% prefer contact lenses, with or without frequent use of eyeglasses. Sustained activation of muscle causes calcium ion accumulation which leads to impaired blood flow (Cinderella hypothesis) and again there will be reperfusion of these muscles finally adapting permanent faulty posture. Using eyewear for a prolonged duration can

lead to muscle damage due to sustained low-intensity muscle activity for a prolonged time. Studies have shown that postural adaptation has been caused while viewing a visual target as a result of interaction between the visual and musculoskeletal systems¹⁴.

Larry Sachs et al, found that on an average population there is a significant increase in the degree of forward head posture in the multifocal lens users than non-multifocal lens users and this gives important information for the physiotherapist who treats patient complaining pain over the neck-shoulder region. He also stated in his study that if a patient is having forward head posture and who is a multifocal lens user, then the lens usage is a greater contributing factor to the change in head posture¹⁴

A recent study conducted in India claims that DNF endurance was less in subjects wearing bifocal eyeglasses followed by unifocal and no eye glasses, which leads to a greater risk of getting forward head posture especially in people wearing a bifocal lens³.

These changes in posture may lead to a greater risk of musculoskeletal disorder and headache¹⁵. Early identification of risk factors

leading to permanent postural changes is helpful to take necessary preventive measures.

Even though an eyeglass has risk factors it is unavoidable. Thus, exercise is the only remedy for potential postural deviations. Regular neck exercise is advisable for a person using eyeglass and more studies must be done for the same. Regular postural assessment must be indicated for a regular eyeglass user and rehabilitation to prevent future postural deviation must be started as earlier as possible.

Ethical Concern: This study had no risk factor involved; the study was approved by Institutional ethical committee K G College of physiotherapy, Coimbatore.

Conflicts on Study: The author declares there is no competing interest in publishing this article.

Fund of Study: This is a self-funded study.

Acknowledgement: I thank all the participants for spending their valuable time to answering the questionnaire given and for letting me take the photographs without hesitation.

CONCLUSION

Based on the result obtained, it is found that there is a high prevalence of forward head posture in people wearing eyeglasses. Thus, the finding of this study revealed that it is important to realize wearing eyeglasses has an adverse effect on head and neck posture. This implicates the need for postural correction and regular head and neck exercise in daily life, especially for those people who wear eyeglasses every day.

While assessing any musculoskeletal problems in the neck, checking the details of the optic

devices will be helpful to find out the etiologies and assists to derive a proper diagnosis. This small check could be a big move towards reducing the future financial and psychological burden on patient. It can also be a very less invasive public health solution for postural changes on the neck.

This study has put forward the need for further studies searching optometric parameters causing neck disability and to research on the treatment for the same. Further, this study can be done using radiological examination and finding the effect of using each eyeglass like unifocal, multifocal and progressive types on the neck along with the treatment protocol.

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