AN INTERVENTIONAL STUDY ON EFFECTS OF MOBILE SCREEN USAGE ON DIGITAL EYE STRAIN AND INSOMNIA AMONG PROSPECTIVE TEACHERS

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Multi Spectrum Publications

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CHAPTER -1
INTRODUCTION AND CONCEPTUAL FRAMEWORK

1.0 Introduction

Education stands as a cornerstone of national development, fostering enlightened citizens and empowering societies. The advent of technology has revolutionized various domains of human life, including commerce, healthcare, and education. In particular, the digital transformation has significantly impacted the education sector, offering opportunities for enhanced learning experiences through the utilization of emerging technologies (Allada, 2022). The onset of the COVID-19 pandemic further accelerated the adoption of digital education globally, disrupting traditional educational systems and highlighting the importance of technology-based learning.

Digital education, characterized by the integration of digital technologies into educational practices, has emerged as a pivotal tool for advancing learning and structural development in India. This paradigm shift towards digital education not only bridges the gap between traditional teaching methods and the demands of the digital era but also positions India on the trajectory towards becoming a knowledge economy (Connell, 2021). The democratization of knowledge facilitated by digital technologies has democratized access to information, enabling learners to acquire diverse skill sets essential for real-life challenges.

Blended learning, a pedagogical approach combining traditional classroom method with digital resources, has gained prominence in the educational landscape, offering personalized and flexible learning experiences. Through the integration of virtual learning environments and innovative teaching methodologies, digital education fosters engagement and interactivity, making learning more enjoyable and effective.

Smartphones play a crucial role in facilitating digital education, allowing students to access educational resources anytime and anywhere. The ubiquity of smartphones among students in India underscores their significance in supporting online learning, entertainment, and socialization (Assunel, 2020). However, concerns have arisen regarding the potential adverse effects of prolonged mobile screen engagement on visual health and sleep patterns, including Digital Eye Strain (DES) and disruptions in sleep quality.

Despite the growing recognition of these issues, there exists a paucity of research focusing specifically on the impact of mobile screen engagement on DES and sleep patterns among prospective teachers in India. This research seeks to address this gap by investigating the prevalence and correlates of DES and sleep disturbances among prospective teachers, with a particular emphasis on their mobile screen engagement habits.

By shedding light on the prevalence and consequences of digital eye strain and sleep disturbances among prospective teachers, this study aims to inform evidence-based interventions and policies aimed at improving educational outcomes and promoting digital well-being. Through a comprehensive review of existing literature and empirical research, this research endeavours to provide insights into the effects of mobile screen engagement on visual health and sleep patterns, thus contributing to the development of strategies to mitigate these challenges in the digital age.

1.1 Digital Education in India

Digital education has emerged as a transformative force in India's educational landscape, driven by the widespread availability of smartphones and internet connectivity. This paradigm shift transcends traditional boundaries, offering students' unparalleled access to a vast array of educational resources. By harnessing digital tools and technology, such as the internet and Information and Communication Technology (ICT) devices, digital education aims to enhance the teaching and learning experience, making it more interactive, immersive, and inclusive. Recognizing its potential, the Government of India has embarked on a promotion campaign to ensure the universal availability of digital education across the country, underscoring its commitment to leveraging technology for inclusive growth and development (NEP 2020).

As digital education gains momentum, it is imperative to explore its multifaceted impact on teaching and learning practices, educational outcomes, and societal development. By embracing digital education, India can bridge existing educational gaps, promote lifelong learning, and equip individuals with the skills needed to thrive in the digital age. This research aims to examine the evolution of digital education in India, its key drivers and challenges, and its implications for educational policy and practice. Through a comprehensive analysis of existing literature, empirical research, and policy documents, this study seeks to provide insights into the transformative potential of digital education and identify strategies to maximize its benefits while addressing potential barriers to implementation. By shedding light on the opportunities and challenges associated with digital education, this research endeavors to inform evidence-based policymaking and practice, contributing to the advancement of education and societal development in India and beyond.

1.1.1 Significance of Digital Education in India

Digital literacy, as a pedagogical approach utilizing technology, represents a comprehensive technical discipline aimed at facilitating equitable access to education for all students across the geographical expanse of India. Positioned as the cornerstone of future learning paradigms, Digital Education in India has garnered significant attention from policymakers and educational stakeholders alike. The Government of India has delineated various channels and undertaken numerous initiatives to disseminate educational resources and pedagogical tools across diverse regions of the country.

In response to the rapid evolution of digital education, the government has introduced a new National Education Policy (NEP, 2020), which underscores the importance of digitization and technology integration in educational practices. A notable emphasis within this policy framework lies on leveraging Edutech solutions to enhance educational opportunities, particularly in rural areas. This initiative aims to ensure the provision of quality education, particularly in tier 2 and tier 3 towns and villages, thereby bridging existing educational disparities. What once appeared as a distant aspiration has been successfully translated into tangible initiatives, effectively implemented across the nation.

1.1.2 Aim and Goals of Digital Education in India

The Annual Status of Education Report (ASER) published by the NGO Pratham provides valuable insights for including digital initiatives in the field of education which delivers empirical evidence and analysis to corroborate the statements regarding digital education's goals and strategies in India as follows

- Digital education in India aims to ensure universal access to learning, regardless of geographical location or socio-economic background.

- The primary goal is to elevate the quality of education by providing interactive and engaging learning experiences through the integration of technology.
- Bridging the educational gap in remote areas is a key focus, achieved through innovative technological solutions that extend educational access to marginalized communities.
- Developing high-quality electronic content in local languages is prioritized to accommodate India's linguistic diversity and promote inclusivity in education.
- Flexibility in learning is emphasized, allowing students to access educational resources at their convenience, regardless of time or location.
- Promoting digital literacy among students and teachers is a core objective to equip individuals with essential skills for navigating the digital landscape.
- Personalizing the learning experience is facilitated through technology, adapting to individual learning styles and paces to enhance engagement and efficacy.
- Encouraging innovation and creativity among students is fostered by providing access to diverse digital resources and tools, nurturing critical thinking and problem-solving skills

1.1.3 Importance of Digital Education in India

Digital education facilitates access to learning materials and resources regardless of geographical constraints, ensuring educational accessibility for students irrespective of their location. Students benefit from the flexibility offered by digital education, allowing them to learn at their own pace and convenience, selecting the time and place conducive to their studies. Incorporating interactive multimedia elements such as videos, animations, and quizzes, digital education enhances engagement and interactivity in the learning process, contributing to a more dynamic educational experience (Adele, 2018). Digital platforms provide students with a vast array of learning resources, broadening their knowledge base and enabling comprehensive learning beyond traditional classroom boundaries. By promoting the development of digital literacy and technology skills, digital education equips students with essential competencies in navigating online platforms, utilizing productivity tools, and collaborating digitally.

The adoption of digital education eliminates the need for extensive physical infrastructure, reducing costs associated with textbooks, transportation, and classroom maintenance, thereby increasing affordability and accessibility to a wider population. Digital education facilitates lifelong learning opportunities, enabling students to pursue education beyond conventional classroom settings through access to online courses and webinars, fostering continuous skill development and knowledge enhancement (Adalbert, 2014). With its potential to reach remote areas, digital education serves as a means to bridge educational gaps, promoting inclusivity and equal opportunities for all learners, regardless of their geographic location or socio-economic background.

1.1.4 Digital Initiatives of Government of India in Higher Education

In pursuit of enriching learning outcomes and ensuring widespread access to high-quality education, technology-driven solutions have become paramount in the realm of digital education initiatives. These endeavors aim to leverage digital platforms to enhance educational accessibility and elevate the standard of learning. The National Mission on Education through ICT (NMEICT), a major initiative by the Ministry of Human Resource Development (MHRD), aims to integrate digital education solutions to enhance access to quality content and improve learning outcomes. Several ongoing initiatives under the NMEICT program include:

- **SWAYAM (Study Webs of Active Learning for Young Aspiring Minds):** A platform offering Massive Open Online Courses (MOOCs) under the Digital India initiative, providing access to online courses.
- **SWAYAM PRABHA:** A group of 32 DTH channels broadcasting high-quality educational programs on a

24X7 basis, allowing students to choose convenient viewing times.

- **National Academic Depository (NAD):** An online repository storing all academic awards, ensuring easy access and validation of authenticity.
- **National Digital Library of India (NDL India):** An all-digital library housing various digital contents such as books, articles, videos, and audios, catering to users from diverse educational backgrounds.
- **E-Shodh Sindhu (E-SS):** Merging three consortia initiatives to provide access to peer-reviewed journals and bibliographic databases to the academic community.
- **Virtual Labs:** A consortium project offering over 100 web-enabled experiments for remote operation and viewing, marking a paradigm shift in ICT-based education.
- **e-Yantra:** An initiative promoting education in embedded systems and Robotics, sponsored by MHRD through NMEICT.
- **Talk to a Teacher program:** Talk to a Teacher programme facilitates collaboration among educational institutions through virtual platforms.
- **E-acharya Integrated e-Content Portal:** Hosting e-content projects funded under NMEICT, enables easy access to a wide range of educational materials.

- **E-Kalpa:** A project creating a digital learning environment for design, sponsored by MHRD under the National Mission in Education through ICT.
- **FOSSEE (Free/Libre and Open-Source Software in Education):** A project promoting the use of open-source software in education to improve the quality of learning.
- **VIDWAN:** A premier database profiling scientists, researchers, and faculty members working in academic institutions and R&D organizations in India.
- **Spoken Tutorial:** A multi-award-winning educational content portal offering tutorials on Free and Open-Source Software in multiple languages.

Additional initiatives include BAADAL, GIAN, NIRF, IMPRINT, SAKSHAT, ARIIA, KNOW YOUR COLLEGE, Digi Locker, NPTEL, OSCAR, Shodh Gangotri, Virtual Learning Environment (VLE), Text Transcription of Video content, SOS Tools, and e-PG Pathshala. These initiatives collectively strive to revolutionize education through digital means, fostering accessibility, quality, and innovation in learning experiences.

1.1.5 Digital Transformation towards Education 4.0

In response to the evolving demands of the global job market, there arises a pressing need to redefine the approach to teaching and learning in order to align with the ever-changing careers landscape). This imperative transformation in education has been catalyzed by the emergence of new pedagogical approaches, advancements in technology, and the pervasive influence of digitalization (Victor, 2022). The early stages of this transformation, termed Education 2.0, witnessed the integration of technology into the Indian education system, characterized by the introduction of computers, interactive whiteboards, and smart projectors in classrooms. These technological innovations ushered in novel teaching and learning methods, thereby augmenting the quality of education across diverse domains.

Subsequent advancements marked the advent of Education 3.0, wherein the proliferation of the internet via devices such as laptops, tablets, and smartphones propelled digital learning into the mainstream educational sphere. Education 4.0 represents the latest phase in this trajectory, emphasizing global connectivity and the transformative potential of smart machines and new media in shaping the educational landscape (Elke, 2020). The evolution towards Education 4.0 is imperative, particularly in India, where it holds the promise of leveraging industrial technologies to enhance learning outcomes and mitigate disparities in education among schoolchildren. Notably, the Education 4.0 India initiative, as proposed by UNICEF (2022), underscores the importance of addressing foundational literacy and numeracy, enhancing teachers' professional development, facilitating school-to-work transition, and bridging the digital divide to ensure comprehensive educational advancement

1.1.6 Elevating Classroom Learning

Across the globe, the landscape of education is undergoing significant transformations, characterized by the integration of immersive technologies into educational settings. Educational institutions are increasingly adopting immersive technologies within classrooms to enhance student experiences, bolster retention rates, and facilitate a deeper understanding of academic concepts traditionally taught in conventional classroom environments. Immersive technologies encompass a diverse array of interactive tools and platforms designed to engender immersive and interactive learning experiences within educational contexts.

These technologies, including virtual reality (VR), augmented reality (AR), and mixed reality (MR), are leveraged to create simulations, visualizations, and interactive learning environments that transcend the boundaries of traditional pedagogical methods. By harnessing immersive technologies, educators and institutions are empowered to prioritize student-teacher engagement, foster deeper levels of learning, encourage collaboration among students, and establish accessible learning environments that transcend geographical constraints. (Clinics, 2024). Consequently, the integration of immersive technologies is revolutionizing the dissemination of education and reshaping the dynamics of teaching and learning on a global scale.

1.1.7 Core Features of Education 4.0

Education 4.0 encompasses a variety of core features aimed at revolutionizing the educational landscape. These features reflect the integration and fusion of diverse digital technologies, aligning Education 4.0 with the principles and advancements of the Fourth Industrial Revolution (4IR). Key technologies driving Education 4.0 include multimedia presentations such as online slide shows, lesson-based podcasts, instructional videos, and online assessments and quizzes. These multimedia formats cater to various learning styles and preferences, offering learners flexibility and accessibility in their educational journey.

Furthermore, Education 4.0 incorporates innovative pedagogical approaches such as educational blog posts, video lectures, and ramification techniques. These methods not only engage learners effectively but also promote active participation and knowledge retention. Additionally, Computer-Assisted Instruction (CAI) facilitates personalized learning experiences by providing learners with interactive opportunities to engage with instructional materials at their own pace. Virtual reality experiments, augmented reality-powered international field trips, and real-time digital engagement strategies further enhance the immersive and interactive nature of Education 4.0.

Moreover, Education 4.0 embraces advancements in technology such as instant feedback mechanisms, trans media edutainment, 3D printers, mobile phones, robotics, and cloud computing. These technologies facilitate collaborative learning, skill development, and access to educational resources beyond traditional classroom boundaries. Furthermore, Education 4.0 promotes innovative teaching methodologies such as flipped classrooms, massive open online courses (MOOCs), social network-based learning, and seamless learning environments, catering to diverse learning needs and preferences.

Incorporating principles of open and distance learning, open access, lifelong learning, adaptive learning, individualized learning, and self-paced learning, Education 4.0 strives to create a dynamic and inclusive educational ecosystem (Voices, 2022). By leveraging technological advancements and innovative pedagogies, Education 4.0 seeks to prepare learners for the evolving demands of the future workforce and society.

1.2 Mobile Screen

- The mobile screen serves as a crucial interface on mobile devices, enabling users to interact with the device and access information. It encompasses the display and touch-sensitive surface through which users navigate and engage with their phones. The phone screen facilitates various functions such as making calls, sending messages, accessing apps, and viewing content. Its significance lies in being the primary medium through which users interact with their devices, whether it is smartphones, tablets, or other portable connected technologies.

- Mobile devices, as defined by UNESCO, encompass a wide range of portable, connected technologies including smartphones, tablets, e-readers, and computers. Today's students, represent the first generation to grow up immersed in digital technology, utilizing various electronic devices from an early age. The integration of mobile devices into education is increasingly recognized as a necessity rather than a luxury, (Kunzler, 2016). Allowing students to utilize mobile devices in the classroom can enhance motivation and engagement in learning.
- The global mobile industry has experienced exponential growth in recent years, with smartphone users increasing steadily since 2016 and projected to continue rising. Estimates suggest that smartphone subscriptions worldwide reached approximately 6.57 billion in 2022 and are expected to surpass 7.69 billion by 2027 (Connel, 2021). This proliferation of smartphone usage underscores the pervasive influence of mobile technology in contemporary society.

1.2.1 Impact of Mobile Phones on Prospective Teachers' Lives

The technological innovation has transformed the way students learn, get entertained, socialize, and how they spend the leisure time. It is common to see prospective teachers use smartphones to connect, study, and unwind. The smartphone wave has taken over our world and there is no escaping it, even for the students. (Banerjee, 2023).

The sleek and sophisticated device i.e. smartphone fits just right in our palms and has many merits to the students' lives when the kids are trained to use it mindfully. Smartphone usage in excess does create a negative impact on the students' lives as well which can be worrisome that the use of smartphone on students has both a negative and positive effect depending on how it is used (Severa & Pagcaliwagan, 2019). The positive aspects of smartphone usage are as follows

- **Convenience in Communication**

Smartphones let students effectively communicate about their location with their parents, teachers, and friends. Smartphones have made it easier for parents to track their student's location and keep their worries at bay. Also, students get to clear their doubts with educators at a faster speed via a smartphone and can discuss topics with their friends with ease. This way, smartphones help propel a student's growth and performance in school.

- **Access to the Internet**

Smartphones can perform all the functions that a personal computer or laptop does which helps them learn anything from the Internet, anytime. Using a smartphone ensures that students can get their work done on the go and learning can happen wherever they are. It helps students be better informed as the right information they need for their project or assignment is just a Google search away.

- **Entertainment**

A smartphone makes the time of rest for students more fun. Searching on their smartphones, students pursue different activities and nurture various hobbies in their leisure time. They make a student's unwinding time fulfilling whether it's watching a movie, listening to music, or seeing a new comedy special.

- **Organized Study**

Smartphones are used to boost students' productivity with alarms, dictionaries, encyclopedias, notes, planners, and more. The users record new deadlines, check the new assignments and projects, gauge the progress and keep track of upcoming due dates easily.

- **Preparation for the Modern World**

Smartphones bring the world to the students. It familiarizes them with the modern world, how it is changing, and what shape it is going to take soon. They are updated with the trends in various fields and are well-acquainted with the job market.

Educational Purpose

The use of smartphone is gradually becoming a compelling learning tool used to enhance teaching and learning in distance education. Its usage ensures flexible course delivery, makes it possible for learners to access online learning platforms, access course resources, and interact digitally.

1.2.1 Negative Impact of Smartphones on Students

The overuse of anything is harmful, and the same is true with smartphone use (Catherine & Nithya, 2018). Here are the demerits of excess smartphone usage for students.

- **Distraction**

Smartphone offers a world of information, music, movies, and social interaction that can keep students engaged for hours and distract them from their goals, making their academic performance, as well as their health, suffer.

- **Harmful for Health**

Using smartphones for long hours hurts the eyes. It not only impairs vision but the radiation emitted by it also leads to chronic health issues such as cancer and tumors, not to forget, sleep disorders.

- **Cyber Bullying**

When students are on social media, they might come across trolls commenting on their looks and the content they put out there. They may face name-calling, body shaming, and even threats that they are not mentally prepared for and these can cause massive stress to their mental health.

- **False Information**

As the Internet can be accessed by all, the sources the students get their information from can be questionable. There is a lot of incorrect information making rounds which can mislead the students and result in wrong learning. Thus, it is significant to ensure the legitimacy of the sources and consultation with educators while learning from the Internet.

- **Increased Academic Misconduct**

Since easy access to information is made via smartphones, students are often tempted to be academically dishonest and plagiarize content from the Internet instead of coming up with it themselves. So, using smartphones might make it seem like students know a lot about teachers, but it can slow down their learning. This way, smartphones hinder the growth of critical thinking and problem-solving skills in students.

- **Isolation & Anxiety**

Smartphones make face-to-face conversation an option. When students choose to stream shows and play video games for hours on end in their leisure, they lose out on meaningful friendships and connections. This invokes a sense of isolation and anxiety in them which is harmful for their mental, emotional, and physical health.

- **Sleep Loss**

Too much smartphone usage not only causes eye strain but also can deprive students of their restful slumber. Both blue light emitted by the screen and radiations from the smartphones disrupt the natural sleep patterns and cause sleeplessness.

- **Mobile Addiction**

The problematic smartphone use can cause poor academic performance and affect diverse areas of students' lives adversely. Due to smartphone overuse, students are unable to concentrate on their studies fully, their memory suffers, and their mind becomes foggy, dull and lethargic.

1.2.2 Mitigating Mobile Phone Side Effects on Prospective Teachers

The pervasive presence of mobile phones among students raises concerns about the potential negative impacts on their well-being and academic performance. However, proactive measures can mitigate these risks and promote healthier habits among pupils. The effective strategy is to implement limits on screen time, encouraging students to take regular breaks while using smartphones to mitigate adverse effects on eye health and posture. By promoting awareness of the importance of moderation in digital consumption, educators can instill responsible technology usage habits in students.

Furthermore, encouraging students to engage in physical activities during their leisure time fosters a balanced lifestyle and reduces dependence on smartphones. Encouraging outdoor play and recreational pursuits not only promotes physical health but also facilitates social interaction and cognitive development. Setting a positive example is crucial in influencing students' behaviour towards smartphone usage (Nouroozi, 2020). Educators and parents can model healthy habits by reducing their own smartphone usage and engaging in alternative activities such as reading books, pursuing hobbies, and participating in offline interactions. By demonstrating the benefits of disconnecting from digital devices, adults can inspire students to prioritize offline activities.

Establishing designated digital-free times, particularly during mornings and before bedtime, can create opportunities for relaxation and restorative activities. Emphasizing the importance of sunlight exposure before engaging with screens can help regulate students' circadian rhythms and promote better sleep hygiene. Encouraging alternative activities that do not involve smartphone usage during these times can foster creativity, mindfulness, and interpersonal connections (Daniel, 2020). The proactive measures such as limiting screen time, promoting physical activity, setting positive examples and creating digital-free times are essential for mitigating the negative effects of smartphones on students. By implementing these strategies, educators and parents can cultivate healthier technology habits and support students' overall well-being and academic success.

1.2.3 Benefits of Mobile Screen for Prospective Teachers

The benefits associated with the presence of a mobile screen are manifold, encompassing various aspects that enhance user experience and functionality (Islamoglu, 2021) is as follows

- **Visual Clarity:** The screen offers a crisp and clear display, facilitating ease of reading, image viewing, and video watching.
- **Touch Interaction:** The touchscreen functionality of the screen enables intuitive user interaction and accessibility.
- **Seamless Communication:** Through the screen, users can effortlessly engage in communication via calls, messages, and video chats.
- **Information Accessibility:** With the screen, users can swiftly access vital information and applications for both productivity and entertainment purposes.
- **Aesthetic Enhancement:** The screen contributes to the overall visual appeal of the device, enhancing its aesthetic qualities.
- **Educational Applications:** The screen serves as a platform for various educational activities, including:

- Creation of PowerPoint presentations with multimedia content.
- Establishment of online classrooms, including meeting links, attendance tracking, and recording capabilities.
- Utilization of online whiteboards for presentation preparation and equation typing.
- Editing and dissemination of recorded online class videos among students.
- Administration of online exams with automated evaluation features and online report generation.
- **Innovative Teaching Methods:** The incorporation of Augmented Reality (AR) and Virtual Reality (VR) technologies through the screen opens up new avenues for engaging teaching practices, particularly through virtual classroom experiences.

1.2.4 Harmful Effects of Long Screen Time on Physiological aspects

The phenomenon of prolonged screen time pertains to extended durations spent engaging with digital screens, whether for work-related activities, entertainment purposes, or social interactions. While the utility and convenience of digital devices are undeniable, excessive screen exposure can engender a plethora of adverse effects. (Banerjee, 2023) states that repercussions of excessive screen time encompass various domains, including physical health, mental well-being, and social dynamics such as

- **Ocular and Musculoskeletal Strain:** Extended exposure to the blue light emitted by screens can induce eye strain, dryness, and discomfort, leading to symptoms such as headaches, blurred vision, and near-sightedness. Additionally, prolonged sitting during screen use can result in poor posture, back pain, and musculoskeletal issues.
- **Disrupted Sleep Patterns:** The blue light emitted by screens can disrupt circadian rhythms, leading to sleep disturbances and insomnia, which in turn can result in fatigue and diminished cognitive function.
- **Sedentary Lifestyle and Obesity:** Excessive screen time often correlates with reduced physical activity levels and unhealthy snacking habits, thereby increasing the risk of obesity and related health conditions.
- **Cognitive Impairment:** Prolonged screen exposure has been associated with diminished cognitive abilities, including impaired concentration, memory, and information processing, as well as an elevated risk of mental health issues such as depression and anxiety.
- **Socio-Emotional Challenges:** Excessive screen time can diminish social skills and exacerbate feelings of isolation, while exposure to certain media content may influence emotional judgment and increase susceptibility to aggressive behaviour.

- **Self-Esteem Concerns:** Excessive reliance on digital platforms, particularly social media, can contribute to diminished self-esteem and identity concerns, particularly among children and adolescents vulnerable to cyber bullying and self-image challenges.
- **Decreased Productivity and Screen Addiction:** Excessive screen time can detract from productivity by fostering distraction, procrastination, and reduced focus. Moreover, the compulsive need to constantly check notifications and social media updates can lead to screen addiction, resulting in neglect of other essential aspects of life. Though digital screens offer numerous benefits, overindulgence in screen time poses multifaceted risks to physical health, mental well-being, and social interactions. Understanding and mitigating these consequences are imperative for promoting holistic well-being in an increasingly digital-centric society.

1.2.5 Health Benefits of Reducing Screen Time

In the contemporary era, screens have become an integral aspect of daily life, but concerns regarding their impact on sleep quality have emerged.

- **Enhances Sleep Quality:** Restricting screen time before bedtime can lead to enhanced sleep quality and a more restorative sleep experience. By minimizing exposure to blue light and reducing stimulation from electronic devices, individuals can facilitate the production of melatonin, thereby regulating the sleep-wake cycle. This practice promotes quicker onset of sleep, reduces nocturnal disruptions, and fosters a sense of refreshed wakefulness upon arising in the morning.

- **Alleviates Eye Strain:** Prolonged screen usage often results in ocular discomfort, headaches, and dry eyes due to eye strain. To mitigate this issue, incorporating regular breaks from screen activities is crucial. The widely advocated 20-20-20 rule recommends taking breaks to focus on objects at a distance of 20 feet for 20 seconds every 20 minutes (Shelton, 2018) . Adhering to this rule allows the eyes to rest and refocus, thereby reducing eye strain and promoting healthier visual habits.
- **Promotes Correct Posture:** Excessive screen time frequently correlates with poor posture, leading to discomfort in the back, neck, and shoulders. Many individuals tend to adopt a hunched posture while engaging with screens, placing undue pressure on the spine and musculoskeletal system. Taking frequent breaks to stretch and engage in physical movement can help improve posture and alleviate discomfort. Engaging in simple exercises and stretches, such as shoulder rolls or standing backbends, can counteract the adverse effects of prolonged sitting and screen use.

- **Mitigates Risk of Obesity:** Excessive screen time is associated with heightened risk of obesity due to prolonged sedentary behavior. By intentionally reducing screen time, individuals can create opportunities to participate in physical activities, thereby promoting weight management and reducing the likelihood of obesity-related health complications.
- **Enhances Mental Health:** Being mindful of screen usage aids in prioritizing mental health and overall well-being. Establishing a sleep-conducive environment by minimizing exposure to blue light emitted by screens is essential.
- **Reduces Stress:** Frequent exposure to screens, whether through social media, gaming, or computer work, can activate the central nervous system and elevate cortisol levels, commonly known as the "stress hormone." Taking breaks from screen activities can foster stable mood, reduce anxiety and depression, and enhance empathy toward others.

  The conscientious management of screen time can yield manifold benefits for physical health, mental well-being, and overall quality of life. Understanding and implementing strategies to mitigate the potential adverse effects of excessive screen usage are imperative in promoting holistic wellness in the digital age.

1.2.6 Digital Detox: Why and How to Disconnect

A digital detox entails a deliberate period during which individuals refrain from using digital devices or significantly limit their usage. Given the relatively recent emergence of social media and smartphones, comprehending their long-term effects on mental and physical health remains a challenge (Laura Ceci, 2024). The preliminary indications suggest a concerning trend. Excessive screen time, particularly on social media platforms, has been associated with various health issues, including stress, disrupted sleep patterns, depressive symptoms, and mental health disorders (Moor, 2024).

Psychologist Kia-Rai Prewitt defines a digital detox as a temporary cessation from electronic devices or specific media for a predetermined duration, ranging from a few days to several months. The components of a digital detox may vary among individuals but commonly entail avoiding activities such as checking emails, playing video games, scrolling through social media feeds, text messaging, using smartphones or tablets, and watching news or television programs. Prewitt (Prewitt, 2021) recommends several steps for conducting a digital detox:

- **Identification of the Issue**: Identify the digital habits that require modification, such as excessive smartphone usage, stress from consuming news, or spending excessive time on social media platforms.

- **Establishment of Specific Goals:** Set clear and specific objectives for reducing or eliminating targeted behaviours. Define the duration and frequency of the detox, such as restricting social media usage to 15 minutes daily or implementing tech-free days.
- **Commitment to a Timeframe**: Acknowledge that altering digital habits is a gradual process and commit to a minimum of two weeks for the detox. Strive to reach a point where the targeted behaviour feels less ingrained.
- **Solicitation of Support**: Engage the support of friends, family, or partners who can provide encouragement and hold you accountable. Share your detox goals with them and seek their input on strategies for achievement.
- **Monitoring of Progress:** Regularly evaluate your progress throughout the detox period. Be vigilant of substituting one digital habit for another and adjust your approach accordingly.
- **Reflection on Long-Term Changes**: Reflect on the benefits and challenges encountered during the detox. Determine if any modifications should be incorporated permanently, such as instituting tech-free family gatherings or addressing additional digital habits. A structured approach to digital detoxification can foster awareness of problematic

digital behaviours and facilitate the adoption of healthier usage patterns.

By delineating clear goals, seeking support, and reflecting on long-term changes, individuals can effectively navigate the challenges associated with excessive digital consumption.

1.2.7 Steps to Minimize Screen Time

The steps to minimize screen time for prospective teachers encompass a range of strategies aimed at reducing dependence on digital devices and promoting a healthier balance between technology use and other activities (Simon, 2024). These steps include:

- **Take Regular Breaks:** Incorporate breaks into the workday to relax and reduce screen time. Implementing the 20-20-20 rule—focusing on a distant object for 20 seconds every 20 minutes can alleviate eye strain.
- **Schedule Screen Time:** Organize the day to allocate specific times for work, leisure, and breaks, effectively managing screen time throughout.
- **Use Brain Breaks:** Integrate activities that encourage movement, invigoration, and relaxation into teaching methods. Brain breaks, including relaxation techniques, breathing exercises, or physical movements, can enhance student engagement and decrease screen time.
- **Schedule Tech-Free Days:** Design engaging activities that do not rely on digital devices,

ISBN : 978-81-971077-4-0

promoting hands-on learning experiences. Providing materials and examples for tech-free assignments facilitates effective implementation.

- **Opt for Phone Calls over Texts:** Prioritize phone calls for communication to reduce screen time. Employing traditional methods such as pen and paper for note-taking can further minimize phone usage.
- **Prioritize Family Time:** Allocate quality time for family interactions, such as shared meals, to strengthen relationships and limit screen exposure.
- **Establish No-Gadget Zones:** Designate specific areas or times where gadgets are prohibited, fostering direct interactions and improving mental well-being.
- **Use Screen Time Management Apps:** Employ apps designed to monitor and limit screen time, utilizing features like app blocking and gray scale mode to mitigate phone addiction.
- **Activate Do Not Disturb Mode:** Enable "Do Not Disturb" mode to minimize interruptions and promote mindful screen usage, reducing the urge to check the phone constantly.
- **Switch off all Screens before Sleeping Hours:** Prioritize sleep hygiene by turning off all screens at least an hour before bedtime to facilitate restful sleep.
- **Track Screen Time and Habits:** Utilize apps or device settings to monitor screen time and identify

usage patterns, enabling the setting of realistic goals and progress monitoring.

- **Set Hard Limits on Screen Time:** Implement features or apps that restrict access to certain apps or websites after a predetermined duration, promoting mindful usage.
- **Turn Notifications Off:** Disable notifications, sounds, and vibrations to minimize distractions and reduce the temptation to check the phone frequently.
- **Schedule Screen-Free Breaks:** Plan regular breaks from screens for activities such as walking, meditation, or creative pursuits, fostering a healthier balance in daily routines.
- **Switch Off Before Bed:** Avoid screen usage before bedtime to promote better sleep quality and quantity, replacing digital activities with relaxing alternatives.
- **Develop a Relationship with Nature:** Spend time outdoors to reduce screen time and reap the benefits of nature's calming effects on physical and mental well-being.
- **Engage in Exercise and Low-Tech Hobbies:** Incorporate physical activity and hobbies that do not rely on technology, promoting a more balanced lifestyle.
- **Limit Multitasking:** Refrain from using multiple screens simultaneously, as it can over stimulate the brain and exacerbate the negative effects of excessive screen time.

- **Set and Stick to a Routine:** Establish a consistent bedtime and adhere to it to ensure adequate rest and productivity throughout the day.
- **Stay Motivated:** Set achievable goals and engage in activities that boost mood and motivation, facilitating adherence to screen time reduction strategies.
- **Encourage Alternative Activities:** Provide students with non-screen options for entertainment and learning, promoting creativity and engagement beyond digital devices.

Implementing the above strategies help prospective teachers cultivate a healthier relationship with technology, reduce screen time, and create a more balanced lifestyle for themselves and their students.

1.3 Phone Screens & Digital Eye Strain

The pervasive integration of digital devices into daily life has rendered the notion of living without them virtually obsolete. This technological revolution has significantly altered the landscape of work, communication, and entertainment in the Information Age. However, alongside the benefits of digital technology, a new health concern has emerged called as digital eye strain.

Digital eye strain, or CVS (Computer Vision Syndrome), encompasses a range of eye and vision-related issues resulting from prolonged use of digital devices such as computers, tablets, e-readers, and smartphones. The constant exposure to screens and blue light emitted by these devices has inundated our eyes with unprecedented levels of visual stimuli. As a result, many individuals experience uncomfortable symptoms associated with digital eye strain. One common indicator of Digital Eye Strain is Dry Eye Syndrome (DES), characterized by a chronic lack of sufficient lubrication and moisture on the eye's surface. Untreated DES can lead to discomfort, visual disturbances, and potential damage to the eye's surface, including increased corneal inflammation and susceptibility to eye infections (Mamta Singh, 2022).

The American Optometric Association defines CVS as the collective occurrence of eye and vision-related problems stemming from prolonged screen usage, particularly stressing the near vision. This encompasses ocular, visual, and musculoskeletal symptoms resulting from extended computer use. The continuous demand on the eye's colliery muscles to focus and refocus while viewing digital screens can lead to visual fatigue and strain. Over time, the visual cortex, responsible for processing visual information, becomes overstimulated, exacerbating discomfort associated with digital eye strain. Asthenia, commonly known as eye strain, may occur when eyes are fatigued from prolonged or intense use, such as driving, reading, or working on a computer for extended periods (Shelton, 2018). Resting the eyes typically alleviates these symptoms. The universal use of digital devices has introduced new challenges to ocular health, manifesting as digital eye strain. Understanding the causes and symptoms of this condition is essential for mitigating its impact and promoting eye health in an increasingly digital world.

1.3.1 Digital Eye Strain (DES) Symptoms

Digital Eye Strain (DES) can manifest through various symptoms resulting from prolonged utilization of digital screens. Awareness of these symptoms is imperative as it enables individuals to identify early indications and undertake preventive measures (Bhombal, 2022). The common symptoms of Digital Eye Strain, accompanied by real-life experiences and recommendations for vigilance:

- **Ocular Discomfort:** Individuals may perceive an array of sensations, including itching, burning, or a sensation of grittiness in the eyes, accompanied by excessive blinking, eye redness, eye pain, heavy eyelids, and a perception of worsening eyesight. This sensation resembles that of dry or fatigued eyes. Vigilance is advised regarding the ocular sensations following extended screen usage or activities such as digital reading.
- **Blurred Vision:** Blurred vision may cause objects on the screen to appear fuzzy or out of focus, akin to straining the eyes and experiencing difficulty in discerning objects clearly. Awareness of this symptom entails observing whether text or images on

ISBN : 978-81-971077-4-0

the screen become unclear over time, particularly noting any improvement post taking a break.

- **Dry Eyes:** The eyes may exhibit sensations of dryness, grittiness, or soreness, reminiscent of the feeling of having sand in one's eyes. Recognition of this symptom involves noting if the eyes feel parched or uncomfortable following prolonged screen exposure.
- **Headaches:** DES can induce headaches ranging from mild discomfort to throbbing pain around the temples or forehead. Headaches associated with this condition primarily occur during or after screen usage. Co-occurrence of headaches with other ocular symptoms further indicates DES.
- **Neck and Shoulder Pain:** Inadequate posture during digital device usage may lead to strain in the neck and shoulder regions. Observing any tension or discomfort in these areas while engaging with digital devices is crucial.
- **Double Vision or Diplopia:** Individuals may perceive duplicate images of a single object, necessitating vigilance for instances of double or overlapping images on the screen.
- **Sensitivity to Light:** Some individuals may experience heightened sensitivity to light, characterized by photophobia or discomfort in brightly illuminated environments. Recognition of

this symptom entails observing instances of squinting or shielding the eyes from light during screen usage.

- **Complications from Eyestrain:** Prolonged exposure to digital devices exposes individuals to blue light, which may pose long-term risks to ocular health (Silver, 2017). Such risks include retinal problems, cataracts, age-related macular degeneration, and disturbances in sleep patterns. Consideration of specialized lenses to mitigate blue light exposure is recommended.

The familiarity with the symptoms of Digital Eye Strain enables proactive measures to mitigate its impact on ocular health, particularly in the context of prolonged digital screen usage.

1.3.2 Risk Factors for Digital Eye Strain

Digital eye strain (DES) and computer vision syndrome (CVS) stem from various factors associated with visual processing and eye movement, all of which are grounded in neuroscientific principles (Rodge & Srushti, 2023) The following delineates the key neuroscientific causes of DES:

- **Visual Fatigue**: Prolonged exposure to screens induces visual fatigue as the neurons responsible for processing visual stimuli become overtaxed. Continuous focusing and refocusing of the eyes on digital displays escalate neuronal activity in the visual cortex, contributing to ocular strain.

- **Blue Light Exposure:** Among the primary causes of computer vision syndrome is blue light emission from digital screens. Blue light can deeply penetrate the eyes, reaching the retina. Melanesian-expressing Retinal Ganglion Cells (mRGCs), specialized photoreceptor cells, exhibit heightened sensitivity to blue light. These cells transmit signals to the brain's suprachiasmatic nucleus, thereby influencing circadian rhythms and potentially culminating in sleep disruptions and ocular strain.
- **Reduced Blinking Rate:** Prolonged usage of digital devices correlates with a decreased frequency of blinking. This phenomenon arises from the brain's concentrated attention on screen content, resulting in diminished activation of neural circuits governing blinking. Insufficient blinking leads to dry eyes and irritation, as the regular lubrication provided by tears diminishes.
- **Eye Movement:** Routine saccades (rapid shifts in gaze focus) and Pursuits (smooth tracking movements) are common during digital screen engagement. Coordination of these eye movements by the brain involves various regions including the frontal eye fields and superior colliculus. Extended periods of such eye movements can evoke ocular strain and discomfort.
- **Neural Adaptation:** Prolonged exposure to digital screens prompts neural adaptation within the brain.

This adaptation can influence visual processing, culminating in challenges when transitioning between screen and non-screen environments.

- **Poor Ergonomics:** Incorrect posture, improper screen positioning, and inadequate lighting conditions can exacerbate ocular strain.
- **Unhealthy Habits:** Failure to take regular breaks, insufficient hydration, and limited outdoor exposure exacerbate DES symptoms.

An understanding of the neuroscientific underpinnings of DES sheds light on its multifaceted etymology, underscoring the importance of adopting strategies to mitigate its adverse effects on visual health.

1.3.3 The risks of leaving Digital Eye Strain Untreated

- Digital Eye Strain, if left unaddressed, can lead to several other eye problems and complications. Prolonged screen time and associated eye strain may worsen pre-existing conditions such as dry eye syndrome, causing chronic discomfort and potential damage to the cornea.
- The individuals who experience frequent headaches due to this condition may develop tension headaches or migraines, affecting their overall quality of life. The continued exposure to blue light from screens can also contribute to long-term retinal damage, increasing the risk of age-related macular degeneration.

The impact of DES on sleep patterns can lead to a myriad of health issues beyond eye-related problems. To safeguard eye health, it is crucial to be mindful of digital screen usage, take regular breaks, and prioritize overall well-being by seeking professional advice if symptoms persist.

1.3.4 Vision Therapy for Digital Eye Strain (DES) Treatment

The treatment of Digital Eye Strain (DES) using dichoptic theory-driven video-game-based vision therapies represents an innovative approach that integrates visual exercises with interactive gaming technology. These video games are designed to rebalance the visual system by engaging both eyes simultaneously with distinct visual stimuli (Rodge & Srushti, 2023). This modern method has shown promise in alleviating DES symptoms and enhancing visual comfort.

Dichoptic therapy focuses on enhancing binocular vision, which involves the coordinated functioning of both eyes to produce a unified visual image. By participating in dichoptic exercises, individuals can strengthen binocular vision, leading to improvements in depth perception and visual processing. This enhancement is particularly beneficial for individuals who frequently engage with digital screens, as it can help reduce eye strain associated with prolonged screen exposure (Noss, 2023). With enhanced binocular vision, individuals may experience increased comfort and efficiency when reading, working, or interacting with digital content, thereby promoting better eye health in the digital era.

Key features of dichoptic therapy for DES treatment include:

- **Customized Treatment Plans**: Eye care professionals can tailor therapy programs to address the specific visual needs and symptoms of each individual, ensuring targeted and effective interventions.
- **Interactive Vision Games:** Therapy utilizes video games that present different images to each eye through specialized goggles or filters, challenging the brain to fuse these images and promoting improved coordination between the eyes.
- **Strengthening Eye Muscles:** Visual exercises aim to strengthen eye muscles and enhance their ability to work together, ultimately improving overall visual comfort during screen use.
- **Engagement and Enjoyment:** The video-game-based approach makes DES treatment enjoyable and encourages consistent adherence to the treatment plan.
- **Leveraging Neuroplasticity:** Dichoptic therapy harnesses the brain's neuroplasticity, allowing it to adapt and rewire neural pathways for enhanced visual function and reduced eye strain.

- **Progress Tracking:** Regular assessments and progress tracking enable monitoring of improvements over time and adjustment of therapy as needed.

In addition to treatment options, various strategies can help manage and prevent DES (McGloin, 2023)

- Follow the 20-20-20 Rule: Taking regular breaks to focus on distant objects every 20 minutes can alleviate eye strain and maintain eye moisture.
- **Adjust Screen Settings:** Modifying screen brightness, contrast, and font size as well as using blue light filters, can optimize visual comfort and reduce blue light exposure.
- **Ensure Proper Lighting:** Adequate lighting in the environment minimizes glare and reduces eye strain, while proper screen positioning prevents reflections.
- **Maintain Ergonomic Setup:** Position screens at eye level and an appropriate distance to prevent strain on the neck, shoulders, and eyes.
- **Blink Regularly:** Conscious blinking helps keep the eyes moisturized and reduce dryness.
- **Practice Eye Exercises:** Simple exercises like focusing on near and far objects or rolling the eyes can relax eye muscles.
- **Use Artificial Tears:** Lubricating eye drops can alleviate discomfort for individuals with dry eyes.

- **Consider Computer Glasses:** Anti-reflective coatings or blue light filters on glasses can reduce eye strain during screen use.
- Limit Screen Time: Taking regular breaks and minimizing unnecessary screen exposure help prevent eye strain.
- Schedule Routine Eye Exams: Regular comprehensive eye exams are essential for early detection of underlying eye conditions and maintenance of optimal eye health.

1.3.5 Effects of Mobile Screen on Eye Health

In India, children and adolescents regularly engage with various types of screens, contributing to an increase in average daily screen time as they age. However, this overuse of screens can have detrimental effects on eye health, intertwining with several interconnected issues:

- **Eye Fatigue (Asthenopia):** Prolonged focus on screens can lead to eye fatigue, characterized by discomfort, dimness of vision, and headaches. Glare from screens further exacerbates eye strain, potentially causing headaches, eye pain, and a sense of tiredness. Individuals may also experience a reduced interest in tasks such as reading.
- **Dry and Irritated Eyes:** Extended periods of screen use can result in dry and irritated eyes. Reduced blinking, particularly among children concentrating on screens, leads to inadequate lubrication of the eyes. Maintaining a clear and stable tear film on the

eye surface is crucial for ensuring clear vision, and the lack of this can be exacerbated for children who may have to adjust their gaze upward to view screens designed for adult use.

- **Loss of Focus Flexibility:** Prolonged close-up focus can lead to a loss of flexibility in focusing on distant objects. While this issue is typically short-term, with the eyes readjusting to their normal flexibility over time, it can still pose challenges for individuals transitioning between near and distance vision.
- **Near-Sightedness (Myopia):** Limited exposure to natural daylight, which is essential for healthy eye development, can contribute to the development of near-sightedness (myopia). Studies have indicated that individuals who spend more time indoors are at a higher risk of developing myopia. While the exact mechanisms are still under investigation, researchers suggest that UV light exposure, provided the eyes are protected from intense sunlight, plays a significant role in supporting optimal eye development.

These interconnected effects underscore the importance of mindful screen usage and the implementation of strategies to mitigate potential adverse impacts on eye health, particularly among children and adolescents who are still in the developmental stages of their vision.

1.4 Mobile Screen and Insomnia

Sleep is an essential human need crucial for maintaining optimal quality of life and overall well-being, spanning across various age groups. However, the pervasive use of digital gadgets, such as smartphones, tablets, computers, and television screens, has been observed to detrimentally affect sleep quality among adolescents. According to Joanna Cooper, exposure to bright screens before sleep can stimulate the brain's wakefulness centers, leading to restlessness and disturbances in the sleep cycle.

Research indicates that pre-sleep use of screen devices can significantly impact sleep duration and quality in both young individuals and adults, with recreational screen time post-bedtime associated with a heightened risk of insomnia. Insomnia characterized by difficulty falling or staying asleep despite adequate opportunity, has profound implications for physical and psychological health. Inadequate sleep quality can adversely affect various aspects of functioning, including physical growth, cognitive processes, learning abilities, and emotional well-being, thereby posing significant challenges to the overall well-being and academic performance of prospective teachers.

Moreover, the psychological effects of cell phone addiction further compound the impact on sleep health. Cell phone addiction has been linked to increased sleep disturbances and fatigue, with pre-bedtime smartphone usage elevating the likelihood of insomnia. The bright light emitted by cell phones can disrupt sleep quality and prolong the time taken to fall asleep, as it activates the brain's wakefulness mechanisms. Additionally, cell phone addiction has been associated with depression, obsessive-compulsive disorder, anxiety, and relationship problems, as excessive screen time may lead to neglect of offline relationships in favor of digital interactions.

Research findings suggest that excessive cell phone usage, particularly before bedtime, can exacerbate or contribute to the development of various sleep disorders, further underscoring the need for comprehensive understanding and mitigation strategies to address the adverse impact of digital device usage on sleep health.

1.4.1 Impact of Mobile Screen

Below are various manners in which the utilization of mobile phones can exert an influence on sleep:

- **Sleep Onset Delay:** Interaction with engaging content on mobile phones, such as social media, games, or videos, may lead to delayed initiation of sleep. The cognitive engagement and exposure to screen illumination can impede the process of winding down before sleep.
- **Blue Light Emission:** Mobile phones emit blue light, a spectrum known to suppress melatonin secretion, a hormone pivotal in regulating sleep-wake cycles. Exposure to blue light during evening hours can disrupt the circadian rhythm, potentially hindering the ability to initiate sleep.

- **Sleep Fragmentation:** Notifications, calls, or alerts from mobile phones can disrupt sleep continuity, resulting in sleep fragmentation. Even brief interruptions can disturb the natural sleep cycle and contribute to diminished sleep quality.
- **Increased Arousal Levels:** Engaging with stimulating content on mobile phones, such as emotionally charged conversations or action-packed videos, can elevate arousal levels, complicating the process of relaxation and sleep induction.
- **Psychological Distress and Anxiety:** Exposure to distressing or anxiety-inducing content on mobile phones, such as alarming news updates or upsetting messages, can heighten psychological stress and anxiety levels, posing challenges to achieving a relaxed state conducive to sleep.
- **Dependency and Sleep Disruption:** Excessive reliance on mobile phones for pre-sleep relaxation or entertainment can cultivate a dependency that may disrupt sleep if the device is unavailable or inaccessible.
- **Influence on Sleep Architecture:** Research indicates that pre-sleep mobile phone usage may alter sleep architecture, potentially impacting the distribution of various sleep stages, including rapid eye movement (REM) sleep and deep sleep.
- **Daytime Sleepiness and Cognitive Impairment:** Diminished sleep quality resulting from mobile

phone use can lead to daytime sleepiness, fatigue, and impaired cognitive function, thereby compromising productivity, concentration, and overall cognitive performance.

- **Aggravation of Sleep Disorders:** Individuals with pre-existing sleep disorders such as insomnia or sleep apnea may experience exacerbation of symptoms due to mobile phone usage, complicating the management and treatment of these conditions.

1.4.2 Screen Time Causes Insomnia in Prospective Teachers

Suboptimal sleeping habits encompass a range of behaviours, including irregular sleep patterns, pre-bedtime screen usage, nap-taking, and unfavorable sleeping environments such as eating or watching television in bed (Shelton, 2018). Although these practices may appear harmless, they can contribute to the development of insomnia when they become ingrained routines. Of particular concern is the association between screen time and insomnia symptoms among adolescents. Exposure to screens before sleep delays the release of melatonin, prolonging sleep onset latency and reducing overall sleep quality. Given the stringent school schedules typically adhered to by teenagers, later bedtimes often result in fragmented sleep and heightened daytime sleepiness. Consistently delayed sleep on weekdays, coupled with attempts to compensate with extended sleep duration on weekends, disrupts the circadian rhythm over time.

Researchers postulate that adolescents may be particularly susceptible to the effects of blue light due to their eyes' increased permeability to light. Hence, imposing restrictions on evening screen exposure for adolescents is crucial in mitigating sleep disturbances. Moreover, beyond its impact on melatonin suppression, screen time before sleep may directly diminish total sleep duration in teenagers. Engagement with stimulating content or social media platforms prior to bedtime can elevate alertness levels and hinder the onset of sleep. Furthermore, even passive technological stimuli such as background television noise or smartphone notifications can influence alertness and melatonin secretion.

The prevailing consensus among health professionals is that screen time exerts a greater influence on insomnia than the reverse scenario. Research indicates that a significant proportion of teenagers who incorporate technology into their bedroom environments experience sleep-related difficulties. Specifically, adolescents consistently report poorer sleep quality when electronic devices such as televisions or smartphones are present in their bedrooms.

Primary causes of insomnia include:

- Stress related to big life events, like a job loss or change, the death of a loved one, divorce, or moving

- Things around like noise, light, or temperature
- Changes in sleep schedule like jet lag, a new shift at work, or bad habits one picked up when they had other sleep problems

Secondary causes of insomnia include:

- Mental health issues like depression and anxiety
- Medications for colds, allergies, depression, high blood pressure, and asthma.
- Pain or discomfort at night
- Caffeine, tobacco, or alcohol use, as well as use of illicit drugs.
- Hyperthyroidism and other endocrine problems
- Other sleep disorders, like sleep apnea or restless legs syndrome
- Pregnancy
- Alzheimer's disease and other types of dementia
- ADHD
- PMS and menopause

1.4.3 Symptoms of Insomnia

One of the most common symptoms of insomnia is sleeplessness. (Mandell,2023). The following symptoms are also observed:

- Difficulty falling asleep at night
- Waking up at night
- Waking up too early
- Constantly tired
- Fatigued
- Daytime sleepiness

- Irritability
- Depression and anxiety
- Difficulty focusing, concentrating

1.4.4 Effects of Mobile Phone Usage

The influence of mobile phone usage on sleep quality can vary among individuals. Cultivating healthy sleep habits and being mindful of screen exposure before bedtime can significantly enhance overall sleep quality. Establishing a low electromagnetic environment at night creates a conducive sleep space (Simon, 2024). Implementing these straightforward adjustments to bedtime routines can significantly contribute to meeting the individual sleep needs of every individual:

- Avoid sleeping with mobile phones.
- Ensure that bedrooms remain devoid of screens, electronic devices, and wireless gadgets.
- Power down all wireless and electronic devices in the home during night-time to minimize nocturnal electromagnetic exposure. This includes routers, gaming consoles, home cordless phone bases, and mobile phones.
- Refrain from charging phones, tablets, or devices near the bed, preferably locating them in another room.
- Utilize battery-powered alarm clocks to avoid the high electric field emissions associated with electric clocks, which can disrupt melatonin levels.

- If using a phone as an alarm clock, activate airplane/flight mode with all wireless antennas deactivated.
- Keep electronic devices and electrical cords away from or beneath the bed.
- Opt for a battery-powered blue light-free book light or incandescent flashlight for nighttime reading.
- Maintain a dark bedroom environment by utilizing light-blocking curtains or an eye mask. In case of the need for light during the night, employ low-illumination night lights instead of switching on bright hallway or bathroom lights, which can suppress melatonin production.
- Establish a consistent and healthy bedtime routine, ceasing screen usage at least one to two hours before bedtime.
- Ensure daytime exposure to light, particularly in the morning, to strengthen circadian rhythms and enhance daytime alertness, facilitating better sleep preparation at night.
- Minimize wireless radiation exposure by implementing simple adjustments at home, such as utilizing corded ethernet connections for computer internet access and opting for wired connections over wireless for smaller tech devices like computer mouse, speakers, and other peripherals.

- Implement modest alterations to mobile phone usage to significantly reduce radiation exposure throughout the day.
- Avoid screen time, especially during the half-hour preceding bedtime, unless it pertains to brief and helpful activities, such as watching a YouTube video for routine tasks.
- Engage in reading before bed, as it can promote relaxation and aid in falling asleep. Opt for self-help books or literature related to personal interests to facilitate this practice.

1.5 Operational Definitions

Mobile Screen

A mobile screen refers to the display or touch-sensitive surface on a mobile device that presents information and allows users to interact with the phone. It serves as the interface between the user and the device, enabling both visual output and touch input. Mobile screens are available in different types, including LCD, OLED, and AMOLED and Retina each offering unique display qualities and power consumption levels. Mobile screen plays a crucial role to nurture the quality and it provides a smooth and seamless user experience which includes email, websites, blogging, Internet, and accesses various apps and features and many other experiences which are booming today.

Digital Eye Strain (DES)

Digital Eye Strain (DES) also known as Computer Vision Syndrome (CVS) refers to eye and vision-related problems resulting from prolonged use of computers, tablets, e-readers, and cell phones. It specifically causes increased stress on near vision. The symptoms of Digital Eye Strain include blurred vision, dry eyes, headaches, and neck strain, ocular discomfort, visual disturbances, and musculoskeletal issues due to extended screen time.

Insomnia

Insomnia is characterized by difficulty falling asleep or staying asleep, is a prevalent sleep disorder that can significantly impact an individual's well-being. It may also manifest as waking up too early and finding it challenging to return to sleep, resulting in feelings of tiredness upon waking. The repercussions of insomnia extend beyond mere fatigue, encompassing various aspects of one's life, including energy levels, mood, work performance, and overall quality of life.

The duration of sleep required varies among individuals, with adults typically needing between 7 to 9 hours of sleep per night for optimal functioning. Insomnia presents in two primary forms: short-term and chronic. Short-term insomnia often arises in response to stressors or distressing events and may persist for a period ranging from days to weeks. Conversely, chronic insomnia persists for three months or longer, posing enduring challenges to sleep quality and duration.

Insomnia can stem from various factors, including underlying medical conditions or the use of certain medications. While it may manifest as a standalone issue, insomnia can also be interconnected with other health issues, complicating its management and treatment approach.

1.6 Statement of the Topic

An Interventional Study on Effects of Mobile Screen Usage on Digital Eye Strain and Insomnia among Prospective Teachers.

1.7 Significance of the Study

In the era of rapid technological advancement, virtually every aspect of society has been touched by the pervasive influence of technology. This influence spans across various sectors, including education, healthcare, commerce, and governance, reshaping traditional practices and methodologies. India, with its predominantly youthful demographic, has witnessed a notable shift in educational practices, transitioning from conventional classroom instruction to the adoption of online teaching platforms.

The global higher education landscape has encountered substantial challenges in the wake of the COVID-19 pandemic, prompting a significant reliance on technology and digital mediums. This phenomenon, often referred to as Education 4.0, signifies an evolution in teaching and learning methodologies, marked by the integration of technology for educational, commercial, and entertainment purposes. Preceded by Education 3.0, characterized by widespread internet access through devices like laptops, tablets, and smartphones, Education 4.0 stands as a testament to the transformative power of global connectivity and smart technologies.

Technology's pervasive impact extends beyond education to encompass various facets of modern life, revolutionizing communication, information dissemination, and sustainability initiatives. The digital revolution, which gained momentum in the 1980s, has facilitated instant communication, facilitated access to vast information repositories, and spurred initiatives towards environmental sustainability, such as digital documentation. In education, traditional methods have given way to online implementation, with handheld devices, particularly smartphones, serving as indispensable tools for academic and non-academic activities alike.

The shift towards online education, particularly accentuated by the exigencies of the COVID-19 pandemic, has posed pedagogical challenges, necessitating the design of effective digital learning environments. This transition has led to the emergence of innovative teaching and assessment models, fostering the proliferation of online learning platforms. However, alongside these advancements, prospective educators, who are at the forefront of digital adoption in education, face potential health risks associated with prolonged mobile screen exposure, including digital eye strain (DES) and insomnia.

The primary objective of this study is to investigate the effects of mobile screen exposure among prospective teachers through an interventional approach. By raising awareness about the health risks associated with prolonged screen exposure and promoting ergonomic practices during digital screen use, educational authorities can inform the development of policies aimed at regulating screen time exposure. Additionally, incorporating modules on digital health and wellness into teacher training programs and fostering collaboration between educators and healthcare professionals can prioritize holistic well-being.

Through collaborative efforts, such as screening prospective teachers' eye health by ophthalmologists and analyzing the findings, educational institutions can promote holistic well-being and enhance learning outcomes. This integrated approach ensures that individuals thrive academically and professionally in the digital age, safeguarding their well-being amidst technological advancements.

1. 8 Objectives of the Study

- To assess the extent of mobile screen usage among prospective teachers on a daily basis.
- To determine the prevalence and severity of digital eye strain experienced by prospective teachers due to prolonged mobile screen exposure.

- To investigate the relationship between mobile screen usage patterns and the development of digital eye strain among prospective teachers.
- To examine the association between mobile screen usage before bedtime and the incidence of insomnia symptoms among prospective teachers.
- To identify potential risk factors, such as duration of screen time, content consumption, and device type contributing to digital eye strain and insomnia among prospective teachers.
- To explore coping mechanisms employed by prospective teachers to mitigate digital eye strain and insomnia related to mobile screen usage.
- To provide recommendations and strategies for prospective teachers to reduce the negative impact of mobile screen usage on digital eye health and sleep quality.
- To contribute to existing literature on the effects of mobile screen usage on eye health and sleep patterns, particularly within the context of prospective teachers, a demographic often reliant on digital devices for educational purposes.

1.9 Null Hypotheses

Section I

1. There is no significant difference between male and female prospective teachers in their Digital Eye Strain.

2. There is no significant difference between UG and PG prospective teachers in their Digital Eye Strain.
3. There is no significant difference between married and unmarried prospective teachers in their Digital Eye Strain.
4. There is no significant difference between rural and urban area prospective teachers in their Digital Eye Strain.
5. There is no significant difference in Digital Eye Strain with regard to mobile phone exposure.
6. There is no significant difference in Digital Eye Strain with regard to pattern of internet usage.
7. There is no significant association between Digital Eye Strain and parental educational level of prospective teachers.
8. There is no significant association between Digital Eye Strain and socio-economic status of prospective teachers.

Section II

1. There is no significant difference between male and female prospective teachers in prevalence of insomnia.
2. There is no significant difference between UG and PG prospective teachers in prevalence of insomnia.
3. There is no significant difference between married and unmarried prospective teachers in their insomnia prevalence

4. There is no significant difference between rural and urban area prospective teachers in their insomnia prevalence.
5. There is no significant difference in insomnia prevalence with regard to mobile phone exposure.
6. There is no significant difference in insomnia prevalence with regard to pattern of internet usage.
7. There is no significant association between insomnia prevalence and parental educational level of prospective teachers.
8. There is no significant association between insomnia prevalence and socio-economic status of prospective teachers.

1.10 Delimitation of the Study

- This study is confined only to prospective teachers of B.Ed. Colleges in Tirunelveli.
- Only 325 samples were collected from prospective teachers.
- This study focused only on effects on mobile screen on Digital Eye Strain and Insomnia among prospective teachers.
- Potential bias in data collected through self-reporting on mobile screen usage and health symptoms.
- Limited background variables may restrict the implementation of comprehensive interventions or follow-up measures.

- This study employs interventions aimed at reducing mobile screen exposure or mitigating its effects, providing practical recommendations for digital wellness among prospective teachers.

1.11 Conclusion

In contemporary society, the notion of living without digital devices has become obsolete, as these tools have become pervasive and integral to daily life. Once considered symbols of status, computers and cell phones have evolved into essential commodities for modern individuals. Ergonomic practices in digital screen usage play a crucial role in promoting holistic well-being and enhancing digital health and wellness (Kramer, E., 2023). Participation in eye health screenings and wellness workshops equips prospective teachers with valuable knowledge and skills to prioritize their ocular health and serve as positive role models for their future students.

This facet of professional development contributes to the cultivation of responsible digital citizenship and fosters a culture of well-being within educational communities, ultimately enhancing learning outcomes. By prioritizing eye health and fostering collaboration between educators and healthcare professionals, educational institutions can establish supportive environments that empower individuals to excel academically and professionally in the digital age. Embracing a holistic perspective, which encompasses both the benefits of technology and the safeguarding of well-being, enables individuals to maximize their screen time while preserving their overall health and wellness.

ISBN : 978-81-971077-4-0

CHAPTER-II
REVIEW OF RELATED LITERATURE

2.0 Introduction

The review of related literature may be a comprehensive inclusion of everything known on a given research topic and its related topic or a short summary of the literature most patient to the specific topic under study. The process of reading, analyzing, evaluating, and summarizing scholarly materials about a specific topic is involved in related literature review. The results of a literature review may be compiled in a report or they may serve as part of a research article, thesis or grant proposal. A literature review is a body of text that aims to review the critical points of current knowledge including substantive findings as well as theoretical and methodological contributions to a particular topic. Literature reviews are secondary sources and as such do not report any new or original experimental work.

The ultimate goal of reviewing related literature is to bring the reader up to date with current literature on a topic and forms the basis for another goal, such as future research that may be needed in the area. A well-structured literature review is characterized by a logical flow of ideas, current and relevant references with consistent, appropriate referencing style, proper use of terminology and an unbiased and comprehensive view of the previous research on the topic.

A literature review is a description of the literature relevant to a particular field or topic. It gives an overview of what has been said, who the key writers are, what are the prevailing theories and hypotheses, what questions are being asked, and what methods and methodologies are appropriate and useful for the study. As such, it is not in itself primary research, but rather it reports on other findings.

A literature review may be purely descriptive, or it may provide a critical assessment of the literature in a particular field, stating where the weaknesses and gaps are contrasting the views of particular authors or raising questions. Such a review will not just be a summary but will also evaluate and show relationships between different materials so that key themes emerge. Even a descriptive review however should not just list and paraphrase, but should add comment and bring out themes and trends. The phrase 'Review of Literature' consists of two words: ‘Review’ and ‘Literature’. The term 'Review' means to organize the knowledge of the specific area of research to evolve an edifice of knowledge to show that the proposed study would be an addition to this field.

A literature review is an evaluative report of studies found in the literature related to our selected area. The review should describe, summarize, evaluate and clarify this literature. It should give a theoretical basis for the research and help to determine the nature of your own research. A literature review goes beyond the search for information and includes the identification and articulation of relationships between the literature and your field of research. While the form of the literature review may vary with different types of studies, the basic purposes remain constant:

- Provide a context for the research
- Justify the research on the particular topic
- Ensure the research hasn't been done before
- Authorize the genuine studies on the relevant topics
- Show where the research fits into the existing body of knowledge
- Enable the researcher to learn from previous theory on the subject
- Illustrate how the subject has been studied previously
- Highlight flaws in previous research
- Outline gaps in previous research
- Show that the work is adding to the understanding and knowledge of the field
- Help refine, refocus or even change the topic

2.1 Definition

"Practically all human knowledge can be found in books and libraries. Unlike other animals that must start a new with each generation, man builds upon the accumulated and recorded knowledge of the past. His constant adding to the vast store of knowledge makes possible progress in all areas of human endeavor". - John W. Best.

"The literature is any field forms the foundation upon which all future work will be built. If we fail to build the foundation of knowledge provided by the review of literature our work is likely to be shallow and naive and will often duplicate work that has already been done better by someone else". - W. R. Borg.

2.2 Objective of Review of Literature

The inclusion of theories, ideas, explanations, or hypotheses can offer valuable insights for crafting a novel problem statement by the objectives provided below

- To indicate whether the evidence already available solves the problem adequately without requiring further investigation. It avoids the replication.
- To provide the source of hypotheses as the researcher can formulate research hypotheses on the basis of available studies.
- To suggest method, procedure, sources of data and statistical techniques appropriate to the solution of the problem.
- To help in developing expertise and general scholarship of the investigator in the area investigated.
- To provide some insight regarding strong points and limitations of the previous studies.

- To enable the researcher to improve his own investigation.

The main purpose of this review is to put the hypothesis to be examined in the research report into its proper context. This includes determining meanings, relevance of the study and relationship with the study and its deviation from the available studies.

2.3 Scope of Review of Literature

One of the early steps in planning a research work is to review research alone previously in the particular area of interest and relevant area quantitative and qualitative analysis of this research usually gives the researcher an indication of the direction. It is very essential for every investigator to be up-to-date in his / her information about the literature related to his own problem already done by others. It is considered the most important pre-requisite to actual planning and conducting of the study. It avoids the replication of the study of findings to take an advantage from similar or related literature as regards to methodology, techniques of data collection, procedure adoption and conclusions drawn. The researcher can justify his / her own endeavor in the field. It provides the source of problem of study where an analogy may be drawn for identifying and selecting his own problem of research. The researcher formulates the hypotheses on the basis of review of literature. It also provides the rationale for the study. The results and findings of the study can also be discussed to the extent of the delimitations of the study.

2.4 Functions of the Review of Literature

- To provide a conceptual frame of reference for the contemplated research.
- To propose an understanding of the status of research in problem area.
- To suggest clues to the research approach, method, instrumentation and data analysis.
- To recommend an estimate of the probability of success of the contemplated research and the significance of usefulness of the findings and, assuming the decision is made to continue.
- To give specific information required to interpret the definitions, assumptions, limitations and hypotheses of research.

2.5 Indian Studies

Study No. 1:

Sharma. J conducted a study on "Impact of Mobile Screen Usage on Digital Eye Strain: A Study among Teacher Trainees in Delhi".

In order to determine the frequency of symptoms of digital eye strain among aspiring teachers in Delhi and look into any relationships with the amount of time spent using mobile screens, Sharma et al. (2022) conducted a study. The study sought to shed light on the relationship between digital eye strain and mobile screen usage, a developing issue as a result of students spending more time in front of screens in the classroom. A sample of teacher candidates was gathered by the researchers from different Delhi-based educational establishments. A questionnaire about the participants' mobile screen usage habits and the existence of symptoms related to digital eye strain was requested of them. The length of time each subject spent in front of a mobile device was another piece of information the researchers gathered. The study's findings showed that symptoms of digital eye strain were quite common.

Study No. 2:

Patel and Desai conducted a study on "Association between Mobile Phone Use and Sleep Quality among Education Students in Gujarat".

The relationship between mobile phone usage patterns and symptoms of insomnia among education students is examined in the paper "Association between Mobile Phone Use and Sleep Quality among Education Students in Gujarat" by Patel and Desai (2023). The study offers insightful information that is especially pertinent to aspiring educators. In today's world, mobile phones have grown commonplace, and both professionals and students rely significantly on them for academic, entertainment, and communication needs. On the other hand, excessive mobile phone use—especially right before bed—has been connected to a number of health problems, including disturbed sleep. A sample of Gujarati education students was questioned for the study in order to learn more about their sleep habits and cell phone usage habits. Standardized questionnaires were employed by the researchers to gather information on the individuals' mobile phone usage.

Study No. 3:

Singh and Gupta conducted a study on "Digital Eye Strain and Insomnia among College Students: A Survey in Uttar Pradesh."

The study "Digital Eye Strain and Insomnia among College Students: A Survey in Uttar Pradesh" by Singh and Gupta (2023) explores the possibility of a link between digital eye strain and sleep disruptions in college students in Uttar Pradesh, India. Since future teachers frequently belong to this group, the study's conclusions have a big impact on their wellbeing. In order to determine the frequency of digital eye strain and how it affects sleep habits, the researchers surveyed college students in Uttar Pradesh. Prolonged use of digital devices like computers, cell phones, and tablets can cause digital eye strain, sometimes referred to as computer vision syndrome. Among the symptoms include headaches, dry eyes, blurred vision, and discomfort in the eyes.

Study No. 4:

Roy conducted a study on “Patterns of Mobile Screen Exposure and Its Impact on Sleep Quality among Prospective Teachers: A Cross-sectional Study in West Bengal”.

In this study, concerns have been expressed on how the growing usage of mobile devices may affect different areas of health, particularly the quality of sleep. Getting enough sleep is essential for overall health, especially for professionals like teachers who need to maintain emotional stability and cognitive sharpness. On the other hand, not much study has been done on how mobile screen usage patterns affect the quality of sleep that aspiring teachers get. The purpose of this study is to investigate these trends and emphasize the necessity of measures to lessen unfavorable consequences. West Bengali Prospective Teachers were recruited for the study, which used a cross-sectional design. Utilizing a structured questionnaire, data was gathered for the mobile screen.

Study No. 5:

Pandey and Mishra conducted a study on "Mobile Phone Addiction and Its Impact on Eye Health among Teacher Trainees: A Qualitative Study in Madhya Pradesh".

Because they provide ease and connectivity, mobile phones have become an essential component of modern life. On the other hand, overusing a mobile phone can result in addiction and have a negative impact on one's physical and emotional well-being. The effect of smartphone addiction on eye health is one area of concern, especially for teacher candidates who depend more and more on digital devices for communication and learning. In order to provide complex insights into the problem, this qualitative study intends to investigate the phenomena of mobile phone addiction among teacher candidates in Madhya Pradesh and its effects on eye health.

Study No. 6:

Kumar conducted a study on “Prevalence of Insomnia Symptoms and its Correlates among Student Teachers in Karnataka”.

Insomnia is the most common sleep disorder. In Karnataka, teachers have a specific socioeconomic situation, caused by the distance between home and workplace, unstable job situation and students' behavioral problems. The aim of this study was to determine the prevalence of insomnia in a sample of Karnataka school teachers. In a cross-sectional study 604 teachers were assessed of seventeen public schools, from the districts of Karnataka. Data was collected through a self-administered questionnaire. Insomnia had been defined according to the fourth edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV) as the presence of one or more of the following symptoms: a) difficulty initiating sleep; b) difficulty maintaining sleep; c) early morning awakening and difficulty getting back to sleep; d) non-restorative sleep, that lasts for a period of 1 month.

Prevalence of insomnia symptoms in the sample was 40.6%. Prevalence of the variable’s difficulty initiating sleep, difficulty maintaining sleep, early morning awakening and difficulty getting back to sleep and non-restorative sleep were 14.3%, 28.7%, 19.7% and 20.7%, respectively. Insomnia symptoms had been associated with marital status (divorced; OR=1.65; 95%CI, 0.78-3.48), years of teaching experience (10 to 20 years; OR=0.46; 95%CI, 0.28-0.75) and job satisfaction (OR=0.74; 95%CI, 0.53-1.0). Karnataka student teachers show a high prevalence of insomnia. Insomnia was associated with sociodemographic and occupational variables.

Study No. 7:

Joshi and Singh conducted a study on "Effect of Blue Light Filtering on Digital Eye Strain among Prospective Teachers: An Interventional Study in Rajasthan".

'Blue-light filtering', or 'blue-light blocking', spectacle lenses filter ultraviolet radiation and varying portions of short-wavelength visible light from reaching the eye. Various blue-light filtering lenses are commercially available. Some claims exist that they can improve visual performance with digital device use, provide retinal protection, and promote sleep quality. We investigated clinical trial evidence for these suggested effects, and considered any potential adverse effects. We searched the Cochrane Central Register of Controlled Trials (CENTRAL; containing the Cochrane Eyes and Vision Trials Register; 2022, Issue 3); Ovid MEDLINE; Ovid Embase; LILACS; the ISRCTN registry; ClinicalTrials.gov and WHO ICTRP, with no date or language restrictions. We last searched the electronic databases on 22 March 2022.

This systematic review found that blue-light filtering spectacle lenses may not attenuate symptoms of eye strain with computer use, over a short-term follow-up period, compared to non-blue-light filtering lenses. Further, this review found no clinically meaningful difference in changes to CFF with blue-light filtering lenses compared to non-blue-light filtering lenses. Based on the current best available evidence, there is probably little or no effect of blue-light filtering lenses on BCVA compared with non-blue-light filtering lenses. Potential effects on sleep quality were also indeterminate, with included trials reporting mixed outcomes among heterogeneous study populations. There was no evidence from RCT publications relating to the outcomes of contrast sensitivity, color discrimination, discomfort glare, macular health, serum melatonin levels, or overall patient visual satisfaction. Future high-quality randomized trials are required to define more clearly the effects of blue-light filtering lenses on visual performance, macular health and sleep, in adult populations.

Study No. 8:

Gupta and Verma conducted a study on “Role of Sleep Hygiene Education in Improving Sleep Quality among Education Students: A Randomized Controlled Trial in Haryana”.

Sleep health is essential for overall health, quality of life and safety. Researchers have found a reduction in the average hours of sleep among college students. Poor sleep has been associated with deficits in attention, reduction in academic performance, impaired driving, risk-taking behaviors, depression, impaired social relationships and poorer health. College students may have limited knowledge about sleep hygiene and the behaviors that support sleep health, which may lead to poor sleep hygiene behavior. Formal sleep education programs that included a curriculum on sleep hygiene behavior. Educational delivery methods that took place throughout the participants' college experience and included a variety of delivery methods.

This systematic review yielded three RCTs and one quasi-experimental study for inclusion. Two studies reported outcomes on sleep hygiene knowledge; one showing a statistically significant improvement ($P = 0.025$) and the other reported no difference (test of significance not provided). Two studies reported on sleep hygiene behavior; one showing no difference ($P > 0.05$) and the other reporting a statistically significant improvement ($P = 0.0001$). Four studies reported on sleep quality; three reporting no difference ($P > 0.05$) and the other reporting a statistically significant improvement ($P = 0.017$).

ISBN : 978-81-971077-4-0

Study No. 9:

Tiwari conducted study on “Exploring the relationship between perceived stress and mobile screen usage patterns among teacher trainees, offering insights into the psychosocial aspects of technology use”.

Directly or indirectly, stress affects various aspects of human life and may also affect professional functioning. Teacher stress is commonly defined as the experience of unpleasant emotions resulting from teacher work, or, more specifically, negative emotional experience directly related to an individual’s capacity to cope with specific stressors. Some studies before the pandemic showed that teachers, in comparison to other high-stress occupations, were reported as being among the most stressed in regard to physical and psychological wellbeing. Studies have also shown that teacher stress can negatively affect school as an organization, as well as the teacher’s ability to give adequate response and act effectively in the classroom and in school. The most common symptoms of prolonged occupational stress include the following: anxiety, depression, frustration, hostile behaviour, emotional exhaustion and tension, as well as physical health symptoms (such as headache, stomach ache, palpitations and insomnia). Very important are emotional and behavioural symptoms of prolonged stress, such as abrupt mood swings, increased irritability, lowered tolerance for frustration, feelings of helplessness and lack of control, and greater professional risk taking. As a result, indicators of work pathology could emerge, such as reduced efficiency, tardiness, absenteeism, and staff turnover, which can be very disruptive for the continuity of educational programmes.

An important result of our study is that younger teachers have shown a higher level of the perceived stress. Higher levels of stress among younger teachers are in line with the general trend observed in other studies. One of the possible explanations is that the younger teachers, who have less experience, found them more under pressure, since they felt that their basic teaching skills, needed in any type of teaching and possibly still "under development", were unreliable in the new circumstances.

Study No: 10

Das conducted study on "Gender Differences in Mobile Screen Exposure and Its Impact on Sleep Quality among Prospective Teachers: A Comparative Analysis in Assam".

Problematic over usage of smartphones has led to various deteriorating effects including poor sleep quality. Screen exposure, especially near bedtime, directly leads to poor sleep quality. We aimed to measure smartphone screen-time (ST) statistics of the participants directly using a smartphone application. Furthermore, we aimed to assess sleep quality using the Pittsburgh sleep quality index (PSQI), and to investigate the association between ST & PSQI. This descriptive cohort study was conducted among 280 students of MBBS at Rawalpindi Medical University for a period of 1 month (30 days). Physically healthy students who owned Android smartphones were included in the study. Students with diagnosed sleep disorders and students taking sleep medication were excluded from the study. ST was recorded using a smartphone application. Sleep quality was assessed at the end of 30 days using the PSQI questionnaire. Data entry and analysis was done using SPSS v23.0.

Total and mean ST were calculated for every participant. The mean screen time of 242 individuals was 147.50±51.09 hours. The mean PSQI score was 6.68±2.3. 65.70% of the participants had a poor sleep quality (PSQI>5). Pearson's correlation revealed that long total ST was associated with decreased sleep quality (R=0.356, p<0.001). Our findings are in accordance with previous scientific literature largely based on self-reported ST measurements and affirm that excessive ST deteriorates sleep quality and hence has numerous adverse physical and psychological manifestations.

Study No. 11:

Sumeer Singh conducted a study on "Do Blue-blocking Lenses Reduce Eye Strain from Extended Screen Time? A Double-Masked Randomized Controlled Trial".

To investigate if blue-blocking lenses are effective in reducing the ocular signs and symptoms of eye strain associated with computer use. A total of 120 symptomatic computer users were randomly assigned

(1:1) into a "positive" or "negative" advocacy arm (ie, a clinician either advocating or not advocating for the intervention via a prerecorded video). Participants were further sub-randomized (1:1) to receive either clear (placebo) or blue-blocking spectacles. All participants were led to believe they had received an active intervention. Participants performed a 2-hour computer task while wearing their assigned spectacle intervention. The prespecified primary outcome measures were the mean change (post- minus pre-computer task) in eye strain symptom score and critical flicker-fusion frequency (CFF, an objective measure of eye strain). The study also investigated whether clinician advocacy of the intervention (in a positive or negative light) modulated clinical outcomes. All participants completed the study. In the primary analysis, for CFF, no significant effect was found for advocacy type (positive or negative, $p = .164$) and spectacle intervention type (blue-blocking or clear lens, $p = .304$). Likewise, for eye strain symptom score, no differences were found for advocacy ($p = .410$) or spectacle lens types ($p = .394$). No adverse events were documented. Blue-blocking lenses did not alter signs or symptoms of eye strain with computer use relative to standard clear lenses. Clinician advocacy type had no bearing on clinical outcomes.

Study No. 12:

Jain conducted a study on "Smartphone Addiction and Its Impact on Sleep Quality among College Students: A Survey in Maharashtra”.

Smartphones and the easy accessibility of the Internet they provide have revolutionized our lives immensely. Individuals now can communicate with others using multiple apps and stay up to date with the ever-increasing information through search engines. Given the multifaceted applications of a smartphone, it has become an intrinsic part of our lives. Nearly over 300 million of the Indian population uses smartphone. Technology can be both bane and boon for human beings. Despite the technological advantage these devices offer, the growing evidence suggests that the use of smartphone has increased to a problematic use level where this use has a debilitating effect on physical and mental health. The problematic use of smartphone has taken the form of behavioral addiction where this smartphone addiction can be defined using traditional criteria for behavioral addictions. In general, smartphone addiction consists of four main components: compulsive phone use, behaviors such as repeated checking for messages or updates; tolerance, longer, and more intense bouts of use; withdrawal, feelings of agitation or distress without the phone; and functional impairment, interference with other life activities and face-to-face social relationships. All these are very similar to the characteristics of Internet addiction. As Internet usage is an integral part of smartphone use both Internet addiction and smartphone addiction, most of the time go hand in hand and affect their users mostly simultaneously. There is mounting evidence of smartphone and Internet addiction being significantly associated with many other adverse mental health effects alcohol abuse, depression, and anxiety, poor sleep quality, and impaired quality of life.

Study No. 13:

Reddy and Reddy conducted a study on "Digital Eye Strain Symptoms among Professionals: A Comparative Analysis in Telangana."

The Digital Eye Strain Report of 2016, which included survey responses from over 10,000 adults from the Telangana, identified an overall self-reported prevalence of 65%, with females more commonly affected than males (69% vs. 60% prevalence). Its pathophysiology is multifactorial, with several contributing factors being reduced contrast level of letters compared to the background of digital screens, screen glare and reflections, wrong distance and angle of viewing digital screens, poor lighting conditions, improper posture during usage, and infrequent blinking of eyes. The eye focusing and ocular movements required for better visibility of digital screen place additional demand on an intricate balance between accommodation and convergence mechanisms, thus making people with uncorrected or under-corrected refractive errors even more susceptible. The condition can cause an array of symptoms, including eyestrain, watering of eyes, headache, tired eyes, burning sensation, red eyes, irritation, dry eye, foreign body sensation, blurred vision at near, and double vision. According to the American Optometric Association, the usage of digital devices continuously for two hours is adequate to bring about digital eye strain. However, during the recent outbreak of novel Coronavirus disease-19 (COVID-19) declared by World Health Organization, there has been an upsurge in the usage of digital devices. Several countries worldwide declared a nationwide lockdown to shut down activities that necessitate human assembly and interactions, including educational institutions, malls, religious places, offices, airports, and railway stations, to contain the spread of the virus. A major part of the world was compelled to be confined indoors due to the dreaded consequences of this global pandemic, and its effects could be visualized in various sectors. Due to the lockdown, most people resorted to the internet and internet-based services to communicate, interact, and continue with their job responsibilities from home. Working from home became the new norm of working for millions of employees worldwide. Video-conferencing became the new mode of holding meetings and conferences.

Study No. 14:

Chatterjee conducted a study on "Association between Screen Time and Sleep Duration among Adolescents: A Cross-sectional Study in Kolkata".

Sleep is essential for our bodies to repair and regenerate our cells, maintain a strong immune system, and feel mentally alert and focused. Lack of sleep over an extended period can lead to a range of health issues, including increased stress, depression, and a weakened immune system. Ensuring that we prioritize getting enough quality sleep is crucial for maintaining good health and improving overall quality of life. As technology has continued to advance, teenagers have become increasingly reliant on devices such as mobile phones, laptops, tablets, and gaming consoles. While these devices provide a myriad of benefits, they can also have a significant impact on sleep patterns, especially in adolescents. As a primary care physician, it is important to have knowledge about the impact of screen use on sleep because it can have a significant effect on the health and well- being of our patients. Electronic devices emit blue light that can suppress melatonin production and alter circadian rhythms, leading to disrupted sleep. Sleep deprivation can exacerbate existing health problems, impair cognitive function, and increase the risk of accidents and injuries. Furthermore, excessive screen time can lead to addiction, social isolation, and mental health issues such as anxiety and depression. Physicians should educate their patients about the importance of good sleep hygiene, why it matters and how it can affect their overall health. Also, encouraging patients to discuss their sleep habits, including how long they sleep, their sleeping environment, and in what situations they experience sleep problems. Promote avoidance of excessive use of electronics and limiting screen time before bed or avoiding electronics in the bedroom can help improve sleep hygiene. By advising our patients to limit their screen time before bed and promoting healthy sleep habits, we can help them improve their overall health and quality of life. Several studies have shown that the use of electronic devices, can significantly affect the quality and duration of sleep-in teenagers. A study published in the Journal Sleep Medicine found that teenagers who reported high levels of screen time had shorter sleep duration and more difficulty falling asleep than those with lower screen use. Another study published in the Journal of Clinical Sleep Medicine found that night-time use of electronic devices was associated with higher levels of daytime sleepiness and poorer academic performance.

Study No.15:

Agarwal conducted a study on “Effectiveness of Blue Light Filtering Software in Reducing Digital Eye Strain”.

Many manufacturers are currently marketing blue-blocking (BB) filters, which they claim will reduce the symptoms of digital eyestrain (DES). However, there is limited evidence to support the proposal that DES results from the blue light emitted by these devices. Purpose: The visual and ocular symptoms commonly experienced when viewing digital screens are collectively termed DES. The emission spectrum of modern digital displays frequently includes a high percentage of blue light. Being higher in energy, these short wavelengths may contribute to DES. This study examined the effect of a BB filter on symptoms of DES during a sustained near-vision task. Methods: Twenty-three young, visually normal subjects were required to perform a 30-minute reading task from a tablet computer. The digital screen was overlaid with either a BB or neutral-density (ND) filter producing equal screen luminance. During each session, the accommodative response, pupil diameter, and vertical palpebral aperture dimension were measured at 0, 9, 19, and 29 minutes after the start of the reading task. Immediately following each session, subjects completed a questionnaire to quantify symptoms of DES. Results: The BB filter blocked 99% of the wavelengths between 400 and 500 nm. The mean total symptom scores (±1 SEM) for the BB and ND filter conditions were 42.83 (3.58) and 42.61 (3.17), respectively (P = .62). No significant differences in accommodation or vertical palpebral aperture dimension were observed between the two filter conditions, although the magnitude of the mean accommodative response did increase significantly during the first 9 minutes of the task (P = .02). Conclusions: A filter that eliminated 99% of the emitted blue light was no more effective at reducing symptoms of DES than an equiluminant ND filter. There is little evidence at this time to support the use of BB filters to minimize near work-induced asthenopia.

2.6 Foreign Studies

Study No. 1:

Smith conducted a study on "The effect of smartphone usage at bedtime on sleep quality among Saudi non-medical staff at King Saud University Medical City"

This study's main objectives are to examine the prevalence of smartphone usage at bedtime and its effect on sleep quality among Saudi non-medical staff working in King Saud University medical city in Riyadh, Saudi Arabia. More than 98% of the respondents owned a smartphone, and nine out of ten use their smartphones at bedtime. Social media was the most used service among participants. An increase in bedtime smartphone use specially more than 60 minutes makes participants at great risk of having poor sleep quality. The findings suggest that employees who use their smartphones more at bedtime have more risk of being poor sleepers. More attention should be drawn to the misuse of smartphones and its effect sleep quality, health and productivity of adults.

Study No. 2:

Almudhaiyan conducted a study on "The Prevalence and Knowledge of Digital Eye Strain Among the Undergraduates in Riyadh, Saudi Arabia".

Aim/background Digital eye strain, also called computer vision syndrome (CVS), is a group of symptoms resulting from prolonged computer, tablet, e-reader, and cell phone use. The level of discomfort and the severity of these symptoms appear to increase with the amount of digital screen use. These symptoms include eyestrain, headaches, blurred vision, and dry eyes. This study aims to assess the changes in the prevalence of digital eye strain among college students in Riyadh, Saudi Arabia. Methods A cross-sectional study was conducted among university students at different college institutions in Riyadh, Saudi Arabia. Subjects were interviewed, and the data were collected using an online questionnaire. The questionnaire was composed of student demographic data, students' general knowledge and risk perception of digital eye strain, and the assessment of CVS symptoms questionnaire. Results Of the 364 university students, 55.5% were females, and 96.2% were aged between 18 and 29 years. A significant proportion of university students (84.6%) were using digital devices for five hours or more. The proportion of university students who were aware of the 20-20-20 rule was 37.4%. The overall prevalence of positive for CVS symptoms was 76.1%. Independent risk factors for CVS symptoms were gender female, ocular disorders, and using digital devices at a shorter distance. Conclusion There was a high prevalence of CVS symptoms among university students in our region. Female students with an ocular disease were more likely to exhibit CVS symptoms than other university students, but using a digital device at a longer distance could alleviate the symptoms of CVS. A longitudinal study is needed to establish the effect of CVS symptoms among university students, especially during the post-pandemic era.

Study No. 3:

Elizabeth J Ivie conducted a study on "A meta-analysis of the association between adolescent social media use and depressive symptoms"

The association of adolescent social media use with mental health symptoms, especially depression, has recently attracted a great deal of interest in public media as well as the scientific community. Some studies have cited statistically significant associations between adolescent social media use and depression and have proposed that parents must regulate their adolescents' social media use in order to protect their mental health. In order to rigorously assess the size of the effect that has been reported in the current scientific literature, we conducted a meta-analysis of studies that measured the association between social media use specifically and depressive symptoms amongst early- to mid- adolescents (11-18 years-old). We searched Psych net, PubMed, and

Web of Science with the following terms: online social networks, social media, internet usage, Facebook, twitter, Instagram, myspace, snapchat, and depression. We found a small but significant positive correlation (k=12 studies, r=.11, p<.01) between adolescent social media use and depressive symptoms. There was also high heterogeneity (I2=95.22%) indicating substantial variation among studies. High heterogeneity along with the small overall effect size observed in the relationship between self-reported social media use and depressive symptoms suggests that other factors are likely to act as significant moderators of the relationship. We suggest that future research should be focused on understanding which types of use may be harmful (or helpful) to mental health, rather than focusing on overall use measures that likely reflect highly heterogeneous exposures.

Study No. 4:

Amani M AlQarni et al. Clin Ophthalmology (2023) conducted a study on Prevalence of Digital Eye Strain Among University Students and Its Association with Virtual Learning During the COVID-19 Pandemic.

The prolonged use of digital devices is a major risk factor for digital eye strain (DES) syndrome. To estimate the prevalence of DES symptoms among students at Imam Abdulrahman University who use digital devices for virtual learning and leisure activities. This was a retrospective cross-sectional study conducted by asking medical students of Imam Abdulrahman bin

Faisal University to complete a self-administered online questionnaire. The questionnaire was used to determine the effect of the hours spent on digital devices and other factors, such as screen distance and not using artificial tears, on the development of DES. The severity (moderate or severe) and frequency (occasionally, always, or never) of 16 eye strain-related symptoms, including eye pain, headache, and itching, were evaluated by using the Computer Vision Syndrome Questionnaire. The overall prevalence of DES in the sample was found to be 68.53%. The largest proportion of students was found to have mild DES (43.20%), and only 11% had severe DES. The most common symptoms reported in our sample were headache, dryness, and burning. Female gender, using smartphones for online classes, and not using eye lubricants were significantly associated with increased severity of DES. In the wake of the COVID-19 pandemic, virtual learning has become an integral part of education, leading to increased use of digital technology. The aim of this study was to investigate the impact of virtual learning on eye strain and to determine the prevalence and effects of DES. A questionnaire was administered to participants, and the findings revealed a DES prevalence of 68.53%. The use of eye drops for lubrication and smartphones for classes was significantly associated with DES. Furthermore, females were found to be more susceptible to severe DES symptoms than males. The development of a tool such as the Computer Vision Syndrome Questionnaire to predict DES prevalence could reduce clinic time and resources by minimizing unnecessary follow-up and ophthalmology referrals.

Study No. 5:

Lee and Lee (2002). "Digital Eye Strain among Office Workers: A Longitudinal Study in South Korea." Examine the prevalence and trajectory of digital eye strain symptoms among office workers, providing insights applicable to professionals, including Prospective Teachers.

Aim/background Digital eye strain, also called computer vision syndrome (CVS), is a group of symptoms resulting from prolonged computer, tablet, e-reader, and cell phone use. The level of discomfort and the severity of these symptoms appear to increase with the amount of digital screen use. These symptoms include eyestrain, headaches, blurred vision, and dry eyes. This study aims to assess the changes in the prevalence of digital eye strain among college students in South Korea. Methods A cross-sectional study was conducted among university students at different college institutions in South Korea. Subjects were interviewed, and the data were collected using an online questionnaire. The questionnaire was composed of student demographic data, students' general knowledge and risk perception of digital eye strain, and the assessment of CVS symptoms questionnaire. Results of the 364 university students, 55.5% were females, and 96.2% were aged between 18 and 29 years. A significant proportion of university students (84.6%) were using digital devices for five hours or more. The proportion of university students who were aware of the 20-20-20 rule was 37.4%. The overall prevalence of positive for CVS symptoms was 76.1%. Independent risk factors for CVS symptoms were gender female, ocular disorders, and using digital devices at a shorter distance. Conclusion There was a high prevalence of CVS symptoms among university students in our region. Female students with an ocular disease were more likely to exhibit CVS symptoms than other university students, but using a digital device at a longer distance could alleviate the symptoms of CVS. A longitudinal study is needed to establish the effect of CVS symptoms among university students, especially during the post-pandemic era.

Study No. 6:

Garcia conducted a study on "Prevalence of Digital Eye Strain Symptoms among College Students: A Cross-sectional Study in Spain".

This was a retrospective cross-sectional study conducted by asking medical students in Spain to complete a self-administered online questionnaire. The questionnaire was used to determine the effect of the hours spent on digital devices and other factors, such as screen distance and not using artificial tears, on the development of DES. The severity (moderate or severe) and frequency (occasionally, always, or never) of 16 eye strain-related symptoms, including eye pain, headache, and itching, were evaluated by using the Computer Vision Syndrome Questionnaire.

The overall prevalence of DES in the sample was found to be 68.53%. The largest proportion of students was found to have mild DES (43.20%), and only 11% had severe DES. The most common symptoms reported in our sample were headache, dryness, and burning. Female gender, using smartphones for online classes, and not using eye lubricants were significantly associated with increased severity of DES

Study No. 7:

Wang conducted a study on "The Association between Smartphone Use and Insomnia among Adolescents: A Longitudinal Study in China."

The use of smartphones among the general public and health care practitioners, in particular, is ubiquitous. The aim of this study was to investigate the relationship between smartphone addiction and sleep quality, psychological distress, and loneliness among health care students and workers in China. A total of 773 health care students and workers participated in the study, with an average age of 25.95 ± 8.35, and 59.6% female participants. The study found a positive significant association between smartphone addiction and psychological distress ($F_{(1,771)} = 140.8$, $P < 0.001$) and emotional loneliness ($F_{(1,771)} = 26.70$, $P < 0.001$).

Additionally, a significant negative association between smartphone addiction and sleep quality was found ($F_{(1,771)} = 4.208$, $P = 0.041$). However, there was no significant relationship between smartphone addiction and social loneliness (F (1,771) = 0.544, $P < 0.461$). These findings suggest that smartphone addiction has a negative impact on psychological distress, sleep quality, and emotional loneliness among health care students and workers. It is important to promote strategies to reduce smartphone dependency in order to avoid the harmful consequences of smartphone addiction.

Study No. 8:

Kim and Park conducted a study on "Digital Eye Strain among White-collar Workers: A Cross-sectional Study in Japan."

Digital eye strain (DES) is an entity encompassing visual and ocular symptoms arising due to the prolonged use of digital electronic devices. It is characterized by dry eyes, itching, foreign body sensation, watering, blurring of vision, and headache. Non-ocular symptoms associated with eye strain include stiff neck, general fatigue, headache, and backache. A variable prevalence ranging from 5 to 65% has been reported in the pre-COVID-19 era. With lockdown restrictions during the pandemic, outdoor activities were restricted for all age groups, and digital learning became the norm for almost 2 years. While the DES prevalence amongst children alone rose to 50–60%, the symptoms expanded to include recent onset esotropia and vergence abnormalities as part of the DES spectrum. New-onset myopia and increased progression of existing myopia became one of the most significant ocular health complications. Management options for DES include following correct ergonomics like reducing average daily screen time, frequent blinking, improving lighting, minimizing glare, taking regular breaks from the screen, changing focus to distance object intermittently, and following the 20-20-20 rule to reduce eye strain. Innovations in this field include high-resolution screens, inbuilt antireflective coating, matte-finished glass, edge-to-edge displays, and image smoothening graphic effects. Further explorations should focus on recommendations for digital screen optimization, novel spectacle lens technologies, and inbuilt filters to optimize visual comfort. A paradigm shift is required in our understanding of looking at DES from an etiological perspective, so that customized solutions can be explored accordingly. The aim of this review article is to understand the pathophysiology of varied manifestations, predisposing risk factors, varied management options, along with changing patterns of DES prevalence post COVID-19.

Study No. 9:

Nguyen conducted a study on “Effectiveness of Mindfulness-based Interventions in Reducing Digital

Media Use and Improving Sleep Quality: A Meta-analysis in Canada."

Findings suggest that virtual MBIs are equivalent to evidence-based treatments, and to a limited extent, more effective than non-specific active controls at reducing some aspects of sleep disturbance. Overall, virtual MBIs are more effective at improving sleep quality than usual care controls and waitlist controls. Studies provide preliminary evidence that virtual MBIs have a long-term effect on sleep quality. Moreover, while virtual MBI attrition rates are comparable to in-person MBI attrition rates, intervention adherence may be compromised in the virtual delivery method. This review highlights virtual MBIs as a potentially effective alternative to managing sleep disturbance during pandemic-related quarantine and stay-at-home periods. This is especially relevant due to barriers of accessing in-person interventions during the pandemic. Future studies are needed to explore factors that influence adherence and access to virtual MBIs, with a particular focus on diverse populations.

Study No. 10:

Zhang conducted a study on "Association between Screen Time and Insomnia Symptoms among Children: A Prospective Study in China."

Women in Shanghai, China, who were at 34 to 36 gestational weeks and had an expected delivery date between May 2012 and July 2013, were recruited for this cohort study. Their children were followed up at 6, 9, 12, 18, 24, 36, 48, and 72 months of age. Children's screen time was classified into 3 groups at age 6 months: continued low (ie, stable amount of screen time), late increasing (ie, sharp increase in screen time at age 36 months), and early increasing (ie, large amount of screen time in early stages that remained stable after age 36 months). Cognitive development was assessed by specially trained research staff in a research clinic. Of 262 eligible mother-offspring pairs, 152 dyads had complete data regarding all variables of interest and were included in the analyses. Data were analyzed from September 2019 to November 2021.

The cognitive development of children was evaluated using the Wechsler Intelligence Scale for Children, 4th edition, at age 72 months. Social-emotional development was measured by the Strengths and Difficulties Questionnaire, which was completed by the child's mother. The study described demographic characteristics, maternal mental health, child's temperament at age 6 months, and mental development at age 12 months by subgroups clustered by a group-based trajectory model. Group difference was examined by analysis of variance.

Study No. 11:

Jones conducted a study on "Associations between Digital Media Use and Sleep in Adolescents: A Meta-analysis in the United Kingdom."

Insufficient sleep associated with daytime sleepiness is predominant among the pediatric population and upsurges during adolescence. Prolonged screen use is theorized to harmfully disturb sleep through numerous pathways. Though, the connotation between media device use and poor sleep has been inadequately assessed due to the rapid development of these devices which has outdone research abilities. An analytical cross-sectional study was carried out using a self-administered online questionnaire targeting all accessible UK adolescents. The final questionnaire was uploaded online using social media platforms by distributing at high schools and primary health care centers. The study questionnaire covered adolescent's personal data, medical history and screen use including the type of used devices, duration of use per day and at bedtime, effect of using devices, and family and friends' influence on using devices. Sleep quality was assessed using Pittsburgh Sleep Quality Index.

In conclusion, the study revealed that adolescents in UK had a high frequency rate and duration of screen use which may exceed 6 hours daily with nearly half of them with poor sleep quality, feeling fatigue, daytime sleepiness, and lack of concentration.

Study No. 12:

Chang, et al. (2020). "Association between Social Media Use and Insomnia Symptoms among Young Adults: A Longitudinal Study in Taiwan."

In 2014 we assessed a nationally representative sample of 1788 Taiwan. young adults ages 19-32. SM volume and frequency were assessed by self-reported minutes per day spent on SM (volume) and visits per week (frequency) using items adapted from the Pew Internet Research Questionnaire. We assessed sleep disturbance using the brief Patient-Reported Outcomes Measurement Information System (PROMIS®) sleep disturbance measure. Analyses performed in Taiwan utilized chi-square tests and ordered logistic regression using sample weights in order to estimate effects for the total Taiwan. In models that adjusted for all sociodemographic covariates, participants with higher SM use volume and frequency had significantly greater odds of having sleep disturbance. For example, compared with those in the lowest quartile of SM use per day, those in the highest quartile had an AOR of 1.95 (95% CI=1.37-2.79) for sleep disturbance. Similarly, compared with those in the lowest quartile of SM use frequency per week, those in the highest quartile had an AOR of 2.92 (95% CI=1.97-4.32) for sleep disturbance. All associations demonstrated a significant linear trend.

Study No. 13:

Lee conducted a study on "Impact of Smartphone Use on Sleep Quality among Adults: A Cross-sectional Study in Singapore."

This systematic review aimed to evaluate the association between smartphone addiction and sleep in medical students. The secondary outcomes included the prevalence of smartphone addiction, duration and purpose of its use, prevalence of poor sleep, duration and quality of sleep. The authors searched PubMed, Cochrane Library, Embase, PsycINFO and CINAHL databases, from inception of each database to October 2022. Quantitative studies in the English language on smartphone addiction and sleep in students studying Western Medicine were included. The Rayyan application was used for title-abstract screening, and Joanna Briggs Institute (JBI) critical appraisal checklist to assess the risk of bias. Heterogeneity tests and meta-synthesis of data were performed using the meta-package in R software. Data on the activities used on the smartphone was synthesized qualitatively

Study No. 14:

Chang conducted a study on "Association between Social Media Use and Insomnia Symptoms among Young Adults: A Longitudinal Study in Taiwan."

Recently, the use of social media has penetrated many aspects of our daily lives. Therefore, it has stimulated much debate and polarization regarding its impact on mental well-being. The present study investigated the association between problematic use of social media, subjective well-being, and insomnia's potential mediator. A proportionate random sample was collected from a University in Taiwan between March and April 2020.The participants (n=288; mean [SD] age = 20.83 [2.13]) involved 101 (35.1%) males. Nearly three-fourths of the participants (n=214; 74.3%) used up more-than three hours daily surfing on social media. Their mean (SD) score was 15.64 (4.80) on the Taiwan Social Media Addiction Scale, 16.19 (9.15) on the Arabic Scale of Insomnia, and 28.13 (7.90) on the overall subjective well-being. Structural equation modeling (SEM) revealed an indirect correlation between problematic use of social media and the overall subjective well-being of users. Similarly, the indirect but not direct effects were found for the overall subjective well-being subdomains. Moreover, all SEM models have a satisfactory fit with the data.

Based on the results, it can be concluded that insomnia appears to play an important role in mediating the association between subjective well-being and problematic social media use. This suggests the importance of tackling the issues of insomnia and problematic use of social media for university students. It also has important implications in dealing with the misuse of social media, especially during the covid-19 pandemic.

Study No. 15:

Park conducted a study on "Perceived Stress and Smartphone Addiction among University Students: A Qualitative Study in South Africa."

According to the General Strain Theory, stress can lead to a range of problem behaviors. In the current study, we focused on the association between perceived stress and mobile phone addiction. We hypothesized that this association is mediated by low self-control and that the first path of the mediation is moderated by security. Mediation analysis showed that as expected, perceived stress was associated with lower self-control, which in turn was associated with a higher risk for mobile phone addiction. Also as expected, moderated mediation analysis indicated that the association between perceived stress and self-control was moderated by security. Specifically, the relationship between perceived stress and self-control was stronger for low security. This study provides useful insight into the understanding of how perceived stress increases the risk of mobile phone addiction. The results are consistent with the General Strain Theory and further indicate that concrete approaches are required for the prevention and intervention to reduce mobile phone addiction among college students.

CHAPTER III
METHODOLOGY AND PROCEDURE

3.0 Introduction

This chapter delineates the comprehensive methodology and procedures employed in our research study to rigorously investigate the research questions postulated in Chapter 1. Research answers any question by means of critical reflective thinking, based upon the best data obtainable. It is an organized learning, looking for specific things to add to your store of knowledge (Sastri, 2008). Sociological research, as research, is primarily committed to establish systematic, reliable and valid knowledge about the social world. Research methodology involves the systematic procedures by which the researcher starts from the initial identification of the problem to its final conclusions. Methodology of research outlines the entire research plan. It describes what must be done, what data will be needed, what specific data gathering tools will be used and how the sources of data will be selected. It is very much essential in systematic research.

The success of any research depends largely on the suitability of the method of tools and techniques used for the collection of data. This chapter entails the research design and methodology followed by the investigator for the present research problem. It deals with the research method, population and sample, choice of research tool, construction of the tools and validation of the tools, procedure adopted for data collection, sample distribution and statistical techniques used by the researcher for analyzing the collected data. The elucidation of the methodology serves as the foundation for the validity and reliability of our study's findings. We meticulously detail the theoretical underpinnings of the statistical tools employed, namely the t-test, Chi-Square test, and ANOVA test, and expound on their application in uncovering insights within our dataset.

3.1 Research Design

Research design is a mapping strategy. It is essentially a statement of the object of the inquiry and the strategies for collecting the evidences, analyzing the evidences and reporting the findings. Thus it includes the following components:

1. Research strategy or Research method.
2. Choice of research tool.
3. Sampling design.
4. Choice of statistical techniques.

The research design of the present study has been sketched out in this chapter

3.2 Method Selected for the Present Study

Research is a method used for finding out the truth unknown. A researcher can choose any method according to his/her choice to unearth these facts (Sastri, 2008). Methodology is a scientific and systematic way to solve research problem (Gupta & Gupta, 2011). Research methods have its strength and weaknesses and certain concepts are more appropriately studied through some methods than through others. Research method has its own relevance in process. In order to achieve the objectives of the study, the investigator had used descriptive method using survey as technique.

Surveys are particularly well suited to study the public opinion (Babbie, 2004). As the present research problem investigates on the effects of mobile screen usage on Digital Eye Strain and Insomnia among Prospective Teachers a survey method might be the most appropriate method.

3.3 Population for the Study

The population for a study is that group of people about whom the conclusions are drawn (Babbie, 2004). The population for the present study consisted of student teachers from B.Ed. colleges, Tirunelveli District in the state of Tamil Nadu constituted the population.

3.4 Sample of the Study

Sample is the small subset of the population from whom the information is collected (Gibbon & Morris, 1988). Sample is a small portion of a selected for observation and analysis‖ (Best & Khan, 2012). The purpose of sampling is to enable researchers to estimate some unknown characteristic of the population based on a good representative sample. The quality of a piece of research stands or falls not only by the appropriateness of methodology and instrumentation but also by the suitability of the sampling strategy that has been adopted

(Cohen, Manion & Morrison, 2010). As each member of the population under study has an equal chance of being selected and the probability of a member of the population being selected is unaffected by the selection of other members of the population (Cohen, Manion & Morrison, 2010) the investigator had used simple random sampling method employing lottery method for selection of a sample of 325 for the present study.

3.5 Tools used for the Study

According to John W. Best and James.V Khan (2012), like the tools in the Carpenter‘s chest, each research tool is appropriate in a given situation to accomplish a particular purpose. The investigator has used questionnaire as a tool in the present study.

According to Barr, Davis and Johnson, Questionnaire is a systematic compilation of questions that are distributed to a sample population to which information is desired‖. A properly constructed and administered questionnaire may serve as a most appropriate and useful data gathering device. Based on the objectives and variables of the present study the investigator had adopted two research instruments for the collection of data. The tools used were:

- Digital Eye Strain Questionnaire (DESQ) published by European Journal of Ophthalmology in 2022
- Regensburg Insomnia Scale (RIS)

3.6 Formula and its Interpretation

➢ **The t-test**

The t-test, a fundamental statistical tool, is essential for determining whether there is a statistically significant difference between the means of two groups. It is widely utilized in experimental research designs to evaluate the impact of independent variables on a dependent variable.

The formula for the t-test is:

$$t = \frac{\overline{x_1} - \overline{x_2}}{\sqrt{\left(\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}\right)}}$$

where

- t = Student's t-test
- x11 = mean of first group
- x22= mean of second group
- s11 = standard deviation of group 1
- s22 = standard deviation of group 1
- n11= number of observations in group 1
- n22= number of observations in group 2

The calculated t-value is then compared to a critical value from the t-distribution to determine statistical significance.

➢ **Chi-Square Test**

The Chi-Square test is a non-parametric statistical test used to analyze categorical data and assess the association between variables. It is particularly valuable when dealing with nominal or ordinal data.

Formula and its Interpretation

The formula for the Chi-Square test is:

$$X^2 = \sum \frac{(\text{Observed value - Expected value})^2}{\text{Expected value}}$$

The Chi-Square statistic is then compared to a critical value from the Chi-Square distribution to determine statistical significance.

- **ANOVA Test**

The Analysis of Variance (ANOVA) test enables the simultaneous comparison of means across multiple groups, offering insights into variations among categorical groups.

Formula and its Interpretation

The formula for the ANOVA test is:

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Squares (MS)	F
Within	$SSW = \sum_{j=1}^{k}\sum_{j=1}^{l}(X-\bar{X}_j)^2$	$df_w = k-1$	$MSW = \frac{SSW}{df_w}$	$F = \frac{MSB}{MSW}$
Between	$SSB = \sum_{j=1}^{k}(\bar{X}_j-\bar{X})^2$	$df_b = n-k$	$MSB = \frac{SSB}{df_b}$	
Total	$SST = \sum_{j=1}^{n}(\bar{X}_j-\bar{X})^2$	$df_t = n-1$		

where:

F = MST/MSE
MST = SST/ p-1
MSE = SSE/N-p
SSE = ∑ (n−1)
F = Anova Coefficient
MSB = Mean sum of squares between the groups
MSW = Mean sum of squares within the groups
MSE = Mean sum of squares due to error
SST = total Sum of squares
p = Total number of populations
n = Total number of samples in a population
SSW = Sum of squares within the groups
SSB = Sum of squares between the groups
SSE = Sum of squares due to error
S = Standard deviation of the samples
N = Total number of observations

The calculated F-value is then compared to a critical value from the F-distribution to determine statistical significance.

3.7 Research Design

A cross-sectional research design was adopted to capture data at a single point in time, facilitating the analysis of associations and differences among variables. This design was deemed appropriate for achieving the objectives of our study.

3.7.1 Sampling Technique: Stratified Random Sampling

Stratified random sampling is chosen to ensure representation from different demographic groups within the prospective teacher population. This technique allows for the creation of strata based on relevant characteristics such as age, gender, educational background, and level of digital device usage. By stratifying the sample, we aim to capture a diverse range of perspectives and experiences, thereby enhancing the generalizability of the study findings.

Procedure:

- **Identification of Strata**: The first step involves identifying the key demographic variables that are pertinent to the research objectives. In this study, potential strata may include age groups (e.g., 21-23, 23-25, 25 <), gender (male, female), educational levels (Undergraduate, Postgraduate), and frequency of mobile screen usage (low, moderate, high).
- **Division of Population**: The prospective teacher population is divided into mutually exclusive strata based on the identified variables. Each individual falls into one and only one stratum, ensuring that the population is fully covered.
- **Determination of Sample Size per Stratum**: Sample sizes are determined for each stratum based on proportional representation. This ensures that the

sample adequately reflects the distribution of the population across different demographic categories.

- **Random Selection within Strata**: Within each stratum, participants are randomly selected using a simple random sampling technique. This involves assigning a unique identifier to each individual within the stratum and then using a random number generator to select the required number of participants.
- **Combination of Samples**: Once the required number of participants has been selected from each stratum, the samples are combined to form the final sample for the study. This aggregated sample represents a diverse cross-section of the prospective teacher population allowing for meaningful comparisons and analyses.

3.7.2 Sample Size Justification: The sample size of 325 is determined based on considerations of statistical power, precision of estimates, and practical feasibility. It is calculated to ensure sufficient representation across different strata while also allowing for robust statistical analyses to detect meaningful associations and differences between variables of interest.

3.7.3 Ethical Considerations: Throughout the sampling process, ethical guidelines regarding informed consent, privacy, and confidentiality are strictly adhered to. Participants are provided with clear information about the purpose of the study, their voluntary participation, and the confidentiality of their responses. Any potential risks associated with participation are minimized, and participants are assured of their rights throughout the research process.

3.8 Data Collection

- **Development of Questionnaire:** A comprehensive questionnaire is designed to gather data on mobile screen usage habits, digital eye symptoms, insomnia symptoms, and relevant demographic information. The questionnaire includes validated scales such as the Digital Eye Strain Questionnaire and the Regensburg Insomnia Scale to assess symptoms accurately.
- **Content Validation:** The questionnaire undergoes rigorous content validation by experts in the fields of optometry, sleep medicine, and educational psychology to ensure relevance, clarity, and comprehensiveness.
- **Pilot Testing:** A pilot study is conducted with a small sample of Prospective Teachers (not included in the main study) to evaluate the clarity of the questionnaire items, identify any ambiguities or inconsistencies, and refine the wording as necessary.

- **Online and Offline Survey Administration:** In this study, a comprehensive approach to data collection is employed, integrating both online and offline survey administration methods. The questionnaire is disseminated through a secure online survey platform such as Google form. Additionally, to ensure a thorough assessment of digital eye strain, a specialized team of ophthalmologists is engaged to administer the questionnaire in face-to-face sessions. This multidisciplinary approach allows for a comprehensive evaluation of participants' experiences with digital devices while ensuring accurate diagnosis and understanding of digital eye strain. Participants receive a unique survey link via email or other electronic communication channels to access the online questionnaire, facilitating seamless data collection across both modalities.
- **Data Entry:** Participants complete the survey at their convenience, providing responses to each questionnaire item. Data entry is automatically recorded and stored securely on the survey platform's servers.
- **Reminders:** Regular reminders are sent to participants who have not yet completed the survey to encourage participation and maximize response rates.

3.9 Data Analysis

The application of statistical tools, including the t-test, Chi-Square test, and ANOVA test, formed the cornerstone of our data analysis approach. Each statistical test was applied judiciously to address specific research questions and hypotheses, with careful attention paid to assumptions and limitations.

3.10 Limitations

Despite meticulous planning and execution, it's important to acknowledge the limitations inherent in any research endeavor. While the sample size of 325 Prospective Teachers provides sufficient statistical power for detecting associations and differences, it may still be relatively small compared to the entire population of Prospective Teachers. As a result, caution should be exercised when generalizing the findings to broader populations of teachers or other demographic groups.

3.11 Conclusion

This chapter has provided a detailed overview of the methodology and procedures employed to investigate the research questions posed in Chapter 1. By leveraging the t-test, Chi-Square test, and ANOVA test, we have endeavored to uncover insights into the relationships and variations within our dataset. Moving forward, the subsequent chapters will present the findings of our analysis and offer interpretations and implications for theory and practice.

CHAPTER - 4
DATA ANALYSIS

4.0 An Overview

This chapter deals with the following sections.

Section 4.1 deals with the importance of data analysis.

Section 4.2 deals with the level of Digital Eye Strain and the level of insomnia prevalence in Prospective Teachers with regard to background variables.

Section 4.3 deals with the significance of difference in Digital Eye Strain of Prospective Teachers with regard to background variables.

Section 4.4 deals with the significance of difference in prevalence of Insomnia among Prospective Teachers with regard to background variables.

4.1 Importance of Data Analysis

The data, after collection, has to be processed and analyzed in accordance with the outline laid down for the purpose at the time of developing the research plan. This is essential for a scientific study and for ensuring that we have all relevant data for making contemplated comparisons and analysis. Technically speaking, processing implies editing, coding, classification and tabulation of collected data so that they are amenable to analysis. The term analysis refers to the computation of certain measures along with searching for patterns of relationship that exist among data-groups. Thus "In the process of analysis, relationships or differences supporting or conflicting with original or new hypotheses should be subjected to statistical tests of significance to determine with what validity data can be said to indicate any conclusions" (Giles,1974).

"Analysis is a process which enters into research in one form or another form the very beginning… It may be fair to say that research consists in general of two larger steps – the gathering of data, and the analysis of these data, but no amount of analysis can validly extract from the data factors when are not present" (Good & Scates, 1954).

4.2 DESCRIPTIVE ANALYSIS

Level of Digital Eye Strain of Prospective Teachers

Table 4.01

Level of Digital Eye Strain of Prospective Teachers

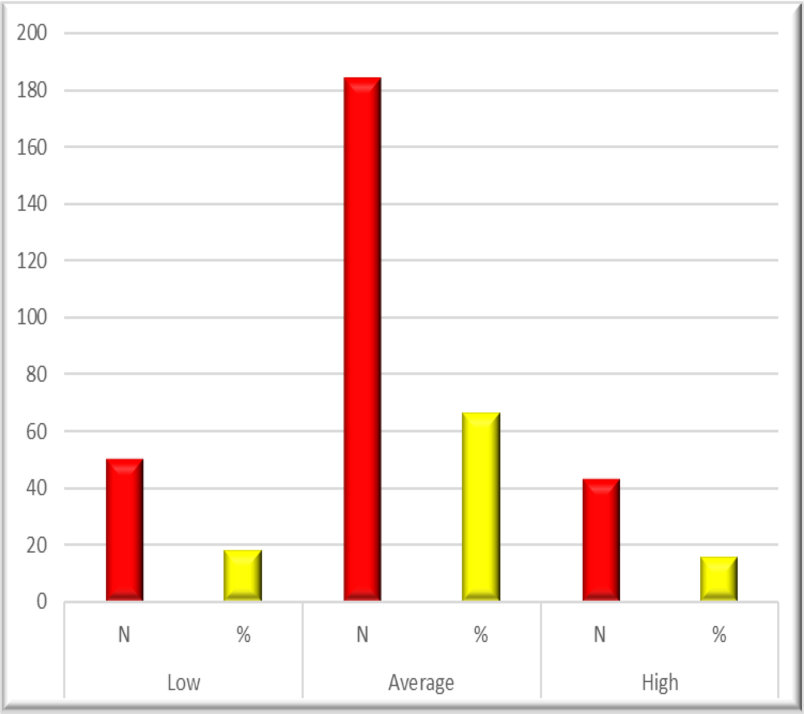
Variable	***N***	***Level of Digital Eye Strain***					
		Low		***Average***		***High***	
		N	***%***	***N***	***%***	***N***	***%***
Digital Eye Strain	277	50	18.1	184	66.4	43	15.5

It is inferred from the above table that three fourth of the Prospective Teachers have average level of Digital Eye Strain.

ISBN : 978-81-971077-4-0

Figure 4.01

Level of Digital Eye Strain of Prospective Teachers



ISBN : 978-81-971077-4-0

Table 4.02
Level of Digital Eye Strain of Prospective Teachers with regard to gender

Personal Variable	*Category*	*Level of Digital Eye Strain*					
		Low		*Average*		*High*	
		N	*%*	*N*	*%*	*N*	*%*
Gender	Male	1	11.1	6	66.7	2	22.2
	Female	49	18.3	178	66.4	41	15.3

From the above table it is clear that 66.7% of male Prospective Teachers and 66.4% of female Prospective Teachers have average level of Digital Eye Strain.

ISBN : 978-81-971077-4-0

Figure 4.02
Level of Digital Eye Strain of Prospective Teachers with regard to gender

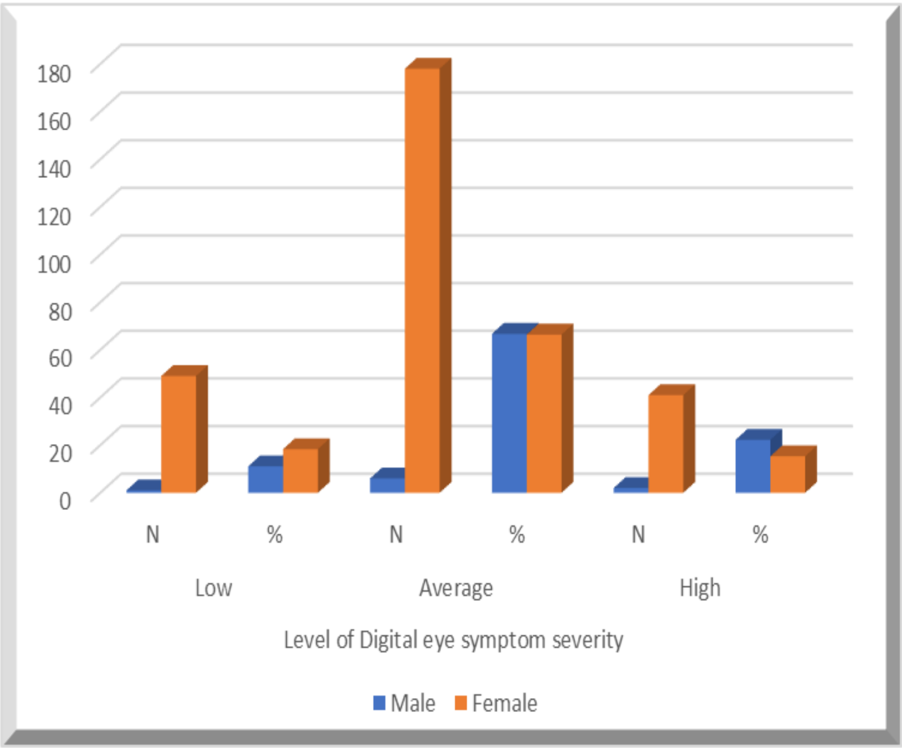


Table 4.03
Level of Digital Eye Strain of Prospective Teachers with regard to academic level

Personal Variable	*Category*	*Level of Digital Eye Strain*					
		Low		*Average*		*High*	
		N	*%*	*N*	*%*	*N*	*%*
Academic Level	UG	29	14.7	130	66	38	19.3
	PG	21	26.2	54	67.5	5	6.2

From the above table it is clear that 66% of UG Prospective Teachers and 67.5% of PG Prospective Teachers have average level of Digital Eye Strain.

ISBN : 978-81-971077-4-0

Figure 4.03
Level of Digital Eye Strain of Prospective Teachers with regard to academic level

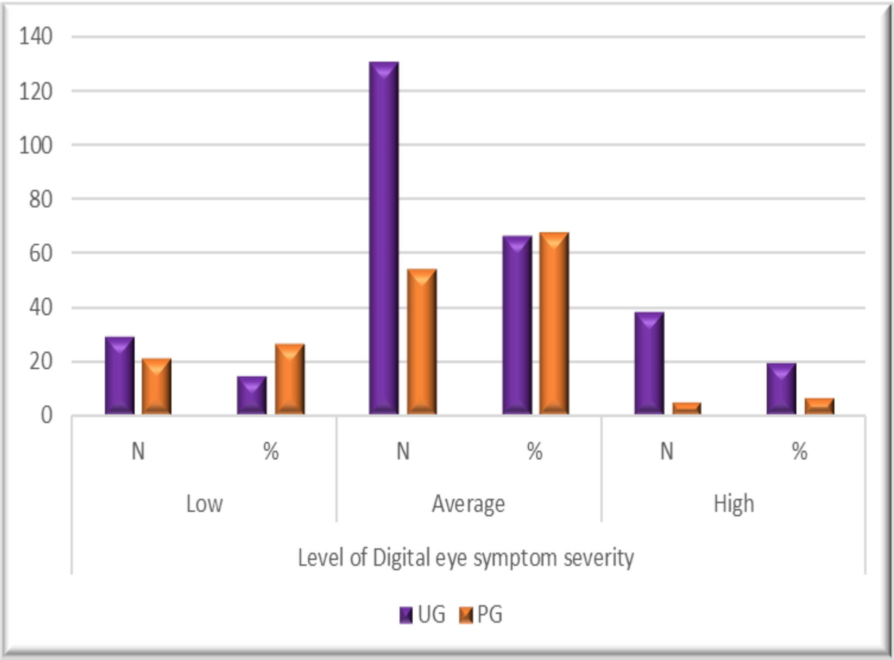


Table 4.04
Level of Digital Eye Strain of Prospective Teachers with regard to marital status

Personal Variable	*Category*	*Level of Digital Eye Strain*					
		Low		*Average*		*High*	
		N	*%*	*N*	*%*	*N*	*%*
Marital Status	Married	8	29.6	19	70.4	0	0
	Unmarried	42	16.8	165	66	43	17.2

From the above table it is clear that 70.4% of married Prospective Teachers and 66% of unmarried Prospective Teachers have average level of Digital Eye Strain.

Figure 4.04

Level of Digital Eye Strain of Prospective Teachers with regard to marital status

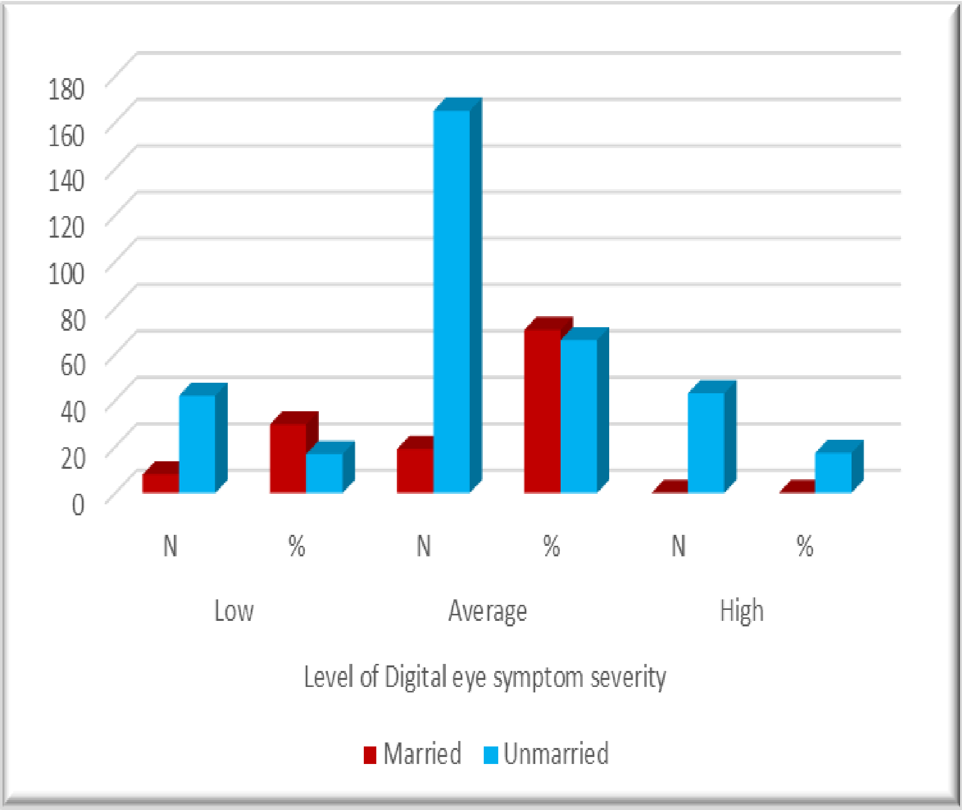


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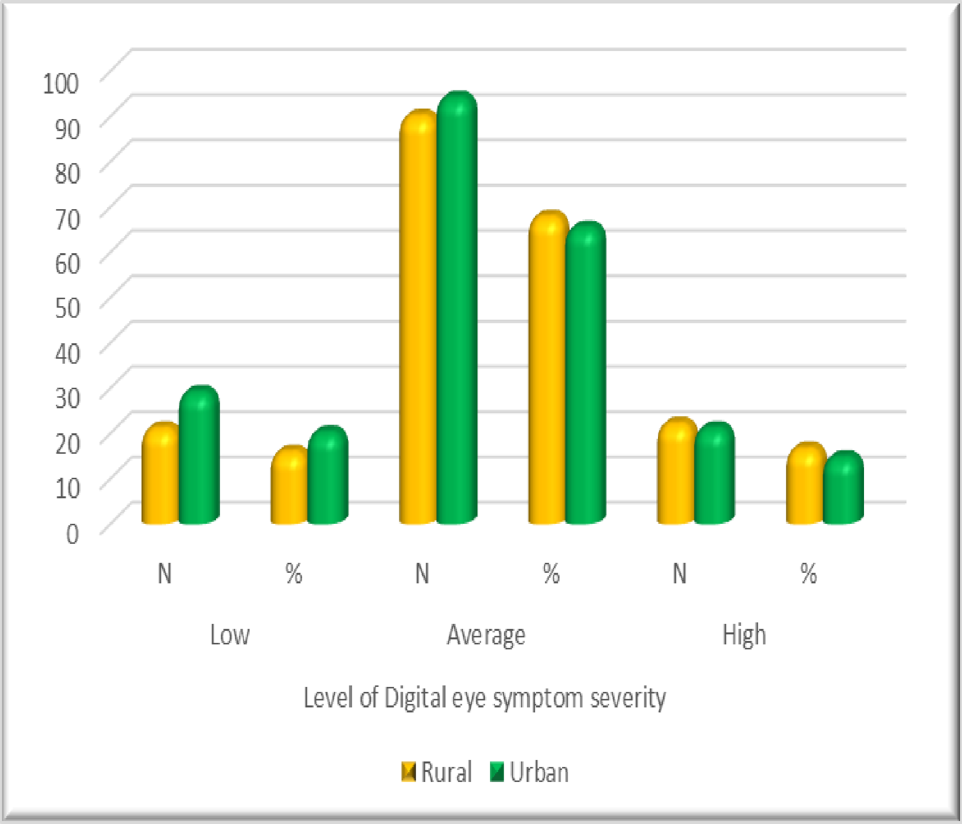
Table 4.05
Level of Digital Eye Strain of Prospective Teachers with regard to area of living

Personal Variable	*Category*	*Level of Digital Eye Strain*					
		Low		*Average*		*High*	
		N	*%*	*N*	*%*	*N*	*%*
Area of living	Rural	21	15.8	90	67.7	22	16.5
	Urban	29	20.1	94	65.3	21	14.6

From the above table it is clear that 67.7% of rural area Prospective Teachers and 65.3.% of urban area Prospective Teachers have average level of Digital Eye Strain.

ISBN : 978-81-971077-4-0

Figure 4.05
Level of Digital Eye Strain of Prospective Teachers with regard to area of living



ISBN : 978-81-971077-4-0

Table 4.06
Level of Digital Eye Strain of Prospective Teachers with regard to parental educational level

Personal Variable	*Category*	*Level of Digital Eye Strain*					
		Low		*Average*		*High*	
		N	*%*	*N*	*%*	*N*	*%*
Parental Educational Level	10^{th}	14	12.8	78	71.6	17	15.6
	12^{th}	15	24.2	36	58.1	11	17.7
	UG	12	21.8	36	65.5	7	12.7
	PG	9	17.6	34	66.7	8	15.7

From the above table it is clear that with regard to parent's education level as 10^{th} standard, 71.6 % of Prospective Teachers have average level of Digital Eye Strain. With regard to parent's education level as 12^{th} standard, 58.1 % of Prospective Teachers have average level of Digital Eye Strain. With regard to parent's education level as UG, 65.5 % of Prospective Teachers have average level of Digital Eye Strain. With regard to parent's education level as PG, 66.7 % of Prospective Teachers have average level of Digital Eye Strain.

Figure 4.06
Level of Digital Eye Strain of Prospective Teachers with regard to parental educational level

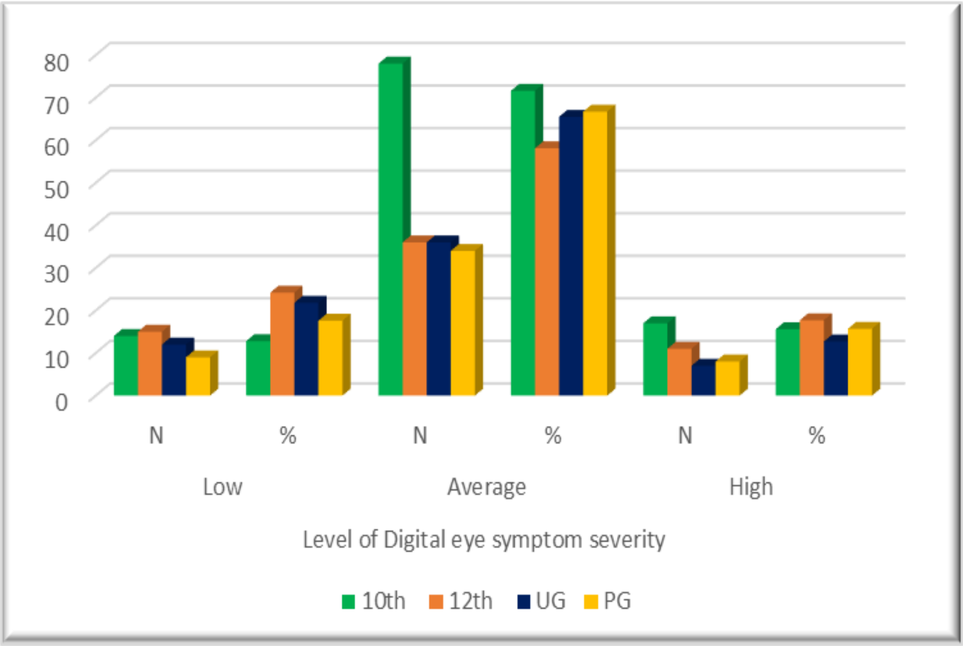


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Table 4.07
Level of Digital Eye Strain of Prospective Teachers with regard to socio economic status

Personal Variable	*Category*	*Level of Digital Eye Strain*					
		Low		*Average*		*High*	
		N	*%*	*N*	*%*	*N*	*%*
Socio economic status	Lower	1	8.3	9	75	2	16.7
	Middle	44	17.2	173	67.6	39	15.2
	Upper	5	55.6	2	22.2	2	22.2

From the above table it is clear that with regard to socio economic status as lower class, 75% of Prospective Teachers have average level of Digital Eye Strain. With regard to socio economic status as middle class, 67.6% of Prospective Teachers have average level of Digital Eye Strain. With regard to socio economic status as upper class, 22.2% of Prospective Teachers have average level of Digital Eye Strain.

Figure 4.07
Level of Digital Eye Strain of Prospective Teachers with regard to socio economic status

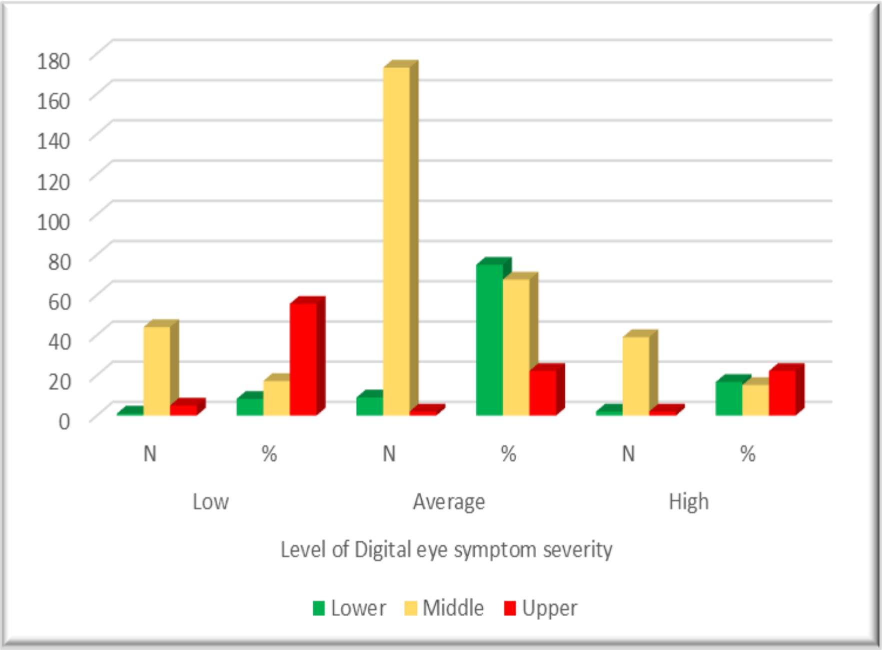


Table 4.08
Level of Digital Eye Strain of Prospective Teachers with regard to mobile phone exposure

Personal Variable	*Category*	*Level of Digital Eye Strain*					
		Low		*Average*		*High*	
		N	*%*	*N*	*%*	*N*	*%*
Mobile phone exposure	1-2 hours	21	28.4	49	66.2	4	5.4
	2-3 hours	19	17	77	68.8	16	14.3
	More than 3 hours	10	11	58	63.7	23	25.3

From the above table it is clear that with regard to mobile phone exposure time of 1-2 hours, 66.2% of Prospective Teachers have average level of Digital Eye Strain. With regard to mobile phone exposure time of 2-3 hours, 68.8% of Prospective Teachers have average level of Digital Eye Strain. With regard to mobile phone exposure time of more than 3 hours, 63.7% of Prospective Teachers have average level of Digital Eye Strain.

Figure 4.08
Level of Digital Eye Strain of Prospective Teachers with regard to mobile phone exposure

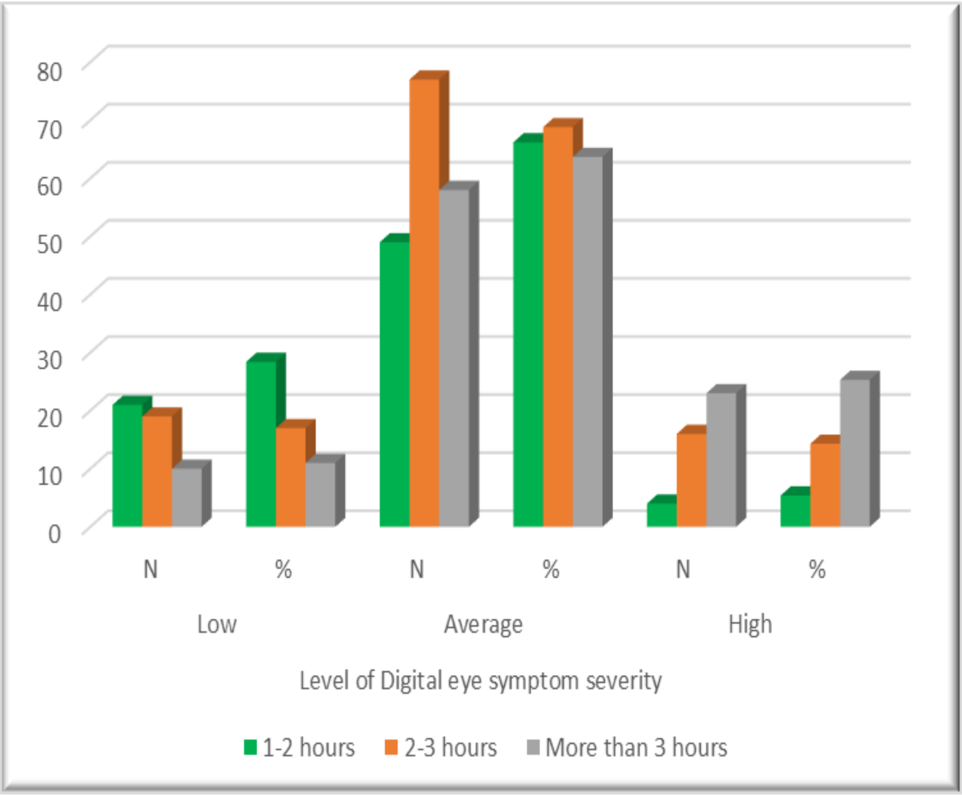


Table 4.09
Level of Digital Eye Strain of Prospective Teachers with regard to pattern of internet usage

Personal Variable	*Category*	*Level of Digital Eye Strain*					
		Low		*Average*		*High*	
		N	*%*	*N*	*%*	*N*	*%*
Pattern of internet usage	Social media	31	16.7	120	64.5	35	18.8
	Gaming	4	26.7	9	60	2	13.3
	Online learning	15	19.7	55	72.4	6	7.9

From the above table it is clear that with regard to internet usage of social media, 64.5% of Prospective Teachers have average level of Digital Eye Strain. With regard to internet usage of gaming, 60% of Prospective Teachers have average level of Digital Eye Strain. With regard to internet usage of online learning, 72.4% of Prospective Teachers have average level of Digital Eye Strain.

Figure 4.09

Level of Digital Eye Strain of Prospective Teachers with regard to pattern of internet usage

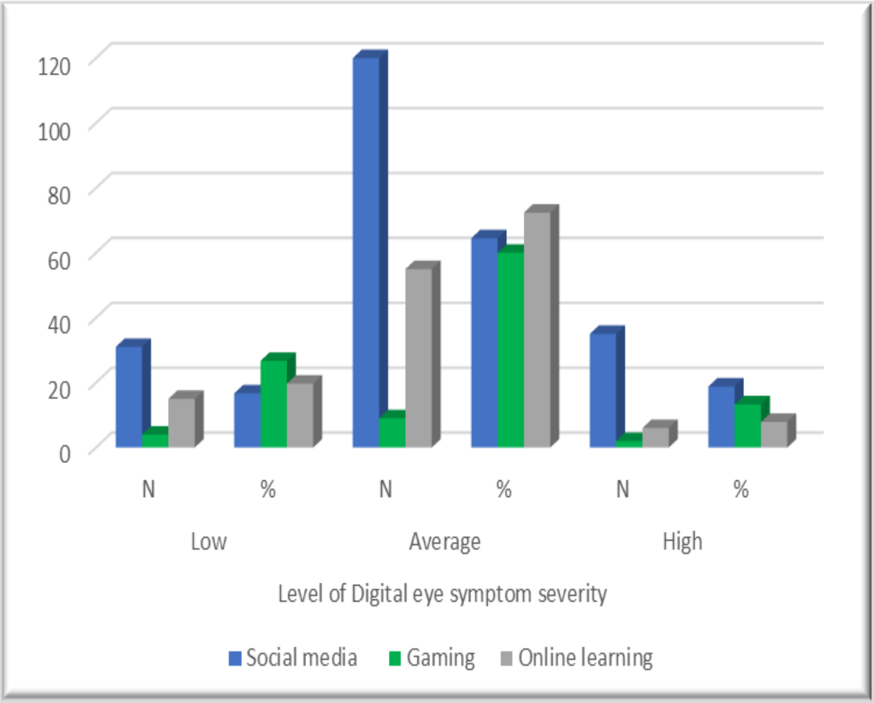
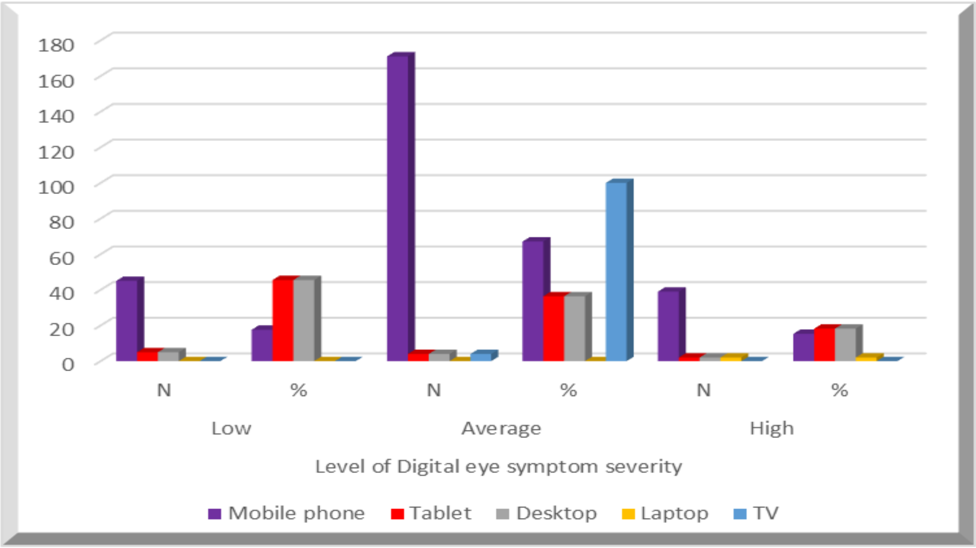


Table 4.10
Level of Digital Eye Strain of Prospective Teachers with regard to type of screen usage

Personal Variable	*Category*	*Level of Digital Eye Strain*					
		Low		*Average*		*High*	
		N	*%*	*N*	*%*	*N*	*%*
Type of screen usage	Mobile phone	45	17.6	171	67.1	39	15.3
	Tablet	5	45.5	4	36.4	2	18.2
	Desktop	5	45.5	4	36.4	2	18.2
	Laptop	0	0	0	0	2	2
	TV	0	0	4	100	0	0

From the above table it is clear that with regard to usage of mobile phone screen, 67.1 % of Prospective Teachers have average level of Digital Eye Strain. With regard to usage of tablet screen, 36.4% of Prospective Teachers have average level of Digital Eye Strain. With regard to usage of desktop screen, 36.4 % of Prospective Teachers have average level of Digital Eye Strain. With regard to usage of laptop screen, 0% of Prospective Teachers have average level of Digital Eye Strain. With regard to usage of TV screen, 100% of Prospective Teachers have average level of Digital Eye Strain.

Figure 4.10
Level of Digital Eye Strain of Prospective Teachers with regard to type of screen usage



4.3 Level of Prevalence of Insomnia Among Prospective Teachers

Table 4.11

Level of Prevalence of Insomnia among Prospective Teachers

Variable	***N***	***Level of Insomnia prevalence***					
		Low		***Average***		***High***	
		N	***%***	***N***	***%***	***N***	***%***
Insomnia prevalence	277	39	14.1	194	70	44	15.9

It is inferred from the above table that seven tenth of the Prospective Teachers have average level of insomnia prevalence.

Figure 4.11
Level of Prevalence of Insomnia among Prospective Teachers

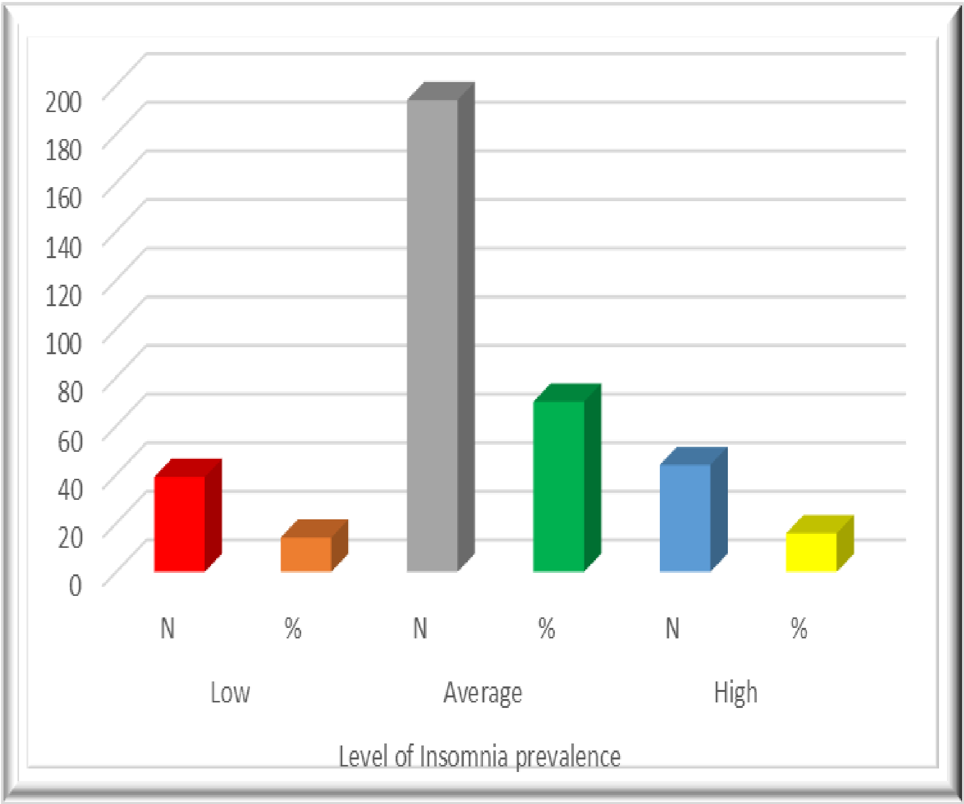


Table 4.12
Level of Prevalence of Insomnia among Prospective Teachers with regard to gender

Personal Variable	*Category*	*Level of Insomnia prevalence*					
		Low		*Average*		*High*	
		N	*%*	*N*	*%*	*N*	*%*
Gender	Male	0	0	6	66.7	3	33.3
	Female	39	14.6	188	70.1	41	15.3

From the above table it is clear that 66.7% of male Prospective Teachers and 70.1% of female Prospective Teachers have average level of insomnia prevalence.

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Figure 4.12
Level of Prevalence of Insomnia among Prospective Teachers with regard to gender

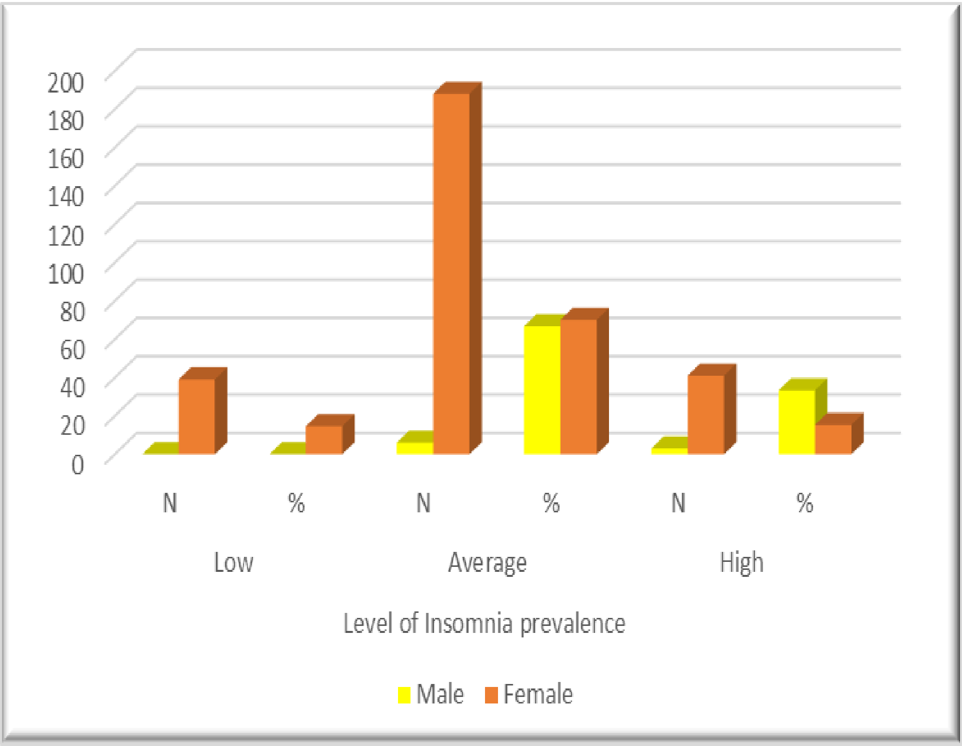

Table 4.13
Level of Prevalence of Insomnia among Prospective Teachers with regard to academic level

Personal Variable	*Category*	*Level of Insomnia prevalence*					
		Low		*Average*		*High*	
		N	*%*	*N*	*%*	*N*	*%*
Academic Level	UG	30	15.2	138	70.1	29	14.7
	PG	9	11.2	56	70	15	18.8

From the above table it is clear that 70.1% of UG Prospective Teachers and 70% of PG Prospective Teachers have average level of insomnia prevalence.

ISBN : 978-81-971077-4-0

Figure 4.13
Level of Prevalence of Insomnia among Prospective Teachers with regard to academic level

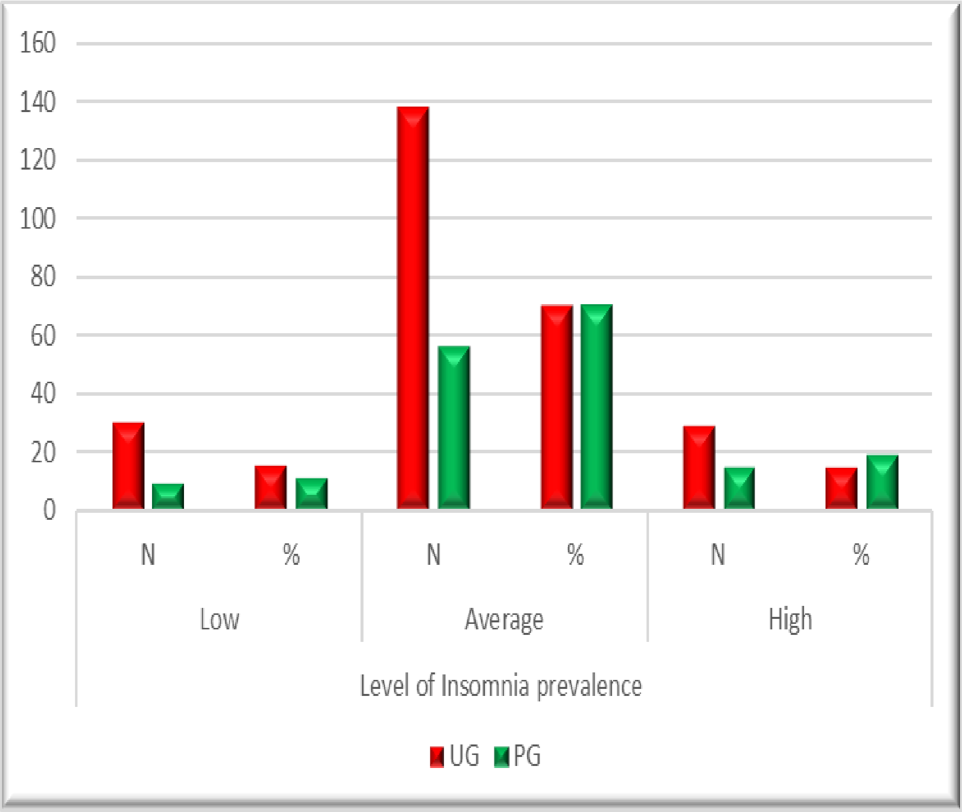

Table 4.14
Level of Prevalence of Insomnia among Prospective Teachers with regard to marital status

Personal Variable	*Category*	*Level of Insomnia prevalence*					
		Low		*Average*		*High*	
		N	*%*	*N*	*%*	*N*	*%*
Marital Status	Married	5	18.5	18	66.7	4	14.8
	Unmarried	34	13.6	176	70.4	40	16

From the above table it is clear that 66.7% of married Prospective Teachers and 70.4% of unmarried Prospective Teachers have average level of insomnia prevalence.

Figure 4.14
Level of Prevalence of Insomnia among Prospective Teachers with regard to marital status

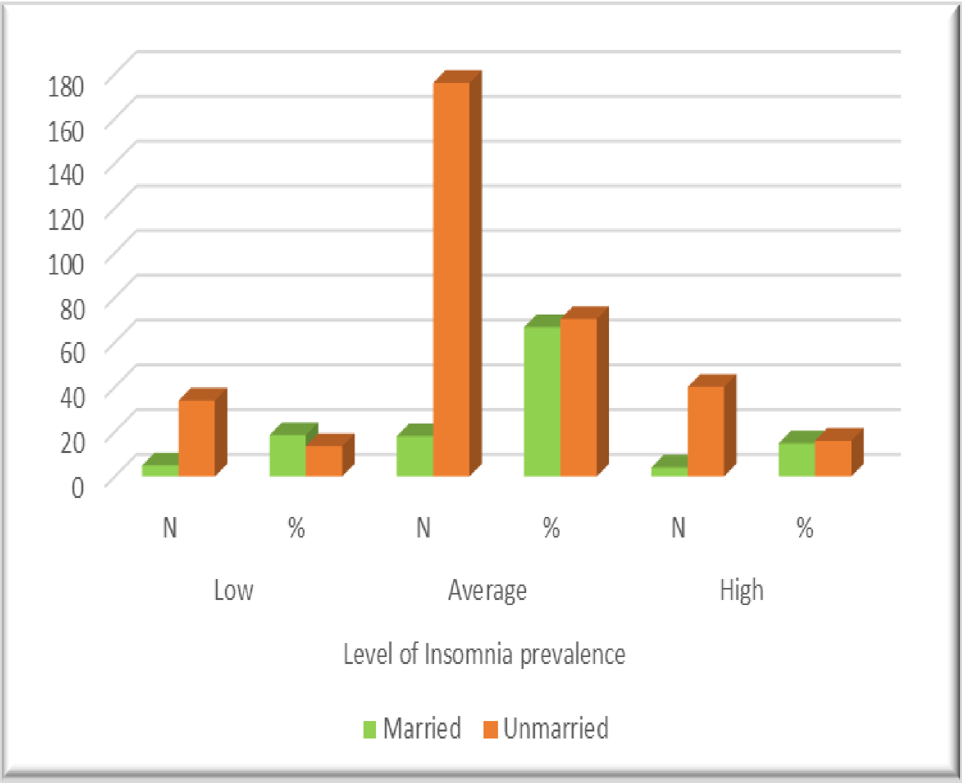

Table 4.15
Level of Prevalence of Insomnia among Prospective Teachers with regard to area of living

Personal Variable	*Category*	*Level of Insomnia prevalence*					
		Low		*Average*		*High*	
		N	*%*	*N*	*%*	*N*	*%*
Area of living	Rural	20	15	99	74.4	14	10.5
	Urban	19	13.2	95	66	30	20.8

From the above table it is clear that 74.4% of rural area Prospective Teachers and 66.% of urban area Prospective Teachers have average level of insomnia prevalence.

Figure 4.15
Level of Prevalence of Insomnia among Prospective Teachers with regard to area of living

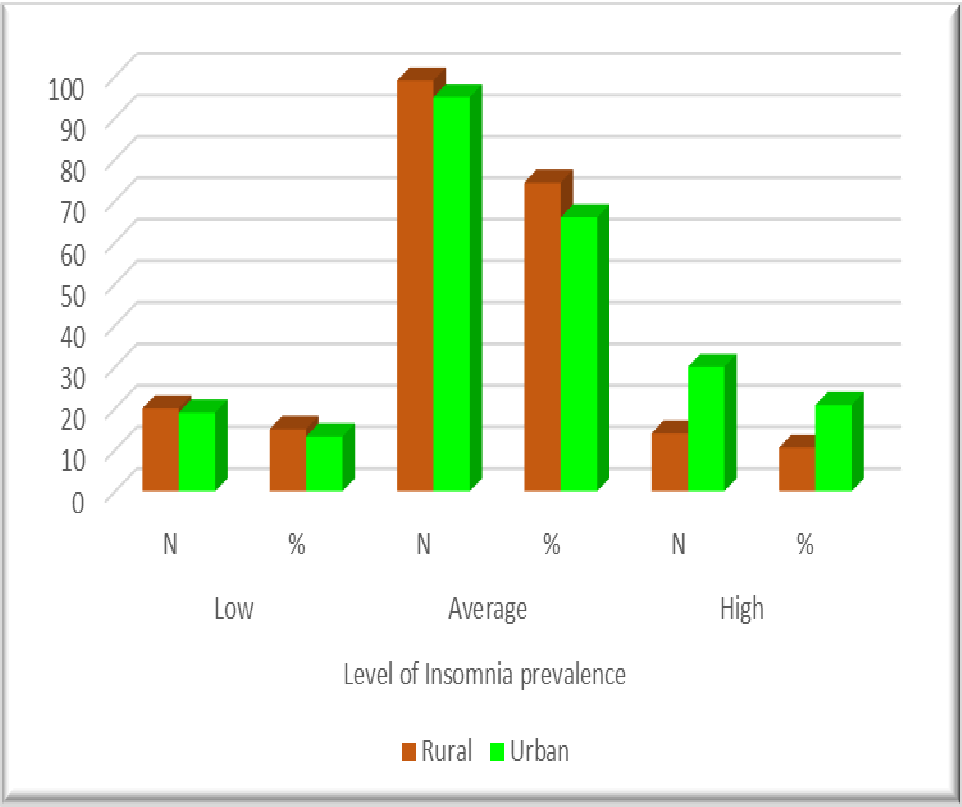

Table 4.16
Level of Prevalence of Insomnia among Prospective Teachers with regard to parental educational level

Personal Variable	*Category*	*Level of Insomnia prevalence*					
		Low		*Average*		*High*	
		N	*%*	*N*	*%*	*N*	*%*
Parental Educational Level	10th	16	14.7	78	71.6	15	13.8
	12th	8	12.9	42	67.7	12	19.4
	UG	8	14.5	39	70.9	8	14.5
	PG	7	13.7	35	68.6	9	17.6

From the above table it is clear that with regard to parent's education level as 10th standard, 71.6 % of Prospective Teachers have average level of insomnia prevalence. With regard to parent's education level as 12th standard, 67.7 % of Prospective Teachers have average level of insomnia prevalence. With regard to parent's education level as UG, 70.9 % of Prospective Teachers have average level of insomnia prevalence. With regard to parent's education level as PG, 68.6 % of Prospective Teachers have average level of insomnia prevalence.

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Figure 4.16
Level of Prevalence of Insomnia among Prospective Teachers with regard to parental educational level

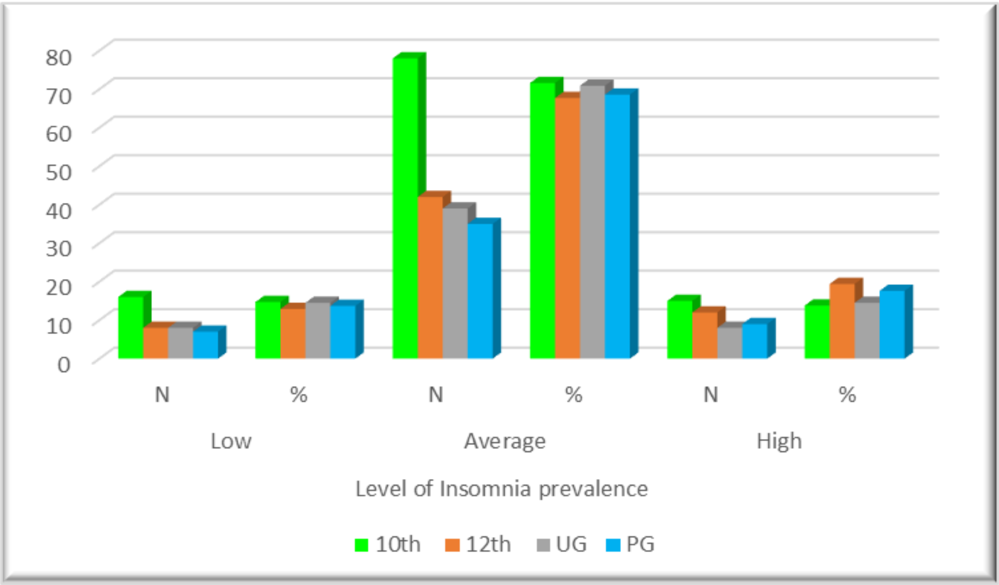


Table 4.17
Level of Prevalence of Insomnia among Prospective Teachers with regard to socio economic status

Personal Variable	*Category*	*Level of Insomnia prevalence*					
		Low		*Average*		*High*	
		N	*%*	*N*	*%*	*N*	*%*
Socio economic status	Lower	4	33.3	4	33.3	4	33.3
	Middle	34	13.3	183	71.5	39	15.2
	Upper	1	11.1	7	77.8	1	11.1

From the above table it is clear that with regard to socio economic status as lower class, 33.3% of Prospective Teachers have average level of insomnia prevalence. With regard to socio economic status as middle class, 71.5% of Prospective Teachers have average level of insomnia prevalence. With regard to socio economic status as upper class, 77.8% of Prospective Teachers have average level of insomnia prevalence.

Figure 4.17
Level of Prevalence of Insomnia among Prospective Teachers with regard to socio economic status

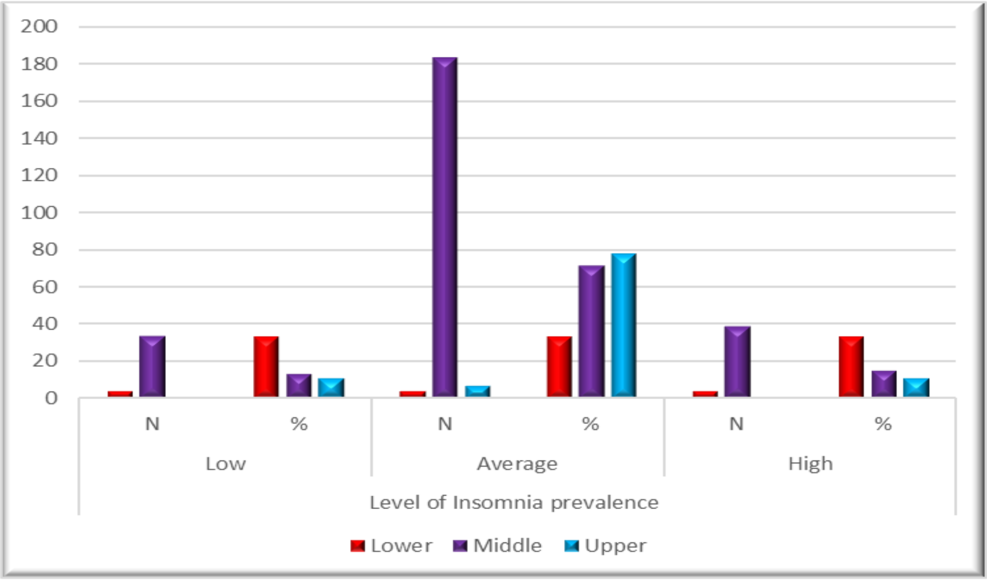


Table 4.18
Level of Prevalence of Insomnia among Prospective Teachers with regard to mobile phone exposure

Personal Variable	*Category*	*Level of Insomnia prevalence*					
		Low		*Average*		*High*	
		N	*%*	*N*	*%*	*N*	*%*
Mobile phone exposure	1-2 hours	11	14.9	51	68.9	12	16.2
	2-3 hours	17	15.2	76	67.9	19	17
	More than 3 hours	11	12.1	67	73.6	13	14.3

From the above table it is clear that with regard to mobile phone exposure time of 1-2 hours, 68.9% of Prospective Teachers have average level of insomnia prevalence. With regard to mobile phone exposure time of 2-3 hours, 67.9% of Prospective Teachers have average level of insomnia prevalence. With regard to mobile phone exposure time of more than 3 hours, 73.6% of Prospective Teachers have average level of insomnia prevalence.

Figure 4.18
Level of Prevalence of Insomnia among Prospective Teachers with regard to mobile phone exposure

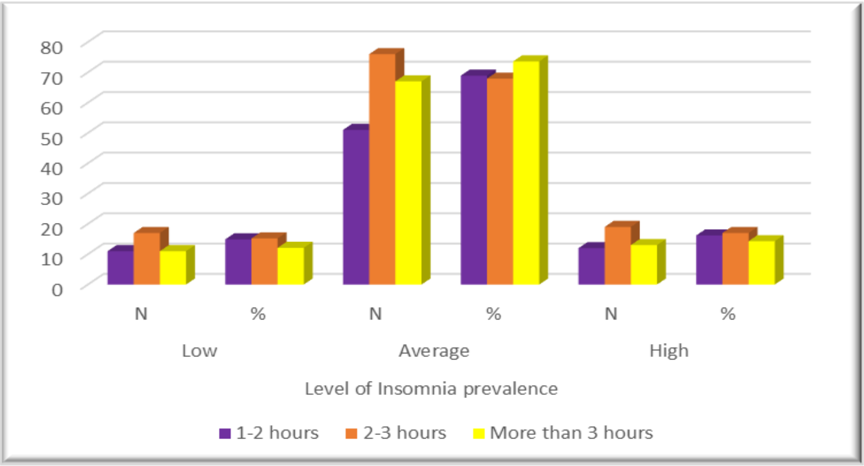


Table 4.19
Level of Prevalence of Insomnia among Prospective Teachers with regard to pattern of internet usage

Personal Variable	*Category*	*Level of Insomnia prevalence*					
		Low		*Average*		*High*	
		N	*%*	*N*	*%*	*N*	*%*
Pattern of internet usage	Social media	30	16.1	127	68.3	29	15.6
	Gaming	2	13.3	8	53.3	5	33.3
	Online learning	7	9.2	59	77.6	10	13.2

From the above table it is clear that with regard to internet usage of social media, 68.9% of Prospective Teachers have average level of insomnia prevalence. With regard to internet usage of gaming, 53.3% of Prospective Teachers have average level of insomnia prevalence. With regard to internet usage of online learning, 77.6% of Prospective Teachers have average level of insomnia prevalence.

Figure 4.19
Level of Prevalence of Insomnia among Prospective Teachers with regard to pattern of internet usage

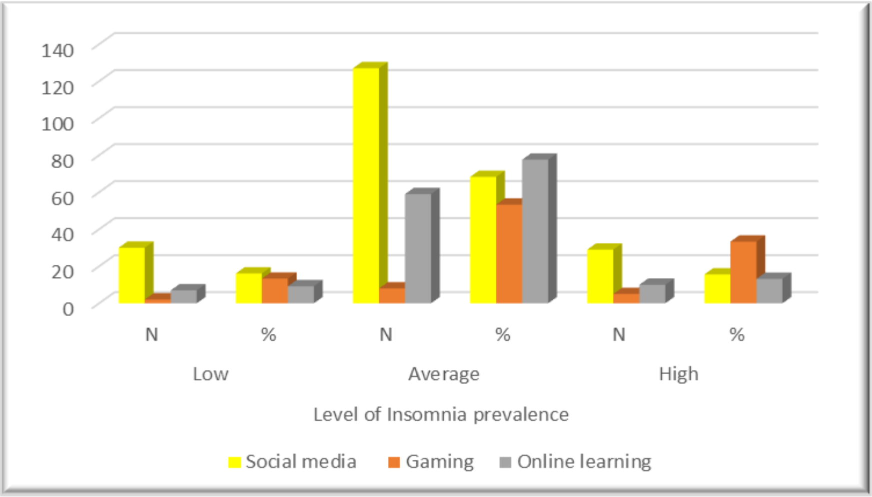
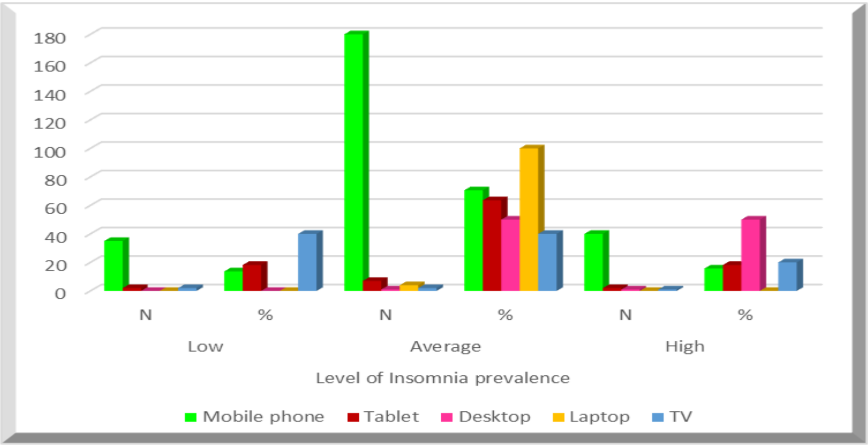


Table 4.20
Level of Prevalence of Insomnia among Prospective Teachers with regard to type of screen usage

Personal Variable	*Category*	*Level of Insomnia prevalence*					
		Low		*Average*		*High*	
		N	*%*	*N*	*%*	*N*	*%*
Type of screen usage	Mobile phone	35	13.7	180	70.6	40	15.7
	Tablet	2	18.2	7	63.6	2	18.2
	Desktop	0	0	1	50	1	50
	Laptop	0	0	4	100	0	0
	TV	2	40	2	40	1	20

From the above table it is clear that with regard to usage of mobile phone screen, 70.6% of Prospective Teachers have average level of insomnia prevalence. With regard to usage of tablet screen, 63.6% of Prospective Teachers have average level of insomnia prevalence. With regard to usage of desktop screen, 50% of Prospective Teachers have average level of insomnia prevalence. With regard to usage of laptop screen, 100% of Prospective Teachers have average level of insomnia prevalence. With regard to usage of TV screen, 40% of Prospective Teachers have average level of insomnia prevalence.

Figure 4.20
Level of Prevalence of Insomnia among Prospective Teachers with regard to type of screen usage



4.4 Inferential Analysis

Digital Eye Strain of Prospective Teachers

Null Hypothesis: 1 There is no significant difference between male and female Prospective Teachers in their Digital Eye Strain.

Table 4.21

t – test Analysis on the Scores of Digital Eye Strain of Prospective Teachers with regard to gender

Variable	*Gender*	*N*	*Mean*	*S D*	*t - Value*	*P - Value*
Digital Eye Strain	Male	9	24.8889	6.66041	0.403	0.697 NS
	Female	268	25.7985	6.46776		

NS - Not Significant at 5% level

It is inferred from the above table that p value is greater than 0.05 for Digital Eye Strain of Prospective Teachers. It shows that there is no significant difference between male and female Prospective Teachers in their Digital Eye Strain.

Null Hypothesis: 2 There is no significant difference between UG and PG Prospective Teachers in their Digital Eye Strain.

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Table 4.22
t – test Analysis on the Scores of Digital Eye Strain of Prospective Teachers with regard to academic level

Variable	*Academic level*	*N*	*Mean*	*S D*	*t - Value*	*P - Value*
Digital Eye Strain	UG	197	26.2487	6.75701	2.117	0.036 S
	PG	80	24.5875	5.54086		

S - Significant at 5% level

It is inferred from the above table that p value is lesser than 0.05 for Digital Eye Strain of Prospective Teachers. It shows that there is significant difference between UG and PG Prospective Teachers in their Digital Eye Strain. The mean difference revealed that the UG Prospective Teachers have greater Digital Eye Strain than the UG Prospective Teachers.

Null Hypothesis: 3 There is no significant difference between married and unmarried Prospective Teachers in their Digital Eye Strain.

Table 4.23

t – test Analysis on the Scores of Digital Eye Strain of Prospective Teachers with regard to marital status

Variable	*Marital Status*	*N*	*Mean*	*S D*	*t - Value*	*P - Value*
Digital Eye Strain	Married	27	22.3333	4.97687	3.657	0.001 S
	Unmarried	250	26.1400	6.50428		

S - Significant at 5% level

It is inferred from the above table that p value is lesser than 0.05 for Digital Eye Strain of Prospective Teachers. It shows that there is significant difference between married and unmarried Prospective Teachers in their Digital Eye Strain. The mean difference revealed that the unmarried Prospective Teachers have greater Digital Eye Strain than the married Prospective Teachers.

Null Hypothesis: 4 There is no significant difference between rural and urban area Prospective Teachers in their Digital Eye Strain.

Table 4.24

t – test Analysis on the Scores of Digital Eye Strain of Prospective Teachers with regard to area of living

Variable	*Area of living*	*N*	*Mean*	*S D*	*t - Value*	*P - Value*
Digital Eye Strain	Rural	133	25.7293	6.38432	0.098	0.922 NS
	Urban	144	25.8056	6.55827		

NS – Not Significant at 5% level

It is inferred from the above table that p value is lesser than 0.05 for Digital Eye Strain of Prospective Teachers. It shows that there is no significant difference between rural and urban area Prospective Teachers in their Digital Eye Strain.

Null Hypothesis: 5 There is no significant difference in Digital Eye Strain with regard to mobile phone exposure.

Table 4.25
F – Test Analysis on the Scores of Digital Eye Strain of Prospective Teachers with regard to mobile phone exposure

Variable	*Source of Variable*	*Sum of Squares*	*df*	*Mean Square*	*F-Value*	*P-Value*
Digital Eye Strain	Between Groups	682.322	2	341.161	8.616	0.000 S
	Within Groups	10848.891	274	39.594		
	Total	11531.213	276			

S - Significant at 5% level

It is inferred from the above table that p value is lesser than 0.05 for Digital Eye Strain of Prospective Teachers. It shows that there is no significant difference in Digital Eye Strain with regard to mobile phone exposure.

Table 4.25.1

Scheffe test result showing the significant difference in Digital Eye Strain of Prospective Teachers with regard to mobile phone exposure

Mean difference in Digital Eye Strain of Prospective Teachers			
1-2 hours	**2-3 hours**	**Above 3 hours**	**Result**
23.79	25.41	-	-
	25.41	27.81	**
23.79	-	27.81	**

*** Mean difference*

It is inferred from the above table that the Prospective Teachers who are using mobile phone for above 3 hours have greater Digital Eye Strain than the Prospective Teachers who are using mobile phone for 2-3 hours. And also, the Prospective Teachers who are using mobile phone for above 3 hours have greater Digital Eye Strain than the Prospective Teachers who are using mobile phone for 1-2 hours.

Null Hypothesis: 6 There is no significant difference in Digital Eye Strain with regard to pattern of internet usage.

Table 4.26
F – Test Analysis on the Scores of Digital Eye Strain of Prospective Teachers with regard to pattern of internet

Variable	*Source of Variable*	*Sum of Squares*	*df*	*Mean Square*	*F-Value*	*P-Value*
Digital Eye Strain	Between Groups	210.642	2	105.321	2.549	0.080 NS
	Within Groups	11320.571	274	41.316		
	Total	11531.213	276			

NS – Not Significant at 5% level

It is inferred from the above table that p value is lesser than 0.05 for Digital Eye Strain of Prospective Teachers. It shows that there is no significant difference in Digital Eye Strain with regard to pattern of internet.

Null Hypothesis: 7 There is no significant association between Digital Eye Strain and parental educational level of Prospective Teachers.

Table 4.27
Chi-square Analysis on the Scores of Digital Eye Strain of Prospective Teachers with regard to parental educational level

Variable	*df*	*Calculated χ^2 Value*	*Table Value*	*P-Value*
Digital Eye Strain	6	4.936	12.549	0.552 NS

NS – Not Significant at 5% level

It is inferred from the above table that p value (0.552) is greater than 0.05 for Digital Eye Strain of Prospective Teachers. It shows that there is no significant association between Digital Eye Strain and parental educational level of Prospective Teachers.

Null Hypothesis: 8 There is no significant association between Digital Eye Strain and socio-economic status of Prospective Teachers.

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Table 4.28
Ci-square Analysis on the Scores of Digital Eye Strain of Prospective Teachers with regard to socio economic status

Variable	*df*	*Calculated χ^2 Value*	*Table Value*	*P-Value*
Digital Eye Strain	6	10.862	9.488	0.028 S

S – Significant at 5% level

It is inferred from the above table that p value (0.028) is lesser than 0.05 for Digital Eye Strain of Prospective Teachers. It shows that there is significant association between Digital Eye Strain and socio-economic status of Prospective Teachers.

4.05 Prevalence of Insomnia among Prospective Teachers

Null Hypothesis: 9 There is no significant difference between male and female Prospective Teachers in prevalence of insomnia.

Table 4.29

t – test Analysis on the Scores of prevalence of Insomnia among Prospective Teachers with regard to gender

Variable	*Gender*	*N*	*Mean*	*S D*	*t - Value*	*P - Value*
Insomnia prevalence	Male	9	19.2222	5.40319	1.143	0.062 NS
	Female	268	15.2799	6.11746		

NS - Not Significant at 5% level

It is inferred from the above table that p value is greater than 0.05 for prevalence of Insomnia among Prospective Teachers. It shows that there is no significant difference between male and female Prospective Teachers in their insomnia prevalence.

Null Hypothesis: 10 There is no significant difference between UG and PG Prospective Teachers in prevalence of insomnia.

Table 4.30
t – test Analysis on the Scores of prevalence of Insomnia among Prospective Teachers with regard to academic level

Variable	*Academic level*	*N*	*Mean*	*S D*	*t - Value*	*P - Value*
Insomnia prevalence	UG	197	15.2437	6.25900	0.722	0.471 NS
	PG	80	15.8125	5.80723		

NS – Not Significant at 5% level

It is inferred from the above table that p value is greater than 0.05 for insomnia prevalence among Prospective Teachers. It shows that there is no significant difference between UG and PG Prospective Teachers in their insomnia prevalence

Null Hypothesis: 11 There is no significant difference between married and unmarried Prospective Teachers in their insomnia prevalence.

Table 4.31

t – test Analysis on the Scores of prevalence of Insomnia among Prospective Teachers with regard to marital status

Variable	*Marital Status*	*N*	*Mean*	*S D*	*t - Value*	*P - Value*
Insomnia prevalence	Married	27	14.5556	6.00214	0.775	0.444 NS
	Unmarried	250	15.5000	6.14500		

NS – Not Significant at 5% level

It is inferred from the above table that p value is lesser than 0.05 for prevalence of Insomnia among Prospective Teachers. It shows that there is no significant difference between married and unmarried Prospective Teachers in their insomnia prevalence.

Null Hypothesis: 12 There is no significant difference between rural and urban area Prospective Teachers in their insomnia prevalence.

Table 4.32

t – test Analysis on the Scores of prevalence of Insomnia among Prospective Teachers with regard to area of living

Variable	*Area of living*	*N*	*Mean*	*S D*	*t - Value*	*P - Value*
Insomnia prevalence	Rural	133	14.8496	6.10576	1.461	0.145 NS
	Urban	144	15.9236	6.12239		

NS – Not Significant at 5% level

It is inferred from the above table that p value is lesser than 0.05 for prevalence of Insomnia among Prospective Teachers. It shows that there is no significant difference between rural and urban area Prospective Teachers in their insomnia prevalence.

Null Hypothesis: 13 There is no significant difference in insomnia prevalence with regard to mobile phone exposure.

Table 4.33

F – Test Analysis on the Scores of Prevalence of Insomnia among Prospective Teachers with regard to mobile phone exposure

Variable	*Source of Variable*	*Sum of Squares*	*df*	*Mean Square*	*F-Value*	*P-Value*
Insomnia prevalence	Between Groups	40.058	2	20.029	0.532	0.588 NS
	Within Groups	10320.845	274	37.667		
	Total	10360.903	276			

NS – Not Significant at 5% level

It is inferred from the above table that p value is lesser than 0.05 for prevalence of Insomnia among Prospective Teachers. It shows that there is no significant difference in insomnia prevalence with regard to mobile phone exposure.

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Null Hypothesis: 14 There is no significant difference in insomnia prevalence with regard to pattern of internet usage.

Table 4.34

F – Test Analysis on the Scores of with regard to pattern of internet

Variable	*Source of Variable*	*Sum of Squares*	*df*	*Mean Square*	*F-Value*	*P-Value*
Insomnia prevalence	Between Groups	37.981	2	18.990	0.504	0.080 NS
	Within Groups	10322.922	274	37.675		
	Total	10360.903	276			

NS – Not Significant at 5% level

It is inferred from the above table that p value is lesser than 0.05 for prevalence of Insomnia among Prospective Teachers. It shows that there is no significant difference in insomnia prevalence with regard to pattern of internet.

Null Hypothesis: 15 There is no significant association between insomnia prevalence and parental educational level of Prospective Teachers.

Table 4.35

Ci-square Analysis on the Scores of prevalence of Insomnia among Prospective Teachers with regard to parental educational level

Variable	*df*	*Calculated χ^2 Value*	*Table Value*	*P-Value*
Insomnia prevalence	6	1.146	12.549	0.552 NS

NS – Not Significant at 5% level

It is inferred from the above table that p value (1.146) is greater than 0.05 for Prevalence of Insomnia among Prospective Teachers. It shows that there is no significant association between insomnia prevalence and parental educational level of Prospective Teachers.

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Null Hypothesis: 16 There is no significant association between insomnia prevalence and socio-economic status of Prospective Teachers.

Table 4.36

Ci-square Analysis on the Scores of Prevalence of Insomnia among Prospective Teachers with regard to socio - economic status

Variable	*df*	*Calculated χ^2 Value*	*Table Value*	*P-Value*
Insomnia prevalence	6	8.291	9.488	0.081 NS

NS – Not Significant at 5% level

It is inferred from the above table that p value (0.081) is lesser than 0.05 for prevalence of Insomnia among Prospective Teachers. It shows that there is no significant association between insomnia prevalence and socio-economic status of Prospective Teachers.

ISBN : 978-81-971077-4-0

CHAPTER V
FINDINGS, INTERPRETATIONS, RECOMMENDATIONS AND SUGGESTIONS

5.0 Introduction

In this chapter, the focus shifts from the presentation of findings to their interpretation and implications. The preceding chapters have precisely examined the prevalence and correlates of digital eye strain symptoms and insomnia among Prospective Teachers, shedding light on various factors such as socio-economic status, screen usage habits, and parental education levels. This chapter serves as a platform to delve deeper into the significance of these findings, elucidate their implications for theory and practice, and offer recommendations for future research and intervention strategies.

The discussion begins by revisiting the research questions and summarizing the key findings derived from the empirical analysis conducted in the previous chapters. By synthesizing the results, this chapter aims to provide a comprehensive understanding of the factors influencing digital eye strain symptoms and insomnia among Prospective Teachers and to identify patterns or trends that emerged from the data.

Subsequently, the discussion proceeds to analyze the implications of these findings within the broader context of digital eye health and education. This involves exploring the potential impact of digital eye strain and insomnia on academic performance, occupational well-being, and overall quality of life among Prospective Teachers. Furthermore, attention is given to the role of technology in contemporary educational settings and its implications for educators' visual and mental health.

Beyond the immediate implications for Prospective Teachers, this chapter also considers the broader societal and public health implications of digital eye strain and insomnia. As digital devices become increasingly ubiquitous in daily life, understanding and mitigating the adverse effects of prolonged screen exposure are paramount for promoting population-wide eye health and well-being.

Additionally, this chapter discusses the limitations of the study and identifies areas for future research. By critically reflecting on the methodological approach and potential biases inherent in the data collection process, insights are offered into avenues for further inquiry and refinement of research methodologies.

This chapter aims to bridge the gap between research findings and practical application, offering actionable recommendations for educators, policymakers and eye health professionals. By synthesizing empirical evidence with theoretical insights this chapter contributes to the ongoing discourse on digital eye health and mental health which underscores the importance of proactive measures to mitigate the adverse effects of screen usage on visual and psychological well-being.

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5.1 Interpretation of Findings for Digital Eye Strain:

5.1.1 Gender Differences

The absence of a significant difference in DES between male and female Prospective Teachers underscores an intriguing aspect of gender dynamics in occupational settings. While the statistical analysis did not reveal a disparity, it is imperative to acknowledge the potential influence of socio-cultural factors that may contribute to differential experiences of DES among genders.

5.1.2 Educational Level and Marital Status

The significant disparity in DES between undergraduate (UG) and postgraduate (PG) Prospective Teachers suggests a nuanced relationship between academic pursuits and ocular health. Prospective Teachers at the UG level may encounter heightened DES, possibly attributed to the demands of academic coursework and prolonged screen exposure. Moreover, the notable difference in DES between married and unmarried Prospective Teachers underscores the relevance of personal life circumstances in exacerbating ocular discomfort. The elevated DES among unmarried individuals may reflect increased screen engagement or heightened stress levels associated with familial or relational dynamics.

5.1.3 Residential Area and Mobile Phone Exposure

The non-significant difference in DES between rural and urban Prospective Teachers underscores the ubiquitous nature of digital technology and its impact on ocular health, transcending geographical boundaries. However, the pronounced disparity in DES concerning mobile phone exposure unveils a concerning trend of escalating ocular discomfort with prolonged screen engagement. This finding accentuates the imperative for targeted interventions aimed at mitigating the adverse effects of excessive mobile phone usage on ocular health.

5.1.4 Socio-economic Status

The significant association between socio-economic status and DES unveils a concerning dimension of health inequality, wherein individuals from lower socio-economic strata are disproportionately burdened by ocular discomfort. This finding underscores the imperative for equitable access to ocular healthcare services and the implementation of socio-economic policies aimed at mitigating health disparities.

5.2 Interpretation of Findings for Insomnia:

5.2.1 Gender Differences and Socio-economic Status

The absence of significant differences in insomnia prevalence between genders and parental educational levels suggests a complex interplay of socio-demographic factors influencing sleep patterns among Prospective Teachers. However, the significant association between socio-economic status and insomnia underscores the salience of socio-economic determinants in shaping sleep quality and duration. Prospective Teachers from lower socio-economic backgrounds may encounter heightened sleep disturbances due to financial stressors or inadequate access to conducive sleep environments.

5.2.2 Educational Level, Marital Status, Residential Area, Mobile Phone Exposure, and Internet Usage Pattern

The non-significant differences in insomnia prevalence across various demographic and lifestyle factors highlight the multifaceted nature of sleep disturbances among Prospective Teachers. While educational level, marital status, residential area, mobile phone exposure, and internet usage pattern did not emerge as significant predictors of insomnia, it is essential to adopt a holistic approach to understand the intricate interplay of individual, social, and environmental determinants of sleep health.

5.3 Conclusion

In our study, we have carefully analyzed the various factors contributing to the prevalence of Digital Eye Strain (DES) and Insomnia among Prospective Teachers. Through thorough examination, we've discerned a complex interplay of demographic, socio-economic, and lifestyle elements that significantly impact these conditions.

The demographic factors such as age, gender, and educational background have emerged as key determinants. Younger teachers, for instance, might be more susceptible to Digital Eye Strain due to prolonged exposure to digital devices both in their professional and personal lives. Moreover, gender dynamics might influence the prevalence of insomnia differently among male and female teachers, demanding targeted interventions tailored to these specific needs.

Secondly, socio-economic factors play a crucial role. Prospective Teachers from lower socio-economic backgrounds might encounter challenges accessing adequate eye care resources or maintaining healthy sleep patterns due to additional stressors related to financial constraints. Addressing these disparities requires targeted support systems and accessible healthcare services.

Lastly, lifestyle factors such as screen time habits, sedentary behavior, and sleep hygiene practices significantly contribute to the prevalence of Digital Eye Strain and Insomnia. Interventions aimed at promoting mindful technology usage, incorporating regular breaks, and cultivating healthy sleep routines are paramount in mitigating these issues.

In light of these findings, it becomes evident that a standard approach to address ocular and sleep health among Prospective Teachers is inadequate. Instead, targeted interventions within educational settings are imperative. These interventions should encompass comprehensive strategies that not only address the specific needs of teachers but also foster a supportive environment conducive to their holistic well-being. By prioritizing ocular and sleep health within educational institutions, we can empower teachers to thrive professionally while safeguarding their physical and mental well-being.

5.4 Limitations and Future Directions

Acknowledging the limitations of the study, including sample size constraints and the cross-sectional nature of the data, future research endeavors should adopt longitudinal designs to explore temporal relationships and employ qualitative methodologies to gain a deeper understanding of the subjective experiences of Digital Eye Strain and Insomnia among Prospective Teachers. Additionally, integrating objective measures, such as eye-tracking technology and polysomnography, can enhance the comprehensiveness of future investigations into ocular and sleep health within educational contexts. These recommendations aim to provide a more nuanced understanding of the complex interplay between demographic, socio-economic, and lifestyle factors in shaping Digital Eye Strain and Insomnia among teachers, thereby informing targeted interventions and support strategies to promote their well-being.

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Digital Eye Strain Questionnaire

Name ………………………..

Age : …………………………….

Name of the college :………………………………

Department:………………

Email Id : …………

Please tick in the appropriate place [✓]

Gender: Male [ ] / Female [ ]

Academic Level : UG [ ] / PG [ ]

Marital Status: Married [ ] / Unmarried [ ] Area of Living : Rural [ ] / Urban [ ]

Parental Educational Level: 10’th [ ] / 12’th [ ] / UG [ ] / PG [ ]

Socioeconomic Status: Lower [ ] / Middle [ ] / Upper [ ]

Mobile Screen Exposure Level per day: 1 to 2 hours [ ] / 2 to 3 hours [ ] / more than 3 hours [ ]

Pattern of Internet Usage: Social Media [ ] / Gaming [ ] / Online Learning [ ]

Type of Screen Usage: Mobile phone [ ] / Tablet [ ] / Desktop [ ] / Laptop [ ] / Tv [ ]

1. How long are you exposed to digital screen in a day on average?
   Very Frequently [ ] / Frequently [ ] / Occasionally [ ] / Rarely [ ] / Never [ ]

2. Do you delay your night’s sleep because of smartphone use?

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Very Frequently [ ] / Frequently [ ] / Occasionally [ ] / Rarely [ ] / Never [ ]

3. Do you modify your digital screen to relieve symptoms of visual disturbances like increasing text size, adjusting brightness, etc?
   Very Frequently [ ] / Frequently [ ] / Occasionally [ ] / Rarely [ ] / Never [ ]

4. Are you wearing any kind of refractive correction like spectacles or contact lenses which are specifically prescribed for use while viewing digital devices?
   Very Frequently [ ] / Frequently [ ] / Occasionally [ ] / Rarely [ ] / Never [ ]

5. Do you miss a planned work due to digital screen usage?
   Very Frequently [ ] / Frequently [ ] / Occasionally [ ] / Rarely [ ] / Never [ ]

6. Do you experience lightheadedness or blurred vision due to excessive digital screen use?
   Very Frequently [ ] / Frequently [ ] / Occasionally [ ] / Rarely [ ] / Never [ ]

7. Do you think that you should shorten your digital screen use time?
   Very Frequently [ ] / Frequently [ ] / Occasionally [ ] / Rarely [ ] / Never [ ]

8. Do you constantly check your Social Networking Services like Twitter, FB, etc., right after you wake up?
   Very Frequently [ ] / Frequently [ ] / Occasionally [ ] / Rarely [ ] / Never [ ]

9. Do you think that there is nothing more fun to do than using your Social Media Network?
   Very Frequently [ ] / Frequently [ ] / Occasionally [ ] / Rarely [ ] / Never [ ]

10. Do the people around you tell you that you use digital screen too much?
    Very Frequently [ ] / Frequently [ ] / Occasionally [ ] / Rarely [ ] / Never [ ]

Referral

Ophthalmologi	
Psychologist	
Others	

Clinician's Name: …………………………… Patient's Name: …………………………….

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	Right Eye	Left Eye
Vision		
With Glass		
Without Glass		

Digital Eye Strain Score

Normal	0 – 12 score	
Mild	13 – 17 score	
Moderate	18 – 22 score	
Severe	23 – 30 score	

Regensburg Insomnia Scale

Please rate the following questions for the last four weeks

1. How many minutes do you need to fall asleep?	1 -20 min .	21 – 40 min.	41 – 60 min.	61 – 90 min.	91min. and more
2. How many hours do you sleep during night?	7 h and more	5 – 6 h	4 h	2 – 3 h	0 – 1 h
How often do the following occurrences happen?	Always	Mostly	Sometimes	Seldom	Never
3. My sleep is disturbed	4	3	2	1	0
4. I wake up too early	4	3	2	1	0
5. I wake up from the slightest sound	4	3	2	1	0
6. I feel that I have not slept all night	4	3	2	1	0
7. I think a lot about my sleep	4	3	2	1	0

8. I am afraid to go to bed because of my disturbed sleep	4	3	2	1	0
9. I feel fit during the day	0	1	2	3	4
10. I take sleeping pills in order to get sleep	4	3	2	1	0

ISBN : 978-81-971077-4-0

"Vision is a treasure beyond measure. As educators, let's nurture, safeguard and promote digital detox to mitigate its side effects."

~ Dr.Michele Borba

ISBN: 978-81-971077-4-0

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