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Asthenopic symptoms prevalence in undergraduate students

Prevalência de sintomas astenópicos em estudantes do ensino superior

Flávio Marconiedson Nunes[1], Henrique Nunes Pereira Oliva[1], Gabriella de Sá Oliveira[2], Dorothéa Schmidt França[1]

ABSTRACT

Objective: *To analyze the prevalence of asthenic symptoms in students of higher education and to assess their influence on academic performance and learning.* **Methods:** *Descriptive research with cross-sectional design through the application of the College of Optometrists Questionnaire in Vision Development Quality of Life (COVDL-QoL), in its cross-cultural and linguistic adaptation to the Portuguese language, to the students of a private college in the city of Montes Claros.* ***Results:*** *The questionnaire was answered by 132 university students. There was no significant discrepancy in the prevalence of asthenopia between genders and age. Symptoms of headache, poor memory and loss of objects predominated in women, while sleepiness during reading and poor management of time were predominant in males.* ***Conclusion:*** *A high prevalence rate of asthenic symptoms among university students and positive associations with sex and time of use of electronic equipment was identified.*

Keywords: *Asthenopia; Optometry; Occupational diseases; Students*

RESUMO

Objetivo: Analisar a prevalência de sintomas astenópicos em estudantes do ensino superior e avaliar a sua influência no desempenho acadêmico e no aprendizado. **Métodos:** Pesquisa descritiva com delineamento transversal por meio da aplicação do Questionário College of Optometrists in Vision Development Quality of Life (COVDL-QoL), em sua adaptação transcultural e linguística para a língua portuguesa, aos alunos de uma faculdade particular da cidade de Montes Claros. **Resultados:** O questionário foi respondido por 132 universitários. Não houve discrepância significativa na prevalência de astenopia entre os sexos e a idade. Os sintomas de dor de cabeça, memória fraca e perda de objetos predominaram nas mulheres, enquanto a sonolência durante a leitura e o mau gerenciamento do tempo foram predominantes no sexo masculino. **Conclusão:** Foi identificada alta taxa de prevalência de sintomas astenópicos entre os universitários e associações positivas com sexo e tempo de utilização de equipamentos eletrônicos.

Descritores: Astenopia; Optometria; Doenças ocupacionais; Estudantes

[1] Faculdades Integradas Pitágoras de Montes Claros, Montes Claros, MG, Brazil.
[2] Programa de Pós-graduação em Saúde, Sociedade e Ambiente da Universidade Federal dos Vales do Jequitinhonha e Mucuri, Diamantina, MG, Brasil.

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Introduction

Vision is essential to learning process and is the way in which we receive most of the sensory information from the external environment. The integrity of this sensory instrument is indispensable for the good process of acquiring knowledge during higher education.[1] During studies, visual disturbances can create problems that go beyond the difficulty of seeing. Headache, inattention, drowsiness, behavioral differences, indiscipline and onus for presentation are some examples.[2] The decrease in visual capacity often leads to a drop in quality of life, as it generates occupational, social and psychological restrictions, as well as a decrease in learning capacity, resulting in a costly burden and loss of work force.[3]

With the advancement of technology, mainly related to electronics and computing, the use of the internet and electronic games has become increasingly popular. Videogame is widely used by young people and the internet across all age groups and all socioeconomic strata.[4] The use of close-up vision for long periods caused by the excessive use of cell phones, smartphones, computers and video games can generate a spasm of accommodation, not allowing relaxation of the ciliary muscle and consequently not undoing the reflex of accommodation completely. Over time, this can become chronic and cause a pseudomyopia or a "hypo" stimulation of farsightedness. In addition, spasm can trigger the onset of asthmatic symptoms such as headache, tearing, low visual distances, blurring of vision, blurred vision, and conjunctival hyperemia, which may interfere with the quality of life of users.[5]

The set of these signs and symptoms can be classified as "occupational asthenopia", characterized by irritative and functional disturbances in the eyeball, portrayed when the visual ingenuity seeks to overcome itself through exhaustive mechanisms, surpassing its particular physiological capacity, producing multiform symptoms.[6] Another ocular problem related to the excessive use of electronic devices is connected to the metal halogen lamps that are widely used in the composition of their screens. These lamps emit blue light that, in excess, can cause potentially serious lesions to the biological tissues of the eyes such as the conjunctiva, the cornea and, especially the retina, where it causes macular degeneration.[7]

This study aims to verify the prevalence of asthenic symptoms in students of higher education and to assess their influence on academic performance and learning. The aim is to contribute to the development of public health policies, aiming at the protection of eye health and the prevention of visual disturbances and their consequences on the quality of life.

Methods

This is a descriptive research, with a cross-sectional design in the data collection and quantitative approach of these about the prevalence of occupational asthenopia in students of higher education due to the use of near vision, mainly due to the use of electronic equipment for studies, reading or fun.

The students of the Faculdades Integradas Pitágoras de Montes Claros (FIPMOC) were studied, with a multidisciplinary character, without restriction to the course or period in which they were enrolled.

The sample consisted of 100% of the university students who volunteered to participate in the survey during the collection period, which took place in the institution's buildings, during the months of November and December 2017. All the major FIPMOC students 18 who were in college during the period of data collection and were willing to participate in the survey voluntarily and free of charge. The provision was proven through the signing of the Informed Consent Form.

As an instrument for data collection, the Visual Efficiency Inventory was used, validated by the University of Beira Interior - Portugal. This is a cross-cultural and linguistic adaptation to the Portuguese language of the College of Optometrists in Vision Development Quality of Life (COVDL-QoL) questionnaire, developed by COVD (College of Optometry in Vision Development) and quoted by several researchers for its simplicity and credibility to assess visual discomfort associated with near-vision tasks.[8]

The instrument was adapted for this study, being composed of 25 questions that evaluated the presence and frequency of symptoms associated with the visual practices and that could influence in visual capacity. Each question had four options of responses regarding the frequencies with which each symptom occurred based on Likert scale, scored from zero to four, where zero corresponds to "never", the one to "rarely", the two to "sometimes ", the three to" often" and the four to "always ". The score of 25 items was added to reach the final score. A total score above 17 points indicated suspicion of visual alteration, indicating the need for a specialized assessment.[9]

The results were recorded and analyzed using descriptive statistics. For this, the Statistical Package for Social Science program was initially used in its 18th version - SPSS 18. The results were later confirmed by the Chi-square test with Excel® for Windows 7.

The research project was appraised and approved by the examining board of the Research Ethics Committee of the Faculdades Integradas Pitágoras de Montes Claros - FIPMOC, through the opinion of number 2,167,947.

Results

The Visual Efficiency Inventory was answered by 132 students. Of these, 90 were male (68.2%), as can be observed in Figure 1. The students were divided into the following age groups: <21 years (28%), 21-30 years (59%), > 30 years (13%). The frequency of college students who reported spending more than 4 hours per day using electronic devices was 75.7%, while those reporting between 2-4 hours and less than 2 hours per day were 18.2% and 6.1% respectively.

The total number of students who presented asthmatic symptoms and scored above 17 points after the analysis of the answers, indicating, therefore, the need for ophthalmologic evaluation, was 103 (78.3%), and no significant discrepancy was observed between the sexes, as shown in figure 1.

Regarding college grades, 28.7% of all students reported low grades. When analyzing the rate of students with low scores associated and not associated with asthenopia, changes in prevalence rates were observed. The university students who presented low grades and had a visual alteration added up 31.4% of the total asthenopics, while the university students with low scores and no asthenopic symptoms accounted for only 18.5% of the total number of non-asthenopic, indicating a relation of visual alteration with higher predominance of low grades.

The distributions of blurred vision, double vision and headaches among students were calculated according to the questionnaire responses (Figure 2). We also calculated the frequency of changes during reading as a mixture of words, burning and eye tearing and drowsiness (Figure 3), as well as dizziness and nausea, jump or repetition of lines and worse vision at the end of the day (Figure 4).

The psychosocial aspects resulting from excessive use of near vision such as poor time management, loss of objects and poor memory have been shown to be the most prevalent in the university population studied and are presented in figure 5.

Differences related to sex were also observed. Asthmatic symptoms of headache, poor memory and loss of objects predominated in women, presenting prevalences of 17.5%, 5% and 75%, respectively. In men, sleepiness during reading and poor management of time stood out, presenting 36.9% and 53% of prevalence, respectively.

Regarding the use of electronic devices, it was evidenced that the symptoms of blurred vision, burning and ocular tearing were more related to a frequency of use of more than 4 hours daily, whereas headaches and double vision were more prevalent in students doing less than 4 hours per day.

Regarding age, no significant changes in the frequency of asthmatic symptoms were observed.

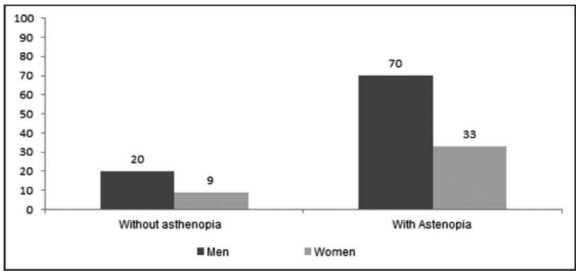

Figure 1: Distribution of frequency of asthenopic symptoms by sex, as reported by 132 students.

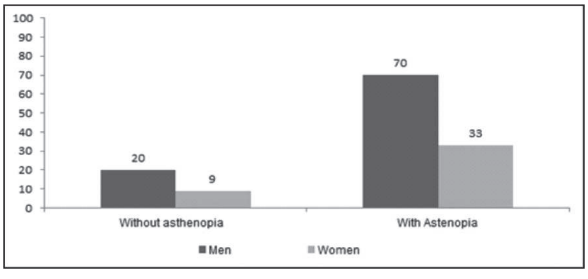

Figure 2: Distribution of blurred vision frequency, double vision and headaches, as reported by 132 students

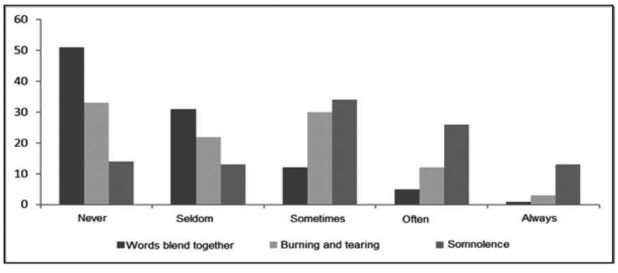

Figure 3: Distribution of word-frequency and drowsiness during reading, burning and ocular tearing as reported by 132 students.

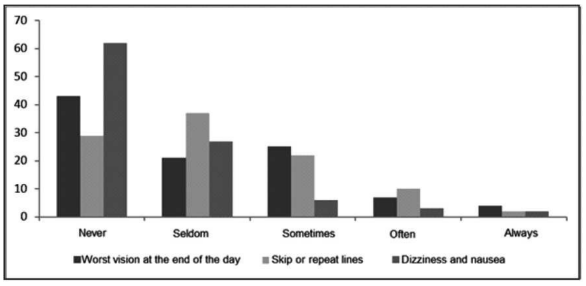

Figure 4: Frequency distribution of worsening of vision at the end of the day, jumping or repetition of words during reading and feeling of dizziness and nausea after close vision, as reported by 132 students

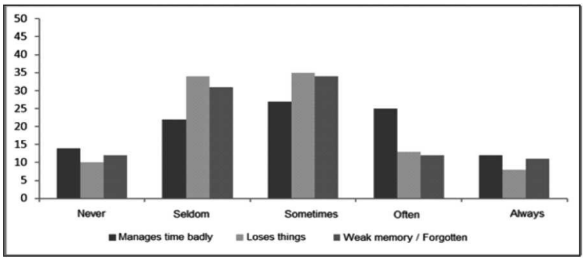

Figure 5: Distribution of the frequency of temporal mismanagement, loss of objects and weak memory among the 132 students.

Discussion

With the incorporation of new technologies, the Internet and electronic games became instruments of widespread and unlimited use, with the important influence of the Internet, being found at any age, educational level and socioeconomic level.[10] In their study, Hayes et al. say that more than 65% of computer operators have symptoms of asthenopia at some time, such as eye discomfort, headache, dry eyes and double vision after prolonged exposure.[11] This is related to the findings of the present study such as poor time management, loss of objects and poor memory being shown to be the most prevalent in the population studied as psychosocial aspects resulting from excessive use of near vision.

This is a prevalent problem among college students, endorsing the choice of the target audience to carry out the present research, which, in carrying out the academic activities, end up remaining too long in front of the screens, including the excessive reading process required in the undergraduate courses and video-classes, increasingly common due to the expansion of virtual classes and faculties.[12]

In this study, no significant discrepancy was found in the prevalence of asthenic symptoms among the sexes. This finding differs from the results of Mocci et al.[13] which showed a higher prevalence in females. However this study corroborates with Bhanderi et al.[14], which also did not identify an association of higher prevalence of asthenopia with either sex.

As in this study, Agarwal et al.[15] identified a difference in frequency and prevalence of asthenopic symptoms when associated with daily time spent in front of computers. It is believed that the use of near vision for prolonged periods may be related to spasms of accommodation, with relaxation of the ciliary muscle and consequent triggering of visual and extra-visual symptoms, such as blurred vision, low visual distant, burning, lacrimation ocular and headache.[5,16] The lens system

of the eyeball is essential for the formation of images, and the composition of their structures ensures the transparency necessary for the passage of light, essential for the formation of images.[17,18]

This study identified an association of headache and double vision in computer use of less than 4 hours daily and blurred vision, burning and eye tearing more related to a frequency of use of more than 4 hours daily. Comério et al.[19] refute this finding, because, in their study in bank employees, a higher prevalence of headache and double vision on exposure was identified over 6 hours daily.

Regarding age, the study did not identify a significant change in the frequency of asthenopic symptoms. It is a finding that endorses the studies of Comério et al.[19], in which there was also no variation in the frequency of symptoms in association with age, except above 50 years, where a higher prevalence of blurred vision was identified and eye tearing. This age group, however, was not evaluated in the present study, due to the lower age of the university students.

The proportion of students who presented low grades was higher among those who presented asthenopic symptoms. However, other studies are still needed to evaluate the association of asthenopia as a cause of university students' poor academic performance, since asthenopia may be strongly related to poorly diagnosed or poorly corrected refractive problems (mainly myopia and astigmatism).[20,21] It is necessary to emphasize the lack of studies on asthenopia as cause of poor academic performance.

It was identified, in this study, a high prevalence rate of asthenic symptoms among university students and relations with poor academic performance. Also, positive associations between asthenopic symptoms, sex and time of use of electronic equipment were identified.

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Corresponding author:
Henrique Nunes Pereira Oliva
Av. Profª. Aida Mainartina Paraiso, 80 - Ibituruna, Montes Claros - MG, 39408-007
Phone: (38) 3214-7100
E-mail: hnpo@hotmail.com