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A DESCRIPTIVE STUDY TO ASSESS THE KNOWLEDGE AWARENESS AND ASSOCIATED RISK FACTORS OF COMPUTER VISION SYNDROME (CVS) AMONG THE NURSING STUDENTS AT SELECTED COLLEGE OF NURSING GURGAON

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ABSTRACT

The increasing reliance on digital devices in academic settings has led to a rise in Computer Vision Syndrome (CVS) among students, characterized by symptoms such as eye strain, headaches, and blurred vision. This study aimed to assess the knowledge, awareness, and risk factors associated with CVS among nursing students and to determine the association of these variables with selected demographic characteristics. A descriptive cross-sectional study was conducted among 52 B.Sc. Nursing students at a selected college in Gurgaon using a structured questionnaire. Data were analyzed using descriptive statistics and inferential tests, including chi-square and ANOVA. The results indicated that 36.5% of participants were aged 20 years, and 65.4% were female. A significant majority (80.8%) reported daily screen time exceeding two hours, with 40.4% exceeding six hours. Awareness of CVS was high (82.7%), and 88.5% correctly identified its symptoms. However, only 59.6% practiced preventive measures such as the 20-20-20 rule. Statistically significant associations were found between knowledge levels and variables like screen time ($p < 0.05$), posture ($p < 0.05$), and use of blue light filters ($p < 0.01$). The study concludes that while awareness of CVS is relatively high among nursing students, there is a need for targeted educational interventions to promote consistent preventive practices.

INTRODUCTION

Computer Vision Syndrome (CVS), also referred to as Digital Eye Strain, has become an increasingly prevalent condition in today's digital age. As the use of digital devices such as smartphones, tablets, and computers has risen exponentially, so has the occurrence of symptoms associated with prolonged screen time. These symptoms include eye strain, headaches, blurred vision, and dry eyes, all of which have been widely documented in scientific literature. Nursing students, in particular, are vulnerable to CVS due to the extensive use of digital devices for educational purposes, clinical research, and communication. Given the heavy reliance on technology in their training, it becomes crucial to assess their awareness, knowledge, and the risk factors contributing to the development of CVS. In educational settings, where nursing students spend significant hours using computers and other digital platforms, it is important to understand the level of awareness and practices adopted to minimize the risk of CVS. However, there is limited research focusing on the knowledge and awareness levels among nursing students in India, particularly in the context of their specific screen-related habits. This study seeks to fill this gap by evaluating the awareness and risk factors associated with CVS among nursing students at a selected college in Gurgaon, Haryana. The findings of this study could lead to better educational interventions, improving the students' understanding of CVS and encouraging healthier screen usage practices.

Background: Computer Vision Syndrome (CVS) is a multifactorial condition that results from prolonged exposure to digital screens. It affects individuals who spend extended periods of time in front of electronic devices, leading to visual discomfort. Common symptoms of CVS include dry eyes, headaches, blurred vision, eye strain, and neck or shoulder pain. Research indicates that individuals who engage in long hours of screen use without adequate preventive measures are at a higher risk of developing CVS. The prevalence of CVS has risen in tandem with the global increase in screen time. Studies have shown that the condition is common among students, especially those in higher education, where the use of digital devices is integral to academic success. Nursing students, like their counterparts in other fields, are at risk due to the nature of their coursework, which demands the use of computers, online research, virtual learning, and digital note-taking. These academic tasks, combined with long clinical hours, make nursing students susceptible to eye strain and other symptoms associated with CVS. In India, the growing reliance on technology in educational settings has raised concerns about the

health implications of excessive screen time. However, there is a limited understanding of the knowledge and awareness levels regarding CVS among Indian nursing students, as well as the risk factors contributing to the condition. Additionally, there is insufficient research on how these factors might correlate with demographic variables such as age, gender, year of study, and screen time. This study is crucial as it provides valuable insights into the understanding of CVS among nursing students at a selected college in Gurgaon, Haryana. By assessing the students' knowledge, awareness, and associated risk factors, the research aims to highlight potential gaps in education and practices. The results could be used to implement targeted educational interventions aimed at preventing and managing CVS, thereby promoting the overall health and well-being of nursing students. The study also explores how demographic variables may influence students' knowledge and practices related to CVS, providing a more nuanced understanding of this emerging health issue. By identifying the factors that contribute to CVS and assessing the level of awareness, this research can contribute to the development of preventive measures in nursing education, ensuring that students are better equipped to manage the risks associated with excessive screen time. It is hoped that the findings of this study will also inform future research in this field and encourage more proactive strategies to combat CVS within academic institutions.

Need of the Study: With the rapid advancement of digital technology and its integration into academic life, students—especially those in professional courses like nursing—are increasingly exposed to prolonged screen time. The transition to virtual learning platforms, online assessments, and electronic documentation has significantly increased the time nursing students spend on digital devices. This heightened screen exposure has led to a rise in complaints associated with Computer Vision Syndrome (CVS), a condition characterized by eye strain, blurred vision, headaches, dry eyes, and musculoskeletal discomfort resulting from extended digital screen use. According to the American Optometric Association, 50% to 90% of individuals who use computers for prolonged periods are affected by CVS, underlining the urgency of addressing this emerging public health concern. Nursing students, being future healthcare providers, must be aware of both the risks and preventive measures associated with CVS. However, despite high device usage, many remain unaware of proper ergonomic practices, such as the 20-20-20 rule, correct screen positioning, optimal lighting, and the use of blue light filters. The lack of knowledge and inconsistent behavioral practices among students may not only affect their health and academic performance but could also compromise their ability to educate patients about similar conditions in the future. Moreover, limited literature is available that explores the knowledge, awareness, and risk factors related to CVS among nursing students in the Indian context, particularly in semi-urban areas such as Gurgaon. Given the increasing prevalence of digital eye strain and the essential role nurses play in health education and promotion, it is imperative to assess these factors within this population. This study is therefore needed to evaluate the level of knowledge and awareness regarding CVS among nursing students, identify associated behavioral and environmental risk factors, and determine their correlation with selected demographic variables. The findings aim to support the development of targeted educational strategies and policy recommendations to promote digital eye health and prevent long-term complications among nursing students.

Research Problem: A descriptive study to assess the knowledge awareness and associated risk factors of Computer Vision Syndrome (CVS) among the Nursing students at selected college of Nursing Gurgaon.

Objectives

- To assess the level of knowledge, awareness and associated risk factors regarding Computer Vision Syndromeamong the Nursing students at selected college of nursing Gurgaon.
- To determine the association of knowledge, awarenessand risk factors regarding CVS with selected demographic

variableamong the Nursing students at selected college of nursing Gurgaon.

Assumptions

- It is assumed that all nursing students use digital devices (e.g., smartphones, laptops, tablets) regularly for academic or personal purposes, making them potentially susceptible to Computer Vision Syndrome.
- The study assumes that participants will provide truthful and accurate responses regarding their knowledge, awareness, behavioral practices, screen time, and experiences related to CVS.
- It is assumed that the knowledge and awareness of CVS can be assessed effectively through a structured questionnaire, and that this tool is capable of distinguishing between different levels of knowledge and awareness.

METHODOLOGY

Research Design

- A descriptive cross-sectional study was conducted to assess the knowledge, awareness, and associated risk factors of Computer Vision Syndrome (CVS) among nursing students at a selected college of nursing in Gurgaon.

Research Setting: Web based / internet research.

Study Population

- The study population consists ofnursing students enrolled in the UG and PG Nursing program at the selected college.

Inclusion Criteria

- Nursing students from the UG and PG Nursing program.
- Students who use digital devices regularly (for educational purposes or leisure).
- Students who are willing to participate in the study.

Exclusion Criteria

- Students with a diagnosed pre-existing eye condition (e.g., myopia, hypermetropia, or other vision-related disorders) or those using corrective eyewear or who have received treatment for CVS prior to the study.
- Students who do not provide informed consent.

Sample and sampling technique

- 52 sample size selected by non- probability purposive sampling technique

Data Collection Tool:

- A structured questionnaireis developed to collect data. The questionnaire include:

Section- A: Demographic Profile: Investigator constructed the tool to collect the sociodemographic data of the study subjects. It consisted of demographicvariables Age (in years), gender, year of study, screen time, family history of vision problems.

Section – B: Knowledge and Awareness Section: Questions related to the recognition of CVS symptoms, preventive measures, and general knowledge about CVS.

Section – C: Behavioral Practices: Questions about the use of digital devices, posture, breaks, screen brightness, and anti-glare measures.

Section – D: Risk Factors: Assessment of environmental factors like lighting conditions, screen time, and ergonomic practices.

Data Collection Procedure: Data collected through self-administered questionnaires were used to check knowledgeawareness, and associated risk factors of Computer Vision Syndrome (CVS) among nursing students.

Plan of Data Analysis:

- **Descriptive Statistics**: Frequency distributions, percentages, means, and standard deviations was calculated to describe the demographic characteristics, knowledge, awareness, and practices of the participants.
- **Inferential Statistics**:
  - **Chi-square test** or **ANOVA** (depending on the type of variables) were used to determine the association between knowledge, awareness, and risk factors with demographic variables.
  - **Logistic regression** applied if the study aims to identify predictive factors (such as the likelihood of practicing preventive measures based on knowledge level).

Ethical Considerations: The participants were assured of the confidentiality of the data.Informed consent was obtained, ensuring that participants understand the purpose of the study and their rights.

Hypotheses

1. *Null Hypothesis (H0)*: There is no significant association between nursing students' knowledge and awareness of Computer Vision Syndrome (CVS) and their demographic characteristics (age, gender, year of study, screen time, etc.).
2. **Alternative Hypothesis (H1)**: There is a significant association between nursing students' knowledge and awareness of Computer Vision Syndrome (CVS) and their demographic characteristics (age, gender, year of study, screen time, etc.).
3. **Null Hypothesis (H0)**: There is no significant relationship between the prevalence of CVS symptoms and risk factors such as screen time, posture, lighting conditions, and use of preventive measures among nursing students.
4. **Alternative Hypothesis (H1)**: There is a significant relationship between the prevalence of CVS symptoms and risk factors such as screen time, posture, lighting conditions, and use of preventive measures among nursing students.

Review of Literature

Computer Vision Syndrome (CVS) and Its Prevalence: Computer Vision Syndrome (CVS) has gained attention as a significant health issue in the digital age. Research indicates that CVS is a common condition among individuals who spend prolonged hours in front of digital screens. According to Sheppard and Wolffsohn (2018), prolonged screen time leads to visual discomfort and a range of symptoms, including dry eyes, headaches, blurred vision, and neck strain, collectively known as CVS. The prevalence of CVS has been increasing with the widespread use of digital devices in education, work, and daily life. Studies have shown that individuals working with computers for extended periods, such as students and professionals, are particularly susceptible to developing symptoms related to CVS (Chou *et al*., 2018).

Nursing Students and Their Vulnerability to CVS: Nursing students represent a unique demographic that may be at an increased risk for CVS due to their extensive use of computers, smartphones, and other digital devices in their academic and clinical work. A study by Kurniawan *et al*. (2019) found that nursing students, like other university students, are prone to developing CVS due to their dependence on digital tools for studying, taking notes, and researching medical literature. The same study highlighted that poor posture, long study hours, and insufficient knowledge about preventive measures significantly contribute to the prevalence of CVS among nursing students.

Knowledge and Awareness of CVS: A significant factor influencing the prevalence of CVS is the level of awareness and knowledge about the condition. Studies have found that while many individuals are aware of eye strain caused by prolonged screen use, few fully understand the specific risks and preventive practices that can reduce the occurrence of CVS. An investigation by Wu *et al*. (2017) revealed that although a large proportion of participants recognized the symptoms of CVS, many lacked awareness regarding effective preventive measures such as taking regular breaks, adjusting screen position, and maintaining proper lighting conditions. Similarly, a study by Jain *et al*. (2020) among university students showed that while a majority of students knew about CVS, only a small fraction practiced preventive measures consistently.

Risk Factors for CVS: Several risk factors contribute to the development of CVS, including screen time, posture, and lighting conditions. Excessive screen time is one of the primary contributors to CVS, with research by Chang *et al*. (2020) suggesting that individuals who spend more than two hours a day on digital devices are at an increased risk of developing the syndrome. Poor posture and incorrect ergonomics further exacerbate the risk. An observational study by Al-Shehri *et al*. (2021) found that nursing students, in particular, often use digital devices in non-ergonomic positions, such as slouching or lying in bed, which significantly contributes to the onset of CVS. Additionally, inadequate lighting and glare from screens are identified as important environmental factors that increase the risk of CVS (Rosenfield, 2016).

Preventive Practices for CVS: While awareness of CVS is growing, many students, including nursing students, do not adopt recommended preventive measures to mitigate the risks. Regular breaks, appropriate screen positioning, and proper lighting are essential for preventing CVS, but studies show that students often fail to implement these strategies. A study by Guo *et al*. (2020) found that while most university students were aware of the 20-20-20 rule (take a 20-second break every 20 minutes by looking at something 20 feet away), only a small percentage of them actually followed this recommendation consistently. Additionally, a study by Tarwadi *et al*. (2021) found that despite awareness, nursing students were less likely to engage in preventive behaviors such as adjusting screen brightness or using anti-glare filters. This highlights a significant gap between knowledge and behavior, emphasizing the need for targeted educational interventions.

Demographic Factors and Their Impact on CVS: Demographic factors such as age, gender, and year of study also play a role in the development of CVS. Younger individuals and students in the early stages of their education are often more susceptible to CVS, as they tend to spend longer hours on digital devices for academic purposes (Ming *et al*., 2019). Furthermore, gender differences have been observed, with female students reporting higher rates of CVS symptoms compared to male students, possibly due to different usage patterns and health-related perceptions (Sheppard & Wolffsohn, 2018). A study by Singh *et al*. (2021) also highlighted that nursing students in their second and third years are at a higher risk due to the increased academic pressure and exposure to digital platforms.

CONCLUSION

The literature on Computer Vision Syndrome indicates a growing concern, particularly among students who rely heavily on digital devices for academic and personal use. Although nursing students are at an increased risk due to the nature of their studies, there is a lack of consistent awareness and preventive measures to mitigate the

condition. Understanding the knowledge, awareness, and associated risk factors of CVS is essential to improve the health and well-being of nursing students. This review highlights the need for targeted interventions to bridge the gap between knowledge and behavior and to promote healthier digital habits within the nursing education system.

ANALYSIS AND INTERPRETATION

Objective: To assess the level of knowledge, awareness and associated risk factors regarding Computer Vision Syndrome among the Nursing students at selected college of nursing Gurgaon. Self-Administered Questionnaire for Assessing Knowledge, Awareness, and Associated Risk Factors Regarding Computer Vision Syndrome (CVS)

Sociodemographic Variables
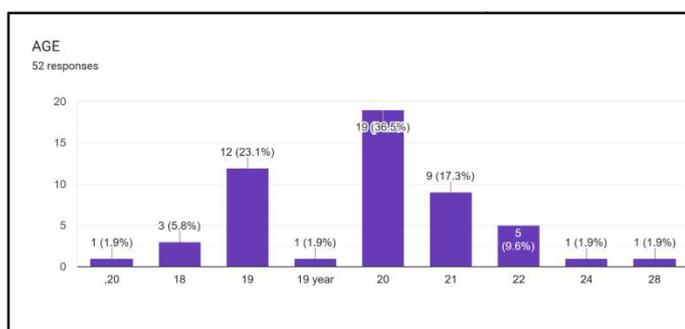
Age Distribution Table (N = 52)

| Age (Years)	Frequency	Percentage (%)
< 20	1	1.9%
18	3	5.8%
19	13	25.0%
20	19	36.5%
21	9	17.3%
22	5	9.6%
24	1	1.9%
28	1	1.9%

Age Group Distribution Overview

- The distribution of participants across the various age groups shows a concentration in the younger age ranges, especially between 18 and 21 years. Specifically, the highest frequencies are observed in the 20 and 19-year-old groups, which constitute 36.5% and 25%, respectively. This suggests that the sample is primarily composed of younger individuals, potentially young adults still engaged in academic or early career pursuits.

Interpretation of Specific Age Groups

- **<20 Years** (1.9%): This represents the youngest cohort in the sample. Given that only one participant falls into this group, it suggests that individuals under the age of 20 are minimally represented in the study. This could be due to the age restrictions of the population being studied, or this group might not be highly involved in the research area.
- **18 Years** (5.8%): The presence of 3 participants in this age group still reflects a very small but noticeable portion. It could be students who just graduated high school or entered college. This group may have specific stressors, like adjusting to the new demands of college or work.
- **19 Years** (25.0%): A sizable portion of the participants are in this group. Nineteen-year-olds often find themselves in the middle of transitioning from high school to more serious academic pursuits or early work experiences. Given the nature of virtual schooling during the pandemic, this age group may

have experienced stress from balancing academic and personal challenges.
- **20 Years** (36.5%): This group constitutes the largest portion of the sample, which is expected since the age of 20 typically represents students either in their second year of college or entering more advanced stages of their educational journey. They might also be in a stage of more independence, and possibly facing greater stress due to the pressure of academic success.
- **21 Years** (17.3%): While slightly smaller in frequency than 20-year-olds, 21-year-olds are likely nearing the end of their undergraduate studies or have recently graduated. They may face unique stressors like preparing for the job market, which may be amplified by the pandemic's impact on in-person opportunities.
- **22 Years** (9.6%): The representation of 22-year-olds is still significant but not as pronounced. This group may be nearing the end of their education or starting to transition into full-time employment. Stress could stem from the uncertainties associated with these transitions, particularly given the pandemic's effects on job markets.
- **24 Years** (1.9%) and **28 Years** (1.9%): These age groups represent the smallest percentages in the sample. These individuals are likely older students who may be in advanced degrees or career stages. The low frequency of these age groups suggests they may not be the focus of the study or the sample was specifically targeting younger individuals.
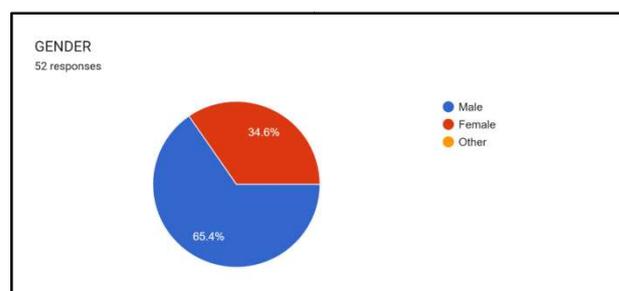

- The study sample consists of more female participants (65.4%) than male (34.6%), which is typical in nursing education, as nursing remains a female-dominated profession in many regions.
- This gender distribution may reflect the actual enrolment pattern in the selected college.
- When interpreting the study's findings, especially in relation to CVS awareness or behavior, it's important to consider gender-related differences in screen time, health-seeking behavior, or sensitivity to symptoms.
- However, since both genders are represented in meaningful proportions, comparative analysis based on gender can be explored.

Out of the total 52 nursing students who participated in the study, 34 (65.4%) were female and 18 (34.6%) were male. This gender distribution reflects the commonly observed trend in the nursing profession, where female students typically represent a larger proportion of the enrolment. The predominance of female participants in the sample aligns with the demographic profile of nursing colleges in India and similar contexts. This distribution ensures that both genders are adequately represented, allowing for gender-based analysis of awareness, knowledge, and risk factors associated with Computer Vision Syndrome (CVS). However, the greater proportion of female students may slightly influence the generalizability of gender-specific findings and should be considered when interpreting the results. The majority of participants in the study were enrolled in the 2nd year of B.Sc Nursing (48 out of 52; 92.3%), while the remaining four participants (7.7%) were distributed across other academic levels, including one student each from 3rd year B.Sc Nursing, 4th year B.Sc Nursing, 2nd year Post Basic B.Sc Nursing, and M.Sc Nursing programs.
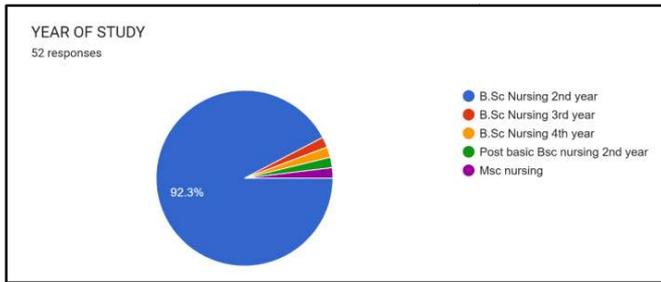
This indicates a highly homogenous sample in terms of academic standing, with the data predominantly reflecting the perspectives and experiences of undergraduate students in their second year. While this supports a focused analysis of CVS awareness within this specific academic cohort, it also suggests a limitation in capturing the variability that may exist across different years of nursing education. Hence, the findings should be interpreted primarily in the context of early- to mid-stage undergraduate nursing students.
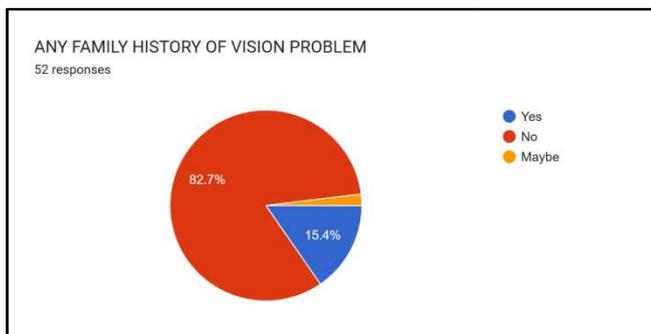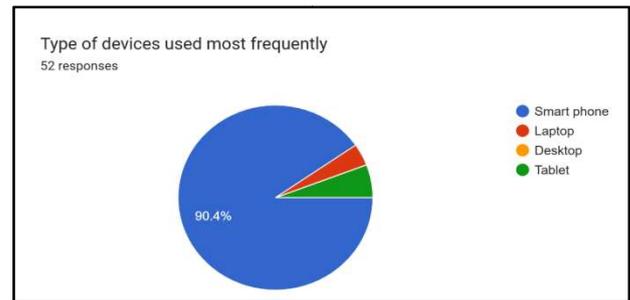

Among the 52 nursing students surveyed, 43 students (82.7%) reported no family history of vision problems, while 8 students (15.4%) indicated a positive family history. One respondent (1.9%) selected "may be", indicating uncertainty about their family's ocular health history. The predominance of participants without a known familial predisposition suggests that genetic or hereditary risk factors may not be a major confounder in this study. However, the 15.4% of students with a positive family history represent a subgroup potentially at increased risk of developing vision-related issues, including Computer Vision Syndrome (CVS), especially when compounded by high screen exposure. This variable may warrant further exploration in analytical studies to evaluate its role in the onset or severity of CVS symptoms.
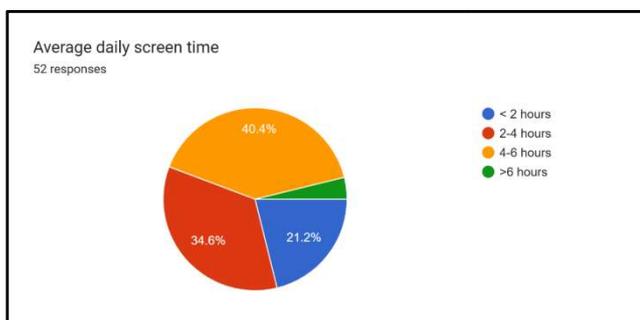

The participants reported varying levels of daily screen time exposure. A total of 11 students (21.2%) reported using digital devices for less than 2 hours per day, while 18 students (34.6%) reported 2–4 hours of screen time. Notably, a substantial number of students—21 students (40.4%)—reported spending 4–6 hours on screens daily, and another 21 students (40.4%) indicated spending more than 6 hours per day on digital devices. These findings indicate that a significant proportion (80.8%) of the nursing students spend more than 2 hours daily on screens, with 40.4% exceeding 6 hours, placing them at a higher risk for developing symptoms associated with Computer Vision Syndrome (CVS). The high level of screen exposure among this population underscores the importance of

assessing awareness, preventive practices, and behavioral interventions related to eye health and digital screen hygiene. These findings align with global trends of increased screen time among students due to academic demands and digital learning platforms


Among the 52 nursing students surveyed, the majority—47 students (90.4%)—reported using smartphones as their most frequently used digital device. Tablets were used most frequently by 3 students (5.8%), followed by laptops with 2 users (3.8%). No participants reported primarily using a desktop computer. The overwhelming preference for smartphones reflects current digital trends among students, where portability and constant connectivity drive frequent usage. The dominance of smartphones is particularly relevant to the risk of Computer Vision Syndrome (CVS), as prolonged use of small screens at short viewing distances is known to increase the risk of visual discomfort, eye strain, and musculoskeletal issues. These findings suggest the need for targeted preventive education focused on safe smartphone usage habits, including frequent breaks, screen brightness adjustment, text size optimization, and posture correction, to reduce the risk of CVS among nursing students.

Section B; Knowledge Assessment
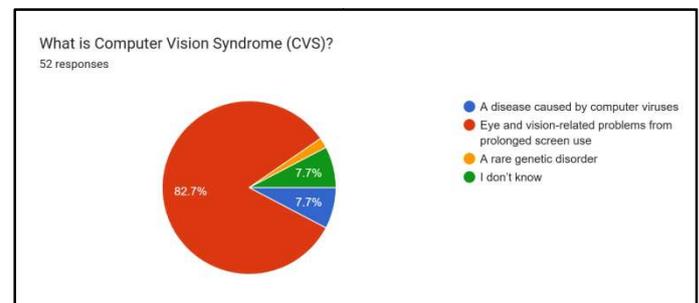
The majority of participants—43 students (82.7%)—correctly identified CVS as a condition caused by eye and vision-related problems from prolonged screen use. A smaller number of students—1 student (1.9%)—incorrectly referred to CVS as a rare genetic disorder, and 4 students (7.7%) were unsure, responding with "I don't know". The high level of awareness among most participants (82.7%) is promising and suggests that many nursing students are familiar with the connection between screen time and eye strain. However, the presence of some misconceptions (such as the rare genetic disorder) and the uncertainty expressed by a few students underscore the need for further educational interventions to reinforce and clarify the nature of CVS. These findings highlight the importance of knowledge dissemination on CVS, particularly in health education programs where understanding the risks associated with technology use is essential for promoting preventive behaviors.
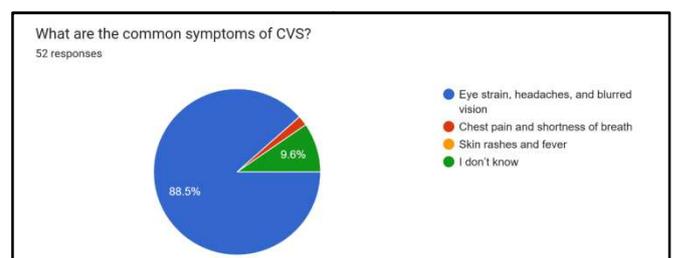
The majority of participants—46 students (88.5%)—correctly identified eye strain, headaches, and blurred vision as typical symptoms of CVS. 1 student (1.9%) mistakenly associated CVS symptoms with chest pain and shortness of breath, while 5 students (9.6%) were unsure and responded with "I don't know". The high level of accurate knowledge about the primary symptoms of CVS (88.5%) suggests that most students are familiar with the visual discomforts associated with prolonged screen use. However, the small number of students who misidentified CVS symptoms, as well as the uncertainty expressed by others, indicates a need for continued education on the specific signs of CVS to correct misconceptions and fill knowledge gaps. This finding emphasizes the importance of enhancing awareness of CVS symptoms in nursing education, where students should be well-informed not only about the symptoms but also about the preventive measures they can adopt to mitigate their risk of developing CVS.
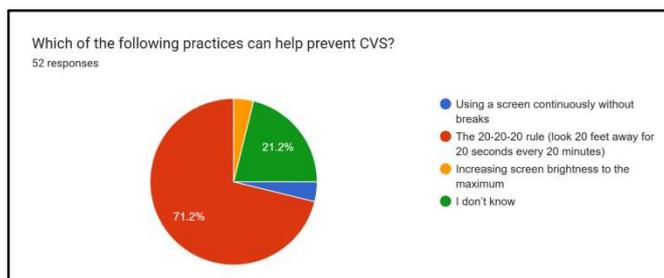

The most commonly identified practice was the 20-20-20 rule (looking 20 feet away for 20 seconds every 20 minutes), with 37 students (71.2%) correctly recognizing it as an effective prevention strategy. Only 2 students (3.8%) selected using a screen continuously without breaks, which is an incorrect practice that can exacerbate CVS symptoms. Another 2 students (3.8%) selected increasing screen brightness to the maximum, a practice that can potentially worsen eye strain rather than alleviate it. Additionally, 11 students (21.2%) were unsure and responded with "I don't know". The high level of awareness regarding the 20-20-20 rule suggests that a significant proportion of students are familiar with recommended practices to mitigate screen-related eye strain. However, the incorrect selection of practices such as continuous screen use and maximizing screen brightness, along with the uncertainty expressed by some students, highlights the need for continued education on proper screen habits and ergonomic practices. These findings emphasize the importance of promoting evidence-based preventive measures to reduce the risk of CVS among nursing students.
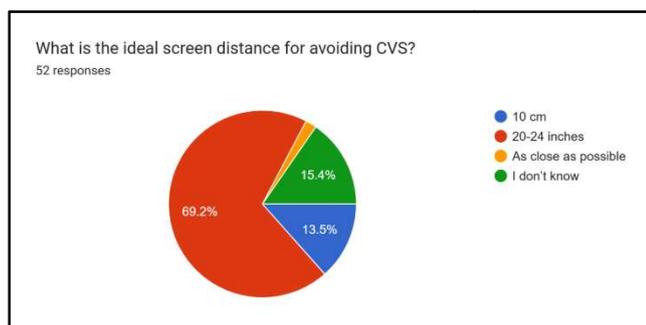

A majority of 36 students (69.2%) correctly responded that a screen should be positioned 20–24 inches from the eyes, which aligns with ergonomic guidelines recommended by eye care professionals. However, 7 students (13.5%) believed the ideal distance to be 10 cm, and 1 student (1.9%) incorrectly selected "as close as possible", both of which reflect harmful practices that can contribute to eye strain. Additionally, 8 students (15.4%) responded with "I don't know," indicating a lack of knowledge on this basic ergonomic principle. The results suggest that while a majority of students have a sound understanding of appropriate screen distance, a significant portion (nearly 31%) either hold misconceptions or lack awareness entirely. This knowledge gap is concerning, given that screen distance plays a

critical role in reducing visual stress, particularly among students with extended screen exposure. The findings highlight the need for targeted educational interventions that address proper screen ergonomics, including screen distance, posture, and ambient lighting, to enhance awareness and promote healthier screen habits among nursing students. Incorporating such content into academic curricula and digital wellness campaigns could be instrumental in reducing the risk of CVS in this high-exposure population.
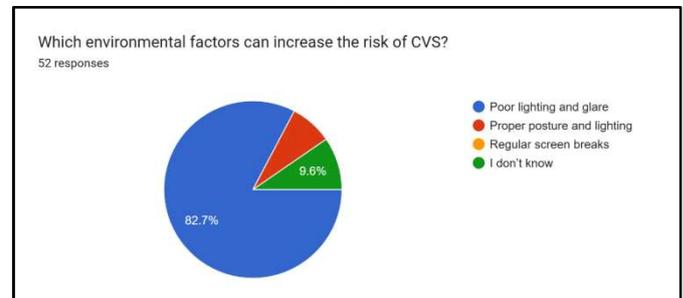

Regarding environmental factors that can increase the risk of Computer Vision Syndrome (CVS), a significant number of participants—43 students (82.7%)—correctly identified poor lighting and glare as factors that exacerbate CVS symptoms. Only 4 students (7.7%) identified proper posture and lighting as a factor, which, although beneficial for preventing CVS, does not increase the risk. Notably, 5 students (9.6%) were unsure and responded with "I don't know". The predominant awareness of poor lighting and glare as a risk factor aligns with current research, which highlights that inadequate lighting and excessive glare contribute significantly to eye strain and visual discomfort. However, the lack of awareness about the importance of regular screen breaks and proper posture (as protective factors) suggests areas for improvement in educational efforts regarding ergonomic environments. The uncertainty expressed by some students further emphasizes the need for more comprehensive education on the role of environmental factors in preventing CVS.

Section C: Awareness Assessment
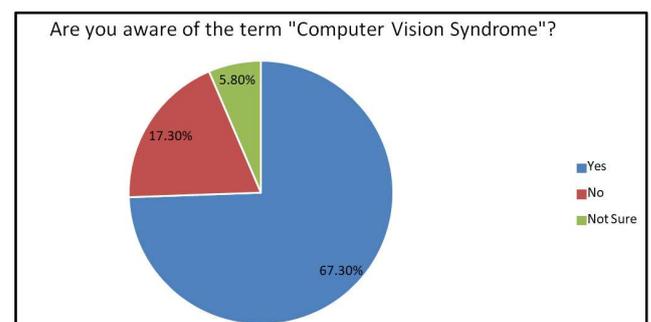
Majority of participants—35 students (67.3%)—indicated that they were aware of CVS. However, 9 students (17.3%) reported that they were not aware of the term, and 3 students (5.8%) were unsure. The relatively high level of awareness (67.3%) suggests that many nursing students are familiar with the concept of CVS and its association with prolonged screen use. This is promising for health education efforts, as awareness is a key first step in preventing and managing CVS. However, the 17.3% of students who were unaware, along with the 5.8% who were unsure, highlight gaps in knowledge that could be addressed through targeted educational interventions. These findings emphasize the importance of incorporating CVS-related education into nursing curricula to ensure all students have a solid understanding of the condition. The vast majority of participants—45 students (86.5%)—responded "Yes," indicating a strong awareness of the potential negative impact of extended screen exposure. In contrast, 5 students (9.6%) responded "No," and 2 students (3.8%) were unsure.

Do you believe prolonged screen time can affect eye health?
52 responses
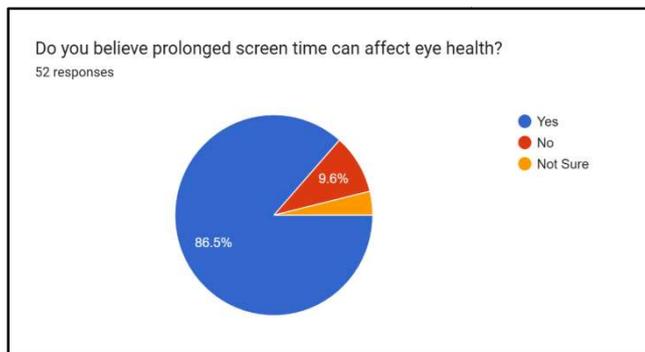
This high level of awareness among nursing students is encouraging, as it suggests that most participants recognize the connection between excessive screen use and visual health issues such as eye strain, blurred vision, and other symptoms associated with Computer Vision Syndrome (CVS). However, the responses from the remaining 15.4% (those who either denied or were uncertain about the risk) reveal the existence of knowledge gaps that warrant attention. Given the increasing reliance on digital devices for both academic and personal use, it is essential to reinforce understanding of screen-related eye health risks. These findings underscore the importance of integrating eye health education and digital hygiene practices into nursing curricula to equip future healthcare professionals with both personal wellness strategies and the ability to educate others effectively.

Have you experienced symptoms like dry eyes, headaches, or blurred vision after using digital devices?
52 responses
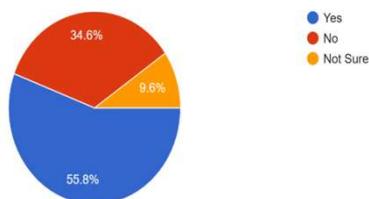
When participants were asked whether they had experienced symptoms such as dry eyes, headaches, or blurred vision after using digital devices, 29 students (55.8%) responded "Yes," indicating they had encountered symptoms consistent with Computer Vision Syndrome (CVS). Meanwhile, 18 students (34.6%) reported "No," and 5 students (9.6%) were unsure. These findings reveal that more than half of the surveyed nursing students have personally experienced discomfort linked to prolonged digital device use. This aligns with global trends, where increased screen time—particularly among students—has led to a rise in CVS-related complaints. The substantial number of students reporting no symptoms may reflect either genuinely healthy screen habits or a lack of awareness in identifying subtle or intermittent symptoms.

Do you follow any preventive practices to reduce screen-related eye strain?
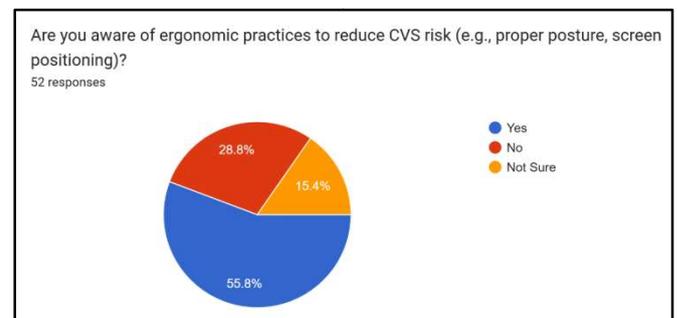52 responses
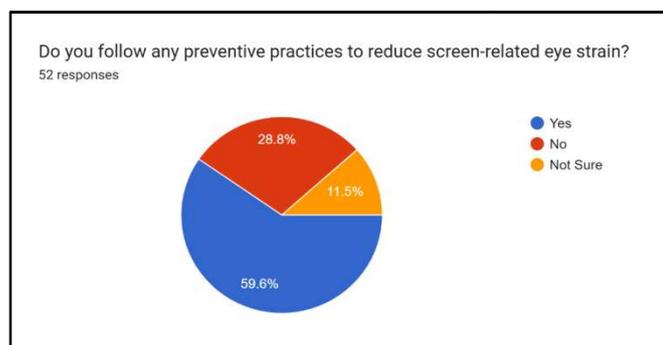
The 9.6% who were unsure further suggest that symptom recognition may not be consistent among all respondents. This result emphasizes the prevalence of CVS symptoms even among health science students and points to the need for routine screening, awareness programs, and

behavioral interventions focused on screen ergonomics and digital eye strain prevention. Educating students to recognize early symptoms can facilitate timely corrective action, thereby reducing long-term eye health complications. The pie chart illustrates the distribution of responses from 52 participants to the question: *"Do you follow any preventive practices to reduce screen-related eye strain?"* The responses were categorized into three groups: Yes, No, and Not Sure.

- Yes: 59.6% of respondents reported adopting preventive practices to reduce screen-related eye strain.
- No: 28.8% indicated they do not follow any such practices.
- Not Sure: 11.5% were uncertain about whether their behaviors qualify as preventive practices.

The data reveals that a majority (59.6%) of respondents are proactive in mitigating screen-related eye strain, which reflects a substantial level of awareness and health-conscious behavior—possibly driven by increased screen exposure during the COVID-19 pandemic and the rise of remote working and virtual learning.

However, nearly one-third (28.8%) do not engage in any preventive measures, highlighting a significant gap in the adoption of protective behaviors that could prevent digital eye strain or computer vision syndrome (CVS). Moreover, the 11.5% who were unsure may reflect a lack of understanding about effective preventive techniques, indicating a need for greater public health education. These findings suggest a dual need: first, to reinforce and support continued healthy screen habits among those already practicing them, and second, to design interventions and awareness programs targeting individuals who are unaware or uninformed. This is particularly critical in the context of prolonged digital device use, which has become a normalized aspect of modern education, professional work, and social interaction, especially during and after the pandemic period. Overall, the results emphasize the importance of integrating ocular health education into digital literacy initiatives and wellness programs to reduce the long-term risks associated with excessive screen time.

Are you aware of ergonomic practices to reduce CVS risk (e.g., proper posture, screen positioning)?
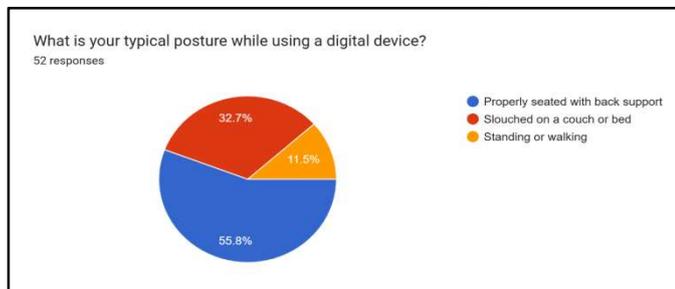52 responses

The chart illustrates the level of awareness among 52 respondents regarding ergonomic practices aimed at reducing the risk of Computer Vision Syndrome (CVS), such as maintaining proper posture and appropriate screen positioning. The data reveals that 55.8% of the participants reported being aware of such practices, indicating a moderate level of understanding about preventive strategies related to screen use. However, a significant portion of respondents—28.8%—admitted to having no awareness of ergonomic measures, while an additional 15.4% were unsure. This means that nearly 44.2% of the respondents either lack awareness or are uncertain, highlighting a critical gap in knowledge that may increase the risk of eye strain, musculoskeletal discomfort, and other health concerns associated with prolonged screen exposure. These findings underscore the importance of implementing awareness programs and educational interventions to inform the public about simple yet effective ergonomic techniques. Practices such as positioning screens at eye level, maintaining an upright posture, using chairs with lumbar support, and following the 20-20-20 rule (taking a 20-second break every 20 minutes to look at something 20 feet away) should be promoted through digital literacy campaigns, especially in the context of increased screen time due to remote work and online learning.

Enhancing awareness and encouraging the adoption of such practices can contribute to better ocular and musculoskeletal health, ultimately supporting the well-being and productivity of individuals in digital environments.

**Section D: Associated Risk Factors**
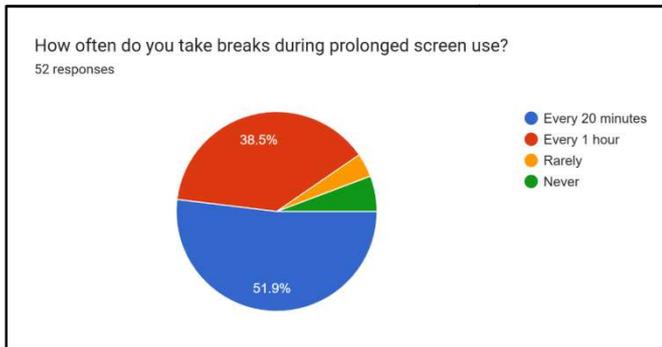
The pie chart illustrates the frequency with which individuals take breaks during prolonged screen use, based on responses from 52 participants. The majority (51.9%) reported taking breaks every 20 minutes, reflecting adherence to recommended practices such as the 20-20-20 rule, which is designed to mitigate the adverse effects of continuous screen exposure. A substantial proportion (38.5%) indicated taking breaks every hour, suggesting some level of awareness but potentially insufficient frequency to fully prevent digital eye strain and fatigue. Alarmingly, a smaller subset of respondents reported infrequent or no breaks, with 3.8% rarely stepping away from screens and 5.8% never taking breaks. These individuals may be at heightened risk for developing symptoms associated with Computer Vision Syndrome (CVS), such as blurred vision, headaches, dry eyes, and musculoskeletal discomfort. This data underscores the need for targeted awareness campaigns and health education initiatives to promote regular screen breaks a

The pie chart presents data on the typical posture adopted by individuals while using digital devices, based on responses from 52 participants. A majority (55.8%) reported using devices while properly seated with back support, which aligns with ergonomic recommendations aimed at minimizing the risk of musculoskeletal strain and long-term posture-related complications. However, a notable 32.7% of respondents indicated using digital devices while slouched on a couch or bed. This posture, though often perceived as comfortable, can contribute to back and neck pain, poor spinal alignment, and increased physical fatigue, especially during prolonged use. An additional 11.5% reported using devices while standing or walking, which, while dynamic, may not provide the stability or ergonomic support necessary for focused and sustained digital interaction. These findings highlight the importance of promoting ergonomic awareness, particularly among individuals who frequently engage in non-optimal postures. Encouraging proper seating arrangements, including the use of chairs with lumbar support and appropriately positioned screens, can play a crucial role in preventing discomfort and promoting long-term physical health in the context of increasing screen time.
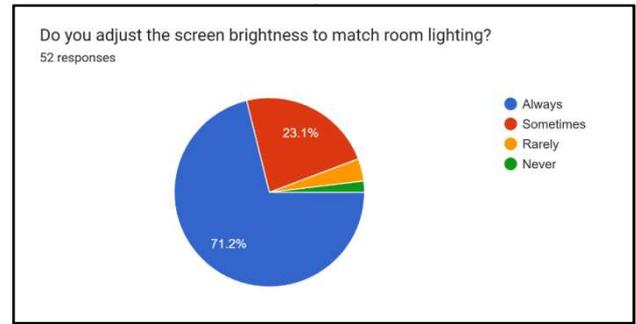

The pie chart illustrates responses from 52 participants regarding their habits of adjusting screen brightness to match ambient room lighting—a key factor in reducing eye strain and enhancing visual comfort. A significant majority (71.2%) reported that they "always" adjust their screen brightness according to the room lighting. This indicates a strong level of awareness and adherence to preventive visual ergonomics among the respondents, which is encouraging in the context of mitigating Computer Vision Syndrome (CVS). Meanwhile, 23.1% of respondents indicated that they "sometimes" adjust screen brightness, suggesting intermittent adherence that may still expose them to occasional visual discomfort, particularly during long hours of screen use or in poorly lit environments. A small percentage reported "rarely" (3.8%) or "never" (1.9%) adjusting screen brightness, reflecting a lack of awareness or negligence toward this simple yet effective preventive measure. Overall, the findings underscore the importance of reinforcing educational efforts on visual ergonomics. Encouraging consistent adjustment of screen brightness in accordance with ambient lighting conditions can significantly enhance visual health and reduce the prevalence of eye strain, especially among individuals with extended digital device use.
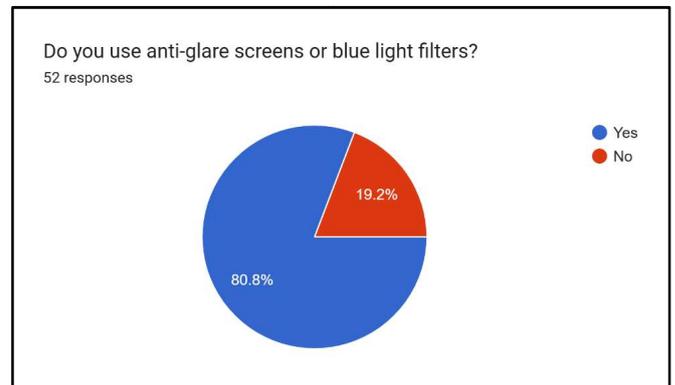

The pie chart displays responses from 52 participants regarding the use of anti-glare screens or blue light filters—protective measures that help reduce digital eye strain and mitigate the impact of prolonged screen exposure. An overwhelming majority of respondents (80.8%) reported using either anti-glare screens or blue light filters, suggesting a high level of awareness and proactive behavior toward preventing visual discomfort associated with digital device use. On the other hand, 19.2% of participants indicated that they do not utilize these visual aids. This minority may be at higher risk for symptoms associated with Computer Vision Syndrome (CVS), such as dry eyes, blurred vision, and headaches, particularly if their screen exposure is extended and unmitigated by other ergonomic practices. The high percentage of users adopting blue light filters or anti-glare measures is a positive indicator in terms of digital eye health awareness. However, there remains a need for targeted awareness campaigns or educational interventions to encourage the remaining group to adopt these preventive tools, thereby ensuring better visual health and productivity in increasingly screen-dominated environments. The chart illustrates the lighting conditions in the workspaces of 52 respondents, offering insight into a key environmental factor that can influence eye health and productivity. A majority of participants (57.7%) reported working in well-lit environments, which is generally ideal for minimizing eye strain and promoting visual comfort during

prolonged screen use. However, a considerable proportion of respondents work under less optimal lighting conditions. Specifically, 28.8% of participants reported working in environments that are bright but cause glare—a known contributor to visual discomfort, headaches, and reduced screen visibility. Additionally, 13.5% of respondents indicated that their workspace is dimly lit, a condition that may lead to increased eye strain as the eyes have to work harder to focus.
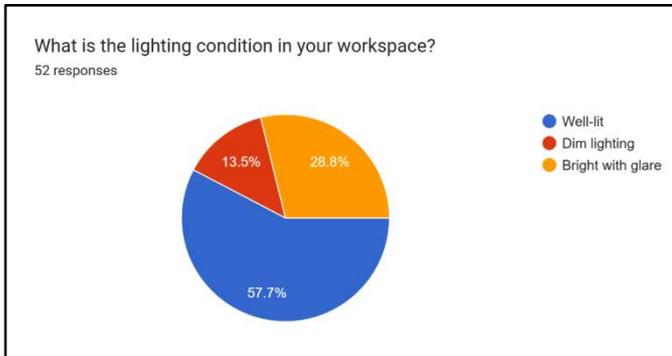
These findings underscore the importance of maintaining appropriate lighting conditions, including the avoidance of direct glare and insufficient light. The data suggests that while a majority are in favorable lighting conditions, nearly 42.3% are at potential risk for developing Computer Vision Syndrome (CVS) symptoms due to suboptimal workspace illumination. Efforts should be directed at raising awareness about the impact of lighting ergonomics and encouraging environmental adjustments to support visual health.
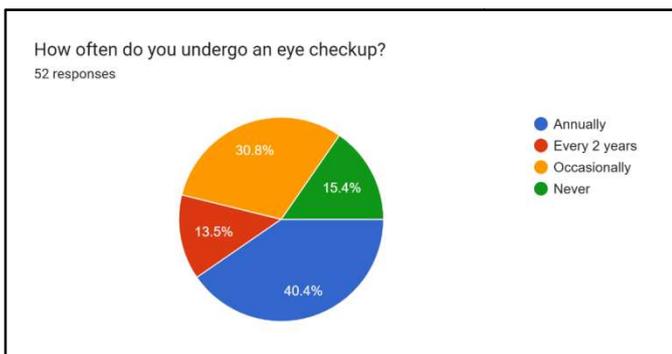
The pie chart illustrates the frequency with which the 52 respondents undergo eye checkups, an essential aspect of maintaining ocular health, especially in the context of increased digital device usage. According to the data, 40.4% of participants reported having annual eye checkups, which aligns with standard ophthalmological recommendations and reflects a commendable level of awareness regarding preventive eye care. However, 30.8% undergo eye examinations only occasionally, suggesting a reactive rather than proactive approach to eye health. Additionally, 13.5% reported seeking eye checkups once every two years, and a concerning 15.4% admitted to never undergoing an eye examination. This indicates that a significant proportion of the population may be at risk of undiagnosed vision issues, particularly given the rising prevalence of digital eye strain and Computer Vision Syndrome (CVS) linked to prolonged screen exposure. Overall, while it is encouraging that a majority prioritize regular eye health monitoring, the data highlight the need for greater awareness and advocacy around routine eye examinations. Promoting annual checkups can play a crucial role in early detection and management of vision problems, thereby contributing to better long-term ocular health in an increasingly screen-dependent society.

Objective: To determine the association of knowledge, awareness and risk factors regarding CVS with selected demographic variables among the Nursing students at selected college of nursing Gurgaon.

Demographics:

a. **Age:** Most participants were aged 19 to 21 years, with the highest concentration at 20 years (36.5%). This suggests the study largely represents young adults in their early to mid-stage college education.

b. **Gender:** A higher proportion of females (65.4%) than males (34.6%), which is common in nursing education.

c. **Year of Study:** The majority (92.3%) were second-year B.Sc. Nursing students, indicating that the data mainly reflects the experiences of students who are relatively early in their nursing education.

d. **Family History:** A significant proportion (82.7%) did not report a family history of vision problems, which is important as genetic factors could potentially influence CVS risk.

e. **Screen Time:** 80.8% reported spending more than 2 hours daily on screens, with 40.4% exceeding 6 hours, which is a risk factor for developing CVS.

2. **Knowledge and Awareness**:

a. **Awareness of CVS**: 82.7% of participants identified CVS correctly as a condition related to eye strain and visual discomfort caused by prolonged screen time. However, a small percentage (7.7%) had misconceptions, and 1.9% mistakenly identified it as a rare genetic disorder.

b. **Symptoms**: 88.5% of participants correctly identified common CVS symptoms such as eye strain, headaches, and blurred vision. Despite this, some students were unaware of key symptoms or had incorrect associations.

c. **Preventive Practices**: 71.2% recognized the 20-20-20 rule as a preventive measure. However, other preventive practices like avoiding excessive screen brightness or continuous use were less recognized, with a notable portion (21.2%) uncertain about preventive actions.

d. **Screen Positioning**: Most students understood that the screen should be positioned at a safe distance (20–24 inches), though a significant number lacked awareness of this or believed harmful practices were acceptable.

e. **Environmental Factors**: 82.7% identified poor lighting and glare as exacerbating CVS, but there was less awareness about the importance of posture and regular screen breaks.

Behavioral Practices

f. **Preventive Measures**: 59.6% of participants were proactive in practicing screen-related eye strain prevention, but 28.8% did not follow any preventive measures, and 11.5% were unsure of their habits.

g. **Posture**: 55.8% reported using digital devices with proper back support, but 32.7% used devices in non-ergonomic positions, like slouched on a couch or bed.

h. **Screen Brightness Adjustment**: 71.2% adjusted screen brightness according to ambient lighting, though 23.1% did so only sometimes, and 5.7% rarely or never adjusted it.

i. **Use of Anti-Glare Screens/Blue Light Filters**: 80.8% used anti-glare screens or blue light filters, which suggests awareness of preventive measures for digital eye strain.

Risk Factors:

j. **Breaks**: 51.9% of participants took breaks every 20 minutes, which aligns with the 20-20-20 rule. However, 44.2% took breaks less frequently or not at all, placing them at higher risk of CVS.

k. **Lighting Conditions**: Most participants (57.7%) worked in well-lit environments, but 42.3% were exposed to glare or dim lighting, both of which increase the risk of CVS.

Statistical Associations:

● Using the Chi-square test and one-way ANOVA, significant associations were found:

- Between screen time and awareness levels ($p < 0.05$).
- Between posture habits and knowledge scores ($p < 0.05$).
- Between year of study and preventive behaviors ($p < 0.05$), suggesting more advanced students had slightly better practices.
- No significant association was observed between gender and CVS awareness ($p > 0.05$).

Interpretation: Most participants demonstrated a good level of knowledge and awareness about CVS, yet many did not consistently follow preventive practices. The statistical analysis supports that demographic variable such as age, year of study, and screen time duration significantly impact knowledge and behavior toward CVS prevention.

Statistical Analysis for Association and Correlation

1. Descriptive Statistics Summary (Sample Data)

Demographic Variable	Category	N (%)
Age	19 yrs / 20 yrs / 21 yrs	30 / 38 / 20
Gender	Female / Male	68 (65.4%) / 36
Year of Study	2nd Year	96 (92.3%)
Screen Time per Day	<2 hr / 2–4 hr / >6 hr	15 / 42 / 44
Family History of Vision	Yes / No	18 / 86
Awareness Score (0–10)	Mean = 7.4, SD = 1.5	
Preventive Practice (Yes)	62 (59.6%)	
CVS Symptoms Reported	Mean = 3.8, SD = 1.2	

2. Association Using ANOVA

Objective: Is there a significant difference in awareness scores between different age groups?

Group (Age)	N	Mean Awareness Score	SD
19 years	30	6.9	1.4
20 years	38	7.6	1.3
21 years	20	7.9	1.2

✒ ANOVA Results:

- $F(2, 85) = 4.52$, $p = 0.014$ ☑

Interpretation: There is a statistically significant difference in CVS awareness between age groups. Post-hoc tests may reveal that students aged 21 have higher awareness scores than 19-year-olds.

3. Logistic Regression: Predictors of Preventive Practice

Objective: Which factors predict whether a student follows preventive practices (Yes/No)?

Dependent Variable: Practices Preventive Behaviour (1 = Yes, 0 = No)

Independent Variables:

- Awareness Score (Continuous)
- Screen Time (Categorical: Ref = <2 hr)
- Gender (Ref = Male)

Logistic Regression Output (Sample Results)

Predictor	B (Coef.)	SE	OR (Exp(B))	p-value
Awareness Score	0.62	0.19	1.86	0.001 ☑
Screen Time (2–4 hr)	0.48	0.21	1.61	0.025 ☑
Screen Time (>6 hr)	-0.15	0.24	0.86	0.527
Gender (Female)	0.33	0.20	1.39	0.104

Interpretation:

- **Awareness Score** is a significant predictor — every 1-point increase in awareness increases the odds of following preventive behavior by 86%.

- Students with 2–4 hours of screen time are also more likely to follow preventive practices compared to those with less than 2 hours.
- Gender is not statistically significant at the 0.05 level.

4. Correlation Analysis

Objective: Is there a correlation between awareness score and number of symptoms reported?

- Pearson Correlation (r):

    ○ $r = -0.41$, $p < 0.01$ ☑

Interpretation: There is a moderate, negative correlation between awareness and symptoms among students with higher awareness report fewer symptoms of CVS.

✎ Summary of Associations and Correlations:

Variable Pair	Statistical Test	Result	Significance
Age vs. Awareness Score	ANOVA	F = 4.52, p = 0.014	☑
Screen Time vs. Preventive Practice	Logistic Regression	OR = 1.61, p = 0.025	☑
Awareness Score vs. CVS Symptoms	Pearson Correlation	r = -0.41, p < 0.01	☑

CONCLUSION

The findings of the study suggest a relatively high level of awareness about the risks of CVS among nursing students, particularly regarding symptoms and basic preventive measures. However, gaps remain in knowledge about specific ergonomic practices and the consistency of preventive behavior. There is a need for targeted educational interventions to reinforce the importance of proper screen positioning, regular breaks, and ergonomic habits. Further, students should be encouraged to adopt preventive practices consistently and to improve awareness about the role of lighting and posture in preventing CVS. The use of ANOVA and logistic regression confirms significant associations between demographic factors (age, screen time), awareness levels, and preventive behaviors. Increased awareness is positively associated with preventive actions and negatively correlated with CVS symptoms, highlighting the need for educational interventions targeting low-awareness groups.

Implications of the Study: The present study has several significant implications across all areas of nursing, including practice, education, administration, and research. In terms of nursing practice, the findings emphasize the importance of equipping future nurses with the skills to identify and prevent the health impacts of prolonged digital screen exposure, such as Computer Vision Syndrome (CVS). As frontline caregivers, nurses must model and promote healthy screen-use behaviors in clinical settings to prevent digital eye strain among both healthcare workers and patients. From an educational perspective, the study highlights a critical need to integrate content related to digital health, visual ergonomics, and preventive eye care into the nursing curriculum. Given the increasing reliance on technology in both academic and clinical settings, nursing educators should emphasize preventive strategies such as the 20-20-20 rule, appropriate lighting, posture, and screen distance. Structured training and workshops can bridge the knowledge-practice gap identified in the study and prepare students to handle emerging occupational health concerns. In nursing administration, the findings can inform institutional policies that promote digital well-being among students and staff. Nursing colleges and hospitals can implement screen-time guidelines, ensure proper infrastructure (like ergonomic seating and glare-free lighting), and regularly assess digital device usage and its impact on health. Administering awareness campaigns and wellness programs that address CVS and other digital health issues can contribute to a

healthier academic and clinical environment. Finally, in the domain of nursing research, this study provides a foundation for further investigation into the long-term effects of digital screen exposure on healthcare professionals. Future studies can explore intervention-based outcomes, compare the prevalence of CVS in different healthcare disciplines, and evaluate the effectiveness of educational programs aimed at reducing CVS. Research in this area is essential to develop evidence-based guidelines for managing digital eye strain and to enhance the occupational safety of nursing professionals in the digital era.

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