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Review article

Digital eye strain: prevention is the logical option

Kamlesh Menaria, Yogeshwar Puri Goswami, Sandeep Kumar N, Menka Mishra

Geetanjali College of Nursing, Udaipur, Rajasthan, India.

Abstract

The constant usage of digital screens we are exposing ourselves to harmful wavelengths of light emitted by screens during continuous working and especially when in dark room. The research always explains the those who are using digital screens with the hours upon hours of close focusing for an extended period of time (without having a break) are at the high risk of digital eye strain. The concept of digital eye strain also defines as computer vision syndrome (CVS) is caused when the individual spends a significant amount of time in staring at digital screens of a desktop computer, laptop, tablets and mobile phones. Globally, personal computers were one of the commonest office tools. Almost all institutions, colleges, and homes today were using a computer regularly. However, their usage, even for 3 h/day, led to a health risk of developing computer vision syndrome (CVS), low back pain, and tension headaches. The digital eye strain may cause the various mind to moderate problems and the solutions are bit complicated. The present review focus on the possible way to prevent the digital eye strain in the common life of individual using digital instruments, which includes an eye exam, use proper lighting, minimize glare, upgrade your display.

Key words: Eye strain, digital screens, computer vision syndrome.

***Corresponding author: Mr. Kamlesh Menaria**, Geetanjali College of Nursing, Udaipur, Rajasthan, India. Email Id: kamleshmenaria59@gmail.com

1. Introduction

A new culture has been born- free, rapid and universal, where people share their knowledge and expertise. The computer has spread its wings within the nursing profession also and nurses are no longer passive users of computer technology but are now becoming the innovators, developers, and implementers of computer systems. [1]
Computers and mobile computing devices are being used by an increasingly larger number of people today. In India, the computer-using population is more than 40 million, and 80% have discomfort due to CVS. [2] This has led to an increase in the number of patients complaining about ocular and non-ocular symptoms related to computer use. Eye Fatigue + Tired Eyes 64.95%, Eye Strain 48.83%, Headaches 45.68% Neck / Shoulder Pain 44.0%, Irritation Of Eyes 37.5%, Itching / Burning Of Eyes 34.38%, Back Pain 34.38%, Blurry vision 30.48%, General Fatigue 25.58%, Tension 25.16%, Arm / Wrist / Shoulder Pain 25.0% reported by the visual display unit users was termed “Computer Vision Syndrome” (CVS). [9]

2. Definition

Computer Vision Syndrome also referred to as Digital eye strain, a condition linked to prolonged computer monitor use. It is a repetitive strain disorder characterized persons viewing computer screens tend to blink less and open their eyes more widely, resulting in eyestrain, dryness, eye fatigue, burning sensations, irritation, redness, blurred vision, difficulty in focusing, headache, neck and shoulder pain when associated with operating a computer and looking at a computer monitor in a temporal association. [3][Figure No: 1]

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Figure No: 1

3. Etiology

There are several contributory factors for Computer Vision Syndrome to develop:
•Uncorrected spectacle power,
•Inappropriate glasses for computer use,
•Difficulty in eye coordination at near work,
•The strain on the muscles of the eye due to work style
•Decreased blink rate to 05-09 times per minutes,
While working on the computer. (Normally 20-24 times/min. relaxing time)
•Glare and reflections from the monitor and inappropriate pixel density on the screen. (Increased pixel density helpful for reading)
•Poor workstation setup or improper use of a workstation,
Reduce eye refresh rate. (Normally 60-75Hz). [3] [Figure No: 2, 3]

Figure No: 2

Figure No: 3

4. Problems associated with computer vision syndrome [7]

Symptom category	Problems
Asthenopic	Eyestrain Tired eyes Sore eyes
Ocular surface related	Dry eyes Watery eyes Irritated eyes Contact lens problems
Visual	Blurred vision The slowness of focus changes Double vision Presbyopia
Extraocular	Neck pain Back pain Shoulder pain

The table shows the problems associated with computer vision syndrome

5. Prevention

5.1 Get a comprehensive eye exam: A routine comprehensive eye exam once in a year, schedule a visit with an eye doctor near you. Computer users should have an eye exam before they start working on a computer and once a year thereafter [5]. [Figure No: 4]

Figure No: 4

5.2 Use proper lighting: Eye strain often is caused by excessively bright light either from outdoor sunlight coming in through a window or from harsh interior lighting. When you use a computer; your ambient lighting should be about half as bright as that typically found in most offices. Eliminate exterior light by closing drapes, shades or blinds. Reduce interior lighting by using fewer light bulbs or fluorescent tubes, or use lower intensity bulbs and tubes. [5] [Figure No: 5]

Figure No: 5

5.3 Minimize glare: Consider installing an anti-glare screen on your monitor. And, if possible, paint bright white walls a darker color with a matte finish. Cover the windows. When outside light cannot be reduced, consider using a computer hood. if you wear glasses, purchase lenses with anti-reflective (AR) coating. AR coating reduces glare by minimizing the amount of light

reflecting off the front and back surfaces of your eyeglass lenses. [5] [Figure No: 6]

Figure No: 6

5.4 Upgrade your display: LCD screens are easier on the eyes and usually have an anti-reflective surface. High refresh rate can eliminated flickering sensation on a computer screen. When choosing a new flat panel display, select a screen with the highest resolution possible. Choose a relatively large display. And monitor should place parallel to the windows for a desktop computer, select a display that has a diagonal screen size of at least 19 inches and entire viewing area of the computer screen should be 15-20 degree below eye level. [5] [Figure No: 7]

Figure No: 7

5.5 Adjust your computer display settings:

5.5.1 Brightness- Adjust the brightness of the display so it's approximately the same as the brightness of your surrounding workstation**.**

5.5.2 Text size and contrast- Black print on a white background is the best combination of comfort means dark letters on a light background.

5.5.3 Color temperature- Reducing the color temperature of your display lowers the amount of blue light emitted by a color display for better long-term viewing comfort. Text Size and Color on Your Digital Screen- it should be three times the smallest size that you can read from your normal viewing position. The best color combination for your eyes is black text on a white background, though other dark-on-light combinations also work well and eyes react very well to the printed character. [5] [Figure No: 8, 9, and 10]

Figure No: 8

Figure No: 9

Figure No: 10

5.6 Blink more often: Blinking moistens your eyes to prevent dryness and irritation. Every 20 minutes, blink 10 times by closing your eyes as if falling asleep (very slowly). This will help rewet your eyes. [8] [Figure No: 11]

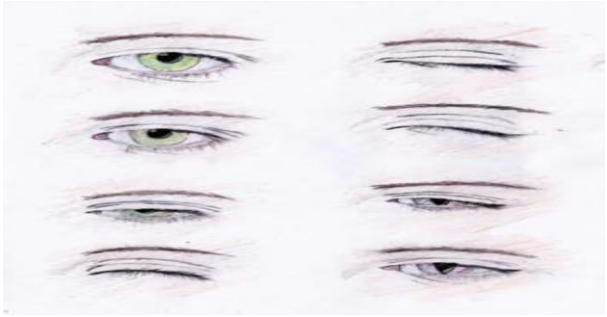

Figure No: 11

5.7 Exercise your eyes: Look away from your computer at least every 20 minutes and gaze at a distant object (at least 20 feet away) for at least 20 seconds. Some eye doctors call this the "20-20-20 rule." Looking far away relaxes the focusing muscle inside the eye to reduce fatigue. [8] [Figure No: 12]

Figure No: 12

5.8 Take frequent breaks: Take only 15-minute breaks after every two hours of continuous computer work. Discomfort and eye strain were significantly reduced when computer workers took breaks throughout their workday. [5] [Figure No: 13]

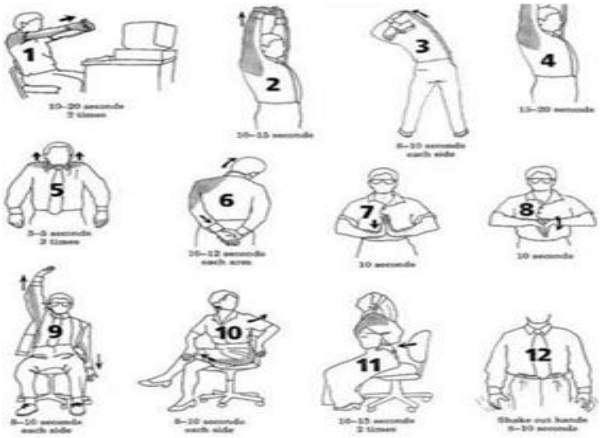

Figure No: 13

5.9 Modify your workstation: Improper posture during computer work also contributes to computer vision syndrome. Adjust your workstation and chair to the correct height and desktop should be placed above the height of workers elbow and it's better to use separate keyboard and mouse during working on a system for long hours. [5] [Figure No: 14]

Figure No: 14

5.10 Consider computer eyewear: Computer glasses also are a good choice if you wear bifocals (for farsightedness) or progressive lenses because these lenses generally are not optimal for the distance to your computer's screen. [5] [Figure No: 15]

Figure No: 15

Conclusion

Computers have now become basic and essential desktop equipment in almost every establishment. Excessive use of computers much of their workday indeed experience symptoms of general fatigue, eyestrain or irritation, and physical discomfort are known as computer vision syndrome also referred to as Digital Eye Strain**.** The best way to treat CVS is to identify the conditions that have contributed to the symptoms and address them.cvs can be prevented by above listed prevented measures.

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