Journal of Research Administration
Society of Research Administrators International

EXPLORING THE INTERPLAY OF VISUAL DISCOMFORT AND INADEQUATE PHYSICAL ACTIVITY ON ACADEMIC SUCCESS AND WELL-BEING OF THE UNIVERSITY STUDENTS: A BRIEF REVIEW

-Aayushi Gupta[1]
(PhD Scholar) M.Optom,
Renu Thakur
[1] PhD
[1]Chitkara School of Health Sciences, Chitkara University Rajpura, Punjab
Email- aayushiopto@gmail.com ; renu.thakur@chitkara.edu.in

Abstract
With the introduction of a new century, the problem of visual discomfort and lack of physical activity occupies as a very big issue among the university students. In this condition, the person feels discomfort during the activities such as reading and undertaking screen-related tasks which may likely lead to the onset of other visual symptoms. At the same time, concerning what pertains most to the modern societal trends, we have to note that there is gradually less physical engagement among students due to some factors as addressed by the sedentary performances and the wide use of the screen-based entertainment. First, a short literature review was done, covering articles that appeared between 2013 and 2023. Included search engines were Google Scholar, PubMed, and Web of Science. By making use of the already established research and scholarly articles, this review investigates the source and symptoms of visual discomfort, the threats that the extensive screen exposure poses, and the necessity of getting involved in physical activities to compensate for these effects. As it has been argued by many authors recently, this review article pays considerable attention to the correlation between these two variables as well as their probable influence on students' scholarly success and general well-being. Apart from this also it gives suggestions for teachers, parents and students wise about efficiency in abating these challenges and develop a more relaxed, learning environment.
Keywords- Physical Activity, Academic Performance, Visual Stress, students.

Introduction

In the modern era of high-speed technological progress continuously changing our lives for either good or bad, university students are becoming increasingly dependent on the modern education of the cadence 'with the times'. Even Though the digital age has resulted as one of the boons for modern education but it does have its banes too. Two of thosebanesbeing visual stress and the phenomenon of lack of physical exercises(Evans & Allen, 2016)(Shajer Shaikh, KalikaBandamwar, 2022).Taking into consideration the increasing pressure that university students face from ever changing and competitive academic demands and widespread screens in their lives, it has become very critical to analyze the fine-grained relationship between these two interdependent sides and their oh-so-important effects on students' academic performance and

general well-being. Involved in a world full of smartphones and digital screen screens, there is a wide variety of troubles faced by the students, such as constant headaches, digital eyestrain, and much discomfort.

All these problems also negatively affect the academic and cognitive abilities of the university students(Mandolesi et al., 2018; Varadaraj et al., 2021).Meanwhile, another element of this rapidly changing environment which cannot be ignored is the deterioration in students' level of physical activity(Thakur et al., 2021). The shift towards inactivity due to sedentary lifestyles, partly linked to the charm of screens and the burdens involved in grappling with the academic life, is an expression of great worries regarding the physical condition of students.

This brief review aims to shed light on the complex relationship present between visual stress and physical inactivity, addressing how it shapes the student's academic performance and over all wellbeing. In the new age, visual stress is often produced by long duration of screen time and unfavorable lighting conditions which makes up for a big threat to the university students. Moreover, this analysis also aims to shed light on the potential solutions and strategies for not only educators but also for parents and students themselves to effectively address these problems and make up a highly optimal environment for the academic and health wellbeing of the students.

Material and Methods

Two techniques used or article search was- "Citation searching "and "Using Keywords".Lack of Physical Activity, sedentary lifestyle, visual stress, attitude to health, attitude to visual were some of the keywords used for the article search. Online search was conducted using search engines- Google scholar, PubMed and Hinari. Both "and" and "or" were used as Boolean operators. This review considered articles published within a particular time frame, ranging from 2013 to 2023. This duration of 10 years was chosen to observe the evolving trends and insights in the field. From this search, a total of 70 articles were initially identified. Afterwards, thorough a screening process 34 articles were ultimately included in this study, ensuring that only the most relevant and high-quality sources informed our analysis. The review process followed the guidelinesof Preferred Reporting Items for systematic reviews and Meta Analyses (PRISMA) method. In order to have a comprehensive presentation with respect to the results the article is structured on the basis of thematic relevance.

Results

The Prevalence of Visual Stress among Students

3.1 Factors contributing to visual stress

Visual stress commonly comes from long-term exposure to computer screens, a large number of electronic devices, or unsuitable environment for eye. Screens emit both glare and blue light, and yet it is highly detrimental to the eyes, as it causes considerable eye strain, resulting various symptoms such as eye fatigue, headache, and even blindness. Moralista et al. (2022) and Zayed et al. (2021) provided research evidence that indicates that long hours of exposure to digital screens are primary cause of visual stress among the younger generation, thus marking it as a highly prevalent issue(Moralista et al., 2022; Zayed et al., 2021). In addition, it is also reported in

the recent studies on students a high number of contributors to the progressing phase of visual stress can be inadequate sleep, ineffective intervals between classes, poor posture, wrong distance from the screen, lack of corrective measures, previous ocular adverse events, and, low screen brightness. These variables, each plays a crucial role in enhancing visual discomfort among students(Al Tawil et al., 2020; Gammoh, 2021; Jahan et al., 2018; Wang et al., 2021; Wangsan et al., 2022).Meanwhile, the importance of even relatively minor factors such as lighting, illumination conditions are pointed out in Loew et al. (2021) study related to visual stress(Loew, 2017). Higher or lower room illumination has a significant effect on the level of the discomfort of the person in case of the prolonged screen exposure while still supporting the idea of the presence of a multi-layered factor in this issue.

3.2 Manifestations and Ramifications

Ocular problems and visual disturbances among students can also result in a number of challenges that manifest through the corridor of concentration and comprehension, in the end, leading to poor performance in their academic level. It is also worth noting that a study by Peregrina et al. investigated the visual health in relation to academic performance in 2020 observing that students with poor academic performance usually have poor visual health when compared to those with good grades(Alvarez-Peregrina et al., 2020).A similar study conducted by Paranjpe et al. examined 100 students with a history of poor academic performance and found a positive correlation between visual health and academic performance(Paranjpe et al., 2016). Apart from academic problems a connection between visual health and mental stress was examined in several studies, for instance, by Kim et al. and Demmin et al., study which reveal the link between ocular health and one's mental state(Demmin & Silverstein, 2020; Kim et al., 2019). Indirect effects that may increase the stress and frustration brought about by challenges of visual discomfort in turn may affect an individual's overall well-being in terms of suffering from mental health problems. In the meantime, the direct effects may appear in the form of such specific forms of psychological distress related to ocular problems, cultivating the demand for comprehensive care and services in favor of students affected by vision disorder.

Insufficient Engagement in Physical Exercise

3.3. Factors Influencing Reduced Physical Activity

The drop in physical activity level among students can be because of the multilayered play of many factors that involves increased screen time, growing academic pressure, and the decreased availability of outdoor recreation facilities. As a supporting observation for the a forementioned statement, Deliens et al. and Fazanes et al. have separately noted relationship between such factors as lack of sleep and lack of access to physical education resources and the tendency to decrease the level of physical activity among students(Carballo-Fazanes et al., 2020; Deliens et al., 2015) .Similarly, with regard to this issue, Silva et al (2012) conducted a recent review which illuminates several explanations for the diminished physical activity in the students of the university.The review highlights a trio of contributory elements like lack of motivation,

restrictions in physical activity resources, and restrictions also pressing notes of time resource (Silva et al., 2022). In addition, Alkhateeb et al. (2019) also conducted a study among the university students in Saudi Arabia that observedthat time constraints and academic stress are the main factors that greatly reduce the levels of physical activity(Alkhateeb et al., 2019). With respect to similar findings, a group of researchers who conducted a cross-sectional study among the Varanasi university students noted several factors affecting physical activities. Among those listed are changes in lifestyles, cell phone usage trends (including audio devices by way of listening to music), heavier reliance on cars, economic factors, and cultural issues that influence student patterns of physical activity (Kumar Verma et al., n.d.). In addition, a number of studies noted a significant relationship between sedentary behaviors and a broad range of health problems over and above mere physical inactivity between studies (Oren et al., 2020). These conditions include obesity and cardiovascular disease, among the musculoskeletal ailments. The combined outcomes of these researches underscore the urgency of tacking this issue of diminished physical activity levels on the part of the students because these students' long-term health will be compromised(Park et al., 2020; Singh et al., 2023; Stefansdottir & Gudmundsdottir, 2017).

.

3.4 Cognitive and Academic Ramifications

A large number of empirical studies has systematically emphasized the importance of attending to physical workouts as one of the tools to a higher cognitive development and for the achievement of academic excellence. This impact of physical activity on the body can be regarded as only part of the enormous scope of benefits from regular physical activity. Multiple reports have suggested the outstanding correlations between physical activity and general psychological performance, revealing the specific pathways that contribute through causality conducive to higher intellectual outcomes (Chaddock-Heyman et al., n.d.; Donnelly et al., 2016; James et al., 2023). Looking at these difficulties, it is imperative to consider redirecting our focus into properly addressing these challenges.

3.5 Encouraging Optimal Screen Practices and Promoting Physical Activity

To decrease visual stress and improve the visual well being among the students a range of strategies have been brought forth and promoted by a number of studies in this field. One such strategy in the implementation of the 20-20-20 rule, which recommends to take short breaks every 20 minutes and look 20 feet away for at least 20 seconds. This approach, was found to be useful as suggested by a study conducted byAnggrainy et al. on working professionals. Their study demonstrated the efficacy of 20-20-20 rule in decreasing eye strain and visual discomfort(Anggrainy et al., 2020). Moreover, in a similar fashion Alghamadi et al.'s research study also observes the significance of 20-20-20 rule as an intervention, mainly for reducing dry eye symptoms, highlight the importance of this rule for the students(Alghamdi & Alrasheed, 2020). Additionally, the maintenance of proper screen distance and room ergonomics also play an important role in minimizing eye straining and visual discomfort. Studies conducted by Lee et al. and Moslander et al. on office workers and students, respectively also emphasize the necessity

of ergonomics in the prevention of visual stress like making sure that the screens are at a recommended distance and angle, adjusting lighting conditions and maintaining correct posture can help in decreasing eye strain and promotion of visual well-being(Lee et al., 2021; Moslander & Jacobs, 2022). Furthermore, in order to increase physical activity among the university students a study conducted by Moon et al. suggests Goal setting, as an effective means of encouraging university students to participate in physical activities(Moon et al., 2016). Moreover, the implementation of bout exercises as suggested by Shaw et al. can also play a vital role in decreasing visual stress(Shaw et al., 2022).These strategies are not only important in boosting physical activity levels but can also contribute to reducing visual discomfort among students. Remarkably, the connection between physical activity and visual well-being extends beyond increased visual stress. Physical activity has been shown to have a positive impact on the reduction of dry eyes. Lopez et al.'s review on the effect of physical activity on tear film characteristics and dry eye-associated symptoms highlights how engaging in physical exercise can be beneficial in managing dry eye symptoms(Navarro-Lopez et al., 2023).

Conclusion

Through this review we were able to shed the light on addressing the highly pressing issue of sedentary lifestyles, and visual stress. In order to improve the well-being of the students it is recommended that we initiatecrucial steps to encourage individuals, to engage in regular physical activity. This responsibility falls not only on educators but also on parents. To overcome this problem effectively, we must incorporate physical activity into the core of education, ensure easy access to sports and recreational facilities, and promote active commuting to school. Furthermore, educational institutions have the potential to play a very significant role by initiating extracurricular athletic programs that actively involve students in physical pursuits.

To draw a comprehensive conclusion from the review presented, it becomes evident that there exists a complex relationship between visual stress and insufficient physical exercise, particularly in the context of children's academic achievements and overall well-being. Resolving these concerns requires the implementation of a comprehensive strategy that engages students, educators, and parents collaboratively. By advocating for the adoption of healthy screen habits and the promotion of regular physical activity, we can create an educational environment conducive to learning and, ultimately, enhance the overall quality of life for our students.

In summary, it is crucial that we recognize the complex relationship between visual stress and physical activity, addressing them as interconnected elements in the broader challenge of sedentary lifestyles. The key to success lies in a united effort, with educators, parents, and students all actively participating in fostering healthier habits and a more conducive learning environment. Through these collective actions, we can pave the way for improved scholastic achievements and better overall well-being among our students.

References

Al Tawil, L., Aldokhayel, S., Zeitouni, L., Qadoumi, T., Hussein, S., & Ahamed, S. S. (2020). Prevalence of self-reported computer vision syndrome symptoms and its associated factors among university students. *European Journal of Ophthalmology*, *30*(1), 189–195. https://doi.org/10.1177/1120672118815110

Alghamdi, W. M., & Alrasheed, S. H. (2020). Impact of an educational intervention using the 20/20/20 rule on Computer Vision Syndrome. *African Vision and Eye Health*, *79*(1). https://doi.org/10.4102/AVEH.V79I1.554

Alkhateeb, S. A., Alkhameesi, N. F., Lamfon, G. N., Khawandanh, S. Z., Kurdi, L. K., Faran, M. Y., Khoja, A. A., Bukhari, L. M., Aljahdali, H. R., Ashour, N. A., Bagasi, H. T., Delli, R. A., Khoja, O. A., & Safdar, O. Y. (2019). Pattern of physical exercise practice among university students in the Kingdom of Saudi Arabia (before beginning and during college): A cross-sectional study. *BMC Public Health*, *19*(1). https://doi.org/10.1186/s12889-019-8093-2

Alvarez-Peregrina, C., Sánchez-Tena, M. Á., Andreu-Vázquez, C., & Villa-Collar, C. (2020). Visual health and academic performance in school-aged children. *International Journal of Environmental Research and Public Health*, *17*(7). https://doi.org/10.3390/ijerph17072346

Anggrainy, P., Lubis, R. R., & Ashar, T. (2020). The effect of trick intervention 20-20-20 on computer vision syndrome incidence in computer workers. *OftalmologicheskiiZhurnal*, *1*. https://doi.org/10.31288/oftalmolzh202012227

Carballo-Fazanes, A., Rico-Díaz, J., Barcala-Furelos, R., Rey, E., Rodríguez-Fernández, J. E., Varela-Casal, C., &Abelairas-Gómez, C. (2020). Physical activity habits and determinants, sedentary behaviour and lifestyle in university students. *International Journal of Environmental Research and Public Health*, *17*(9). https://doi.org/10.3390/ijerph17093272

Chaddock-Heyman, L., Hillman, C. H., Cohen, N. J., & Kramer, A. F. (n.d.). *III. THE IMPORTANCE OF PHYSICAL ACTIVITY AND AEROBIC FITNESS FOR COGNITIVE CONTROL AND MEMORY IN CHILDREN*.

Deliens, T., Deforche, B., De Bourdeaudhuij, I., & Clarys, P. (2015). Determinants of physical activity and sedentary behaviour in university students: A qualitative study using focus group discussions. *BMC Public Health*, *15*(1). https://doi.org/10.1186/s12889-015-1553-4

Demmin, D. L., & Silverstein, S. M. (2020). Visual impairment and mental health: Unmet needs and treatment options. *Clinical Ophthalmology*, *14*. https://doi.org/10.2147/OPTH.S258783

Donnelly, J. E., Hillman, C. H., Castelli, D., Etnier, J. L., Lee, S., Tomporowski, P., Lambourne, K., & Szabo-Reed, A. N. (2016). Physical activity, fitness, cognitive function, and academic achievement in children: A systematic review. In *Medicine and Science in Sports and Exercise* (Vol. 48, Issue 6, pp. 1197–1222). Lippincott Williams and Wilkins. https://doi.org/10.1249/MSS.0000000000000901

Evans, B. J. W., & Allen, P. M. (2016). A systematic review of controlled trials on visual stress using Intuitive Overlays or the Intuitive Colorimeter. *Journal of Optometry*, *9*(4). https://doi.org/10.1016/j.optom.2016.04.002

Gammoh, Y. (2021). Digital Eye Strain and Its Risk Factors Among a University Student Population in Jordan: A Cross-Sectional Study. *Cureus*. https://doi.org/10.7759/cureus.13575

Jahan, F., Rafei, M. A., Ul Islam, Z., &Rafei, M. (2018). Firdous Jahan, Zahidul Islam, Muhammed Rafei. Factors Leading Computer Vision Syndrome in Medical Students: A Descriptive Analysis. *International Journal of Public Health Research*, *6*(3), 78–82. http://www.openscienceonline.com/journal/ijphr

James, J., Pringle, A., Mourton, S., & Roscoe, C. M. P. (2023). The Effects of Physical Activity on Academic Performance in School-Aged Children: A Systematic Review. In *Children* (Vol. 10, Issue 6). Multidisciplinary Digital Publishing Institute (MDPI). https://doi.org/10.3390/children10061019

Kim, H. J., Min, J. Y., Kim, H. J., & Min, K. B. (2019). Association between psychological and self-assessed health status and smartphone overuse among Korean college students. *Journal of Mental Health*, *28*(1). https://doi.org/10.1080/09638237.2017.1370641

Kumar Verma, A., Singh, G., Patwardhan, ; Kishor, & Patwardhan, K. (n.d.). *Patterns of Physical Activity Among University Students and Their Perceptions About the Curricular Content Concerned With Health: Cross-sectional Study*. https://doi.org/10.1101/2021.06.10.21258728v1

Lee, S., De Barros, F. C., De Castro, C. S. M., & De Oliveira Sato, T. (2021). Effect of an ergonomic intervention involving workstation adjustments on musculoskeletal pain in office workers—a randomized controlled clinical trial. *Industrial Health*, *59*(2). https://doi.org/10.2486/indhealth.2020-0188

Loew, S. (2017). Reading conditions in schools: a review of fluorescent lighting, ultra-white paper, unexplained learning difficulties, and visual stress in the classroom. *Revista de Psicología y Educación - Journal of Psychology and Education*, *12*(2), 85. https://doi.org/10.23923/rpye2017.12.147

Mandolesi, L., Polverino, A., Montuori, S., Foti, F., Ferraioli, G., Sorrentino, P., & Sorrentino, G. (2018). Effects of physical exercise on cognitive functioning and wellbeing: Biological and psychological benefits. In *Frontiers in Psychology* (Vol. 9, Issue APR). https://doi.org/10.3389/fpsyg.2018.00509

Moon, D. H., Yun, J., & McNamee, J. (2016). The effects of goal variation on adult physical activity behaviour. *Journal of Sports Sciences*, *34*(19). https://doi.org/10.1080/02640414.2016.1140218

Moralista, R. B., Oducado, R. M. F., Robles, B. R. G., & Rosano, D. A. (2022). Determinants of Zoom Fatigue Among Graduate Students of Teacher Education Program. *International Journal of Emerging Technologies in Learning*, *17*(13), 176–185. https://doi.org/10.3991/ijet.v17i13.31511

Moslander, D., & Jacobs, K. (2022). Efficacy of an ergonomics intervention for remote college students. *Work*, *71*(2). https://doi.org/10.3233/WOR-210689

Navarro-Lopez, S., Moya-Ramón, M., Gallar, J., Carracedo, G., &Aracil-Marco, A. (2023). Effects of physical activity/exercise on tear film characteristics and dry eye associated symptoms: A literature review. *Contact Lens and Anterior Eye*, *46*(4). https://doi.org/10.1016/j.clae.2023.101854

Paranjpe, R. R., Maheshgauri, R. D., Yadav, S. R., Kotadia, B. J., Nagdev, N. G., & Jethwa, K. G. (2016). A STUDY OF VISUAL PROBLEMS IN CHILDREN SCORING. *NATIONAL JOURNAL OF MEDICAL RESEARCH*, *6*(1), 87–88.

Park, J. H., Moon, J. H., Kim, H. J., Kong, M. H., & Oh, Y. H. (2020). Sedentary Lifestyle: Overview of Updated Evidence of Potential Health Risks. *Korean Journal of Family Medicine*, *41*(6). https://doi.org/10.4082/KJFM.20.0165

Shajer Shaikh, KalikaBandamwar. (2022). Assessment Of Digital Eye Strain With The Digital Eye Strain Scoring Index (Dessi). *Journal of Pharmaceutical Negative Results*, 4567–4575. https://doi.org/10.47750/pnr.2022.13.s08.590

Shaw, B. S., Breukelman, G. J., Millard, L., & Shaw, I. (2022). Effect of a Prolonged Maximal Bout of Exercise on Visual Performance. *Asian Journal of Sports Medicine*, *13*(1). https://doi.org/10.5812/asjsm.119406

Silva, R. M. F., Mendonça, C. R., Azevedo, V. D., Memon, A. R., Silva Noll, P. R. E., & Noll, M. (2022). Barriers to high school and university students' physical activity: A systematic review. In *PLoS ONE* (Vol. 17, Issue 4 April). Public Library of Science. https://doi.org/10.1371/journal.pone.0265913

Singh, H., Esht, V., Shaphe, M. A., Rathore, N., Chahal, A., &Kashoo, F. Z. (2023). Relationship between body mass index and cardiorespiratory fitness to interpret health risks among sedentary university students from Northern India: A correlation study. *Clinical Epidemiology and Global Health*, *20*. https://doi.org/10.1016/j.cegh.2023.101254

Stefansdottir, R., & Gudmundsdottir, S. L. (2017). Sedentary behavior and musculoskeletal pain: a five-year longitudinal Icelandic study. *Public Health*, *149*. https://doi.org/10.1016/j.puhe.2017.04.019

Thakur, D., Shergill, K., Kaur, G., Kaur, S., Abrol, D., Singh, H., & Gill, A. (2021). Nursing Intern, Chitkara School of Health Sciences. In *Indian Journal of Forensic Medicine & Toxicology* (Vol. 15, Issue 1).

Varadaraj, V., Munoz, B., Deal, J. A., An, Y., Albert, M. S., Resnick, S. M., Ferrucci, L., & Swenor, B. K. (2021). Association of Vision Impairment with Cognitive Decline across Multiple Domains in Older Adults. *JAMA Network Open*, *4*(7). https://doi.org/10.1001/jamanetworkopen.2021.17416

Wang, L., Wei, X., & Deng, Y. (2021). Computer Vision Syndrome During SARS-CoV-2 Outbreak in University Students: A Comparison Between Online Courses and Classroom Lectures. *Frontiers in Public Health*, *9*. https://doi.org/10.3389/fpubh.2021.696036

Wangsan, K., Upaphong, P., Assavanopakun, P., Sapbamrer, R., Sirikul, W., Kitro, A., Sirimaharaj, N., Kuanprasert, S., Saenpo, M., Saetiao, S., &Khamphichai, T. (2022). Self-Reported Computer Vision Syndrome among Thai University Students in Virtual Classrooms during the COVID-19 Pandemic: Prevalence and Associated Factors. *International Journal of Environmental Research and Public Health*, *19*(7). https://doi.org/10.3390/ijerph19073996

Zayed, H. A. M., Saied, S. M., Younis, E. A., &Atlam, S. A. (2021). Digital eye strain: prevalence and associated factors among information technology professionals, Egypt. *Environmental Science and Pollution Research*, *28*(20). https://doi.org/10.1007/s11356-021-12454-3