DOI 10.5935/0034-7280.20170014

Asthenopia in bankers: identification and analysis of risk factors

Astenopia em bancários: identificação e análise dos fatores de risco

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Abstract

Objective: *To evaluate the prevalence of asthenopia in a cohort of bank employees and identify possible associated risk factors.* ***Methods:*** *Cross-sectional study based on information supplied by bankers in response to a standardized electronic questionnaire.*
Results: *The questionnaire was responded by 945 bankers. The frequency of asthenopic symptoms was positively associated with female gender, age over 50 years, and reading or using the computer >6 hours a day.* ***Conclusion:*** *Asthenopic symptoms were found to be significantly associated with gender, age and time spent reading. The most frequently reported symptoms were headache and sore eyes.*

Keywords: *Work environment; Asthenopia/etiology; Occupational disease; Risk factors*

Resumo

Objetivo: Avaliar a presença de astenopia em bancários e identificar possíveis fatores de risco associados. **Metodos:** Estudo transversal realizado por meio de informações obtidas em um questionário padronizado, aplicado eletronicamente à trabalhadores da categoria de bancários. **Resultados:** Responderam ao questionário 945 trabalhadores. Observou-se que a frequência dos sintomas de astenopia foi maior nos grupos que declararam usar computador ou ler por mais de 6 horas por dia. As queixas de astenopia foram significativamente maiores nos trabalhadores com mais de 50 anos e do sexo feminino. **Conclusão:** Este trabalho identificou uma associação positiva de queixas de astenopia em bancários em relação ao tempo de leitura, sexo e idade. Dentre os sintomas oculares associados à astenopia, foi encontrada uma maior prevalência de dor de cabeça e dor nos olhos.

Descritores: Ambiente de trabalho; Astenopia/etiologia; Doenças ocupacionais; Fatores de risco

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Os autores declaram não haver conflito de interesses.

Recebido para publicação em 11/10/2016 - Aceito para publicação em 19/11/2016.

Introduction

Over the past decades, much attention has been given worldwide to the notion of sustainable development and the need for a harmonious interaction between society, technology and the environment.[1] Work processes have changed profoundly as a result of growing urbanization, the emergence of new industrial sectors and the automation, mechanization and informatization of work processes. This has led to changes in the profile of occupational diseases and, consequently, in occupational medical care.[2]

Not surprisingly, asthenopic symptoms have become highly prevalent.[3-5] According to the Dictionary of Visual Science, the term "asthenopia" covers a range of subjective symptoms of discomfort caused by excessive use of the eyes.[6] Symptoms include eye fatigue, ocular discomfort, headache, irritation, itchy or sore eyes, photophobia, blurry vision, diplopia, lachrymation, dry eyes and foreign body sensation.[7]

Asthenopia produces a significant negative impact on visual well-being and productivity in the workplace.[8] Mocci et al. reported an asthenopia prevalence of 31.9% in 385 bankers in Italy, 13.6% of whom were considered severe.[9]

As shown by Hennessey et al.[10], Levine et al.[11] and Iribarren et al.[12], the administration of questionnaires is an efficient way of obtaining reliable information on asthenopic symptoms in specific risk groups. The purpose of the present study was to evaluate the prevalence of asthenopia in a cohort of bankers working at computer terminals and identify possible associated risk factors.

Methods

In this cross-sectional study, information was collected by administering a standardized electronic questionnaire to a cohort of bankers working at a public bank in Espírito Santo (Southeastern Brazil). The choice of this profession for the study was due to bank employees' exposure to prolonged near work when reading or using the computer. Through a partnership between the researchers and the bank's service of occupational safety and health, the respondents were prompted to answer the questionnaire when logging into their individual computer terminals at work. In addition, an extensive review of the literature was performed.

The collected data was initially submitted to descriptive analysis. Absolute and relative frequencies were calculated for qualitative variables. The homogeneity between proportions was verified with the chi-square test or Fishers' exact test. Since the assumption of normality was rejected, group comparisons with regard to the daily number of hours of near work were made with the non-parametric Kruskal-Wallis test. Multiple comparisons were performed with Dunn's test. The level of statistical significance was set at 5% ($p<0.05$).

This project was approved by Research Ethics Committee under number 19763713.0.0000.5071; Hospital Universitário Cassiano Antônio de Moraes, Espírito Santo, Vitória, Brazil.

Results

The questionnaire was responded by 945 (54.7% women) of the banks' 2,400 employees. The respondents were distributed in the following age groups: < 21 years (0.4%), 21-35 years (37.4%), 36-50 years (32.5%), and >50 years (29.7%).

The frequency distribution of time spent on reading and in front of the computer on an average weekday and on weekends is shown in Figures 1 and 2, respectively.

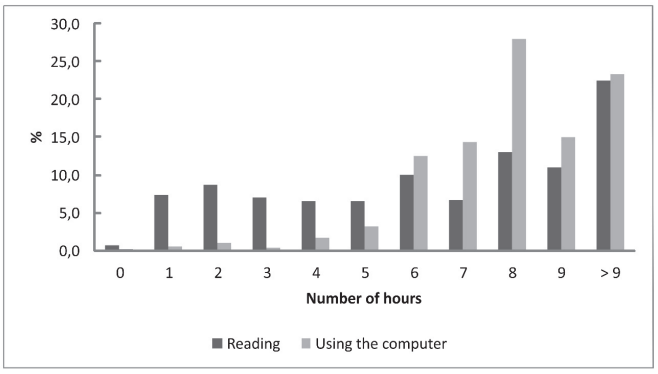

Figure 1. Frequency distribution of time (hours) spent on reading and using the computer on an average weekday as reported by 945 bank employees.

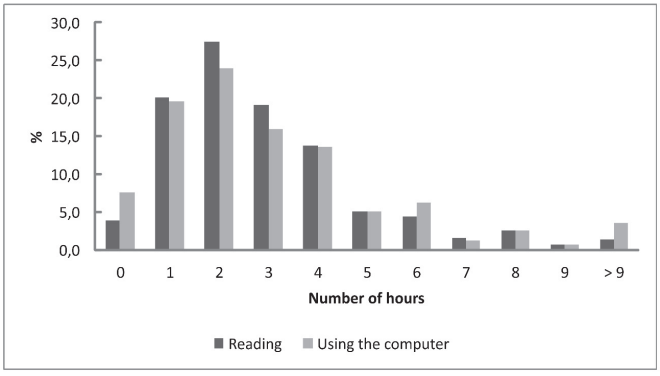

Figure 2. Frequency distribution of time (hours) spent on reading and using the computer on weekends as reported by 945 bank employees

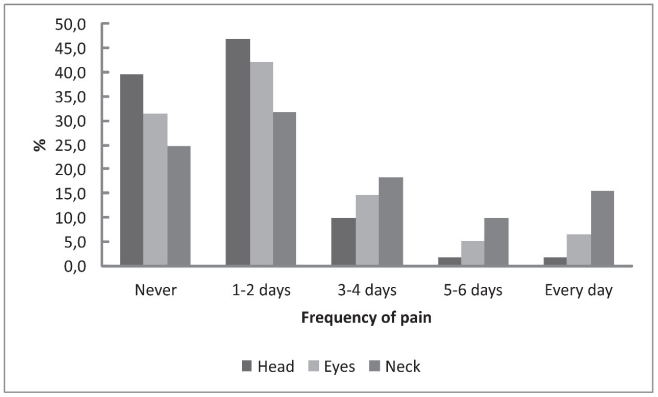

Figure 3. Frequency distribution of headache, sore eyes and neck pain (number of days per week) as reported by 945 bank employees.

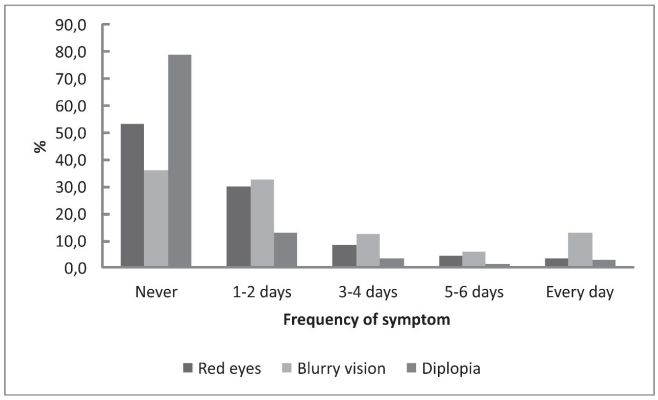

Figure 4. Frequency distribution of red eyes, blurry vision and diplopia (number of days per week) as reported by 945 bank employees.

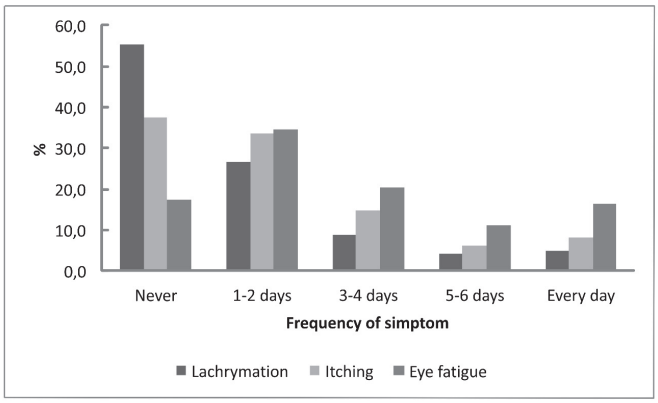

Figure 5. Frequency distribution of lachrymation, itching and eye fatigue (number of days per week) as reported by 945 bank employees.

The predominant frequency of headache, sore eyes and neck pain was 1-2 days per week (Figure 3). The frequency distribution of red eyes, blurry vision and diplopia (Figure 4) and lachrymation, itching and eye fatigue (Figure 5) was also determined.

Age over 50 years was positively associated with red eyes, blurry vision and lachrymation. A larger percentage reported red eyes 5-6 or 7 days a week ($p=0.0180$) and blurry vision every day ($p<0.0001$) in this age group than in any other age group. Likewise, lachrymation 3-4, 5-6 or 7 days a week was also more frequent in subjects over 50 years of age ($p=0.0095$). Eye fatigue and neck pain 5-6 or 7 days a week was more prevalent in subjects aged 35-50 years ($p=0.0157$) and >50 years ($p=0.0004$), compared to subjects under 35. On the other hand, no association was found between age and headache ($p=0.6780$), sore eyes ($p=0.1473$), diplopia ($p=0.3436$) or itching ($p=0.1186$).

Time and gender-related differences were also observed. Thus, sore eyes 1-2 days a week was more prevalent among women ($p<0.0001$). Likewise, blurry vision every day ($p=0.0007$), diplopia every day ($p=0.0499$), itching every day ($p<0.0001$), eye fatigue every day ($p<0.0001$) and neck pain every day ($p<0.0001$) was more frequently reported by women than by men.

Subjects reading more than 6 hours a day on weekdays were significantly more likely to have headache every day ($p=0.007$), sore eyes ≥3 days a week ($p<0.001$), blurry vision ≥5 days a week ($p=0.005$), eye fatigue ≥5 days a week ($p=0.002$) and neck pain ≥5 days a week ($p<0.001$). On the other hand, headache was the only significantly more frequent asthenopic symptom reported by subjects reading more than 6 hours a day on weekends ($p<0.001$). In addition, less than 6 hours of daily work at a computer terminal was associated with a greater percentage of subjects reporting no headache ($p<0.001$).

The frequency of red eyes, diplopia, itching and lachrymation was not significantly associated with time spent on reading and in front of the computer on weekdays and weekends.

Discussion

In clinical practice, excessive near work is generally believed to cause asthenopia and accommodative disorders. [13-14] This association has been recognized for over two centuries. Thus, in 1713 epidemiologists reported that prolonged near work produces "weakness of vision", including myopia and changes in "the tonus of the membranes and fibers of the eye". [15] This has since been confirmed by craftspeople, office workers and students who have experienced blurry vision, eye fatigue and headache after prolonged work.

With the advent of video technology and personal computers, interest in the relation between asthenopia and near vision was rekindled. In fact, ocular manifestations are the most common health problems reported by computer users.[16-18] According to Hayes et al., 64-90% of computer operators have at some point experienced asthenopic symptoms (eye fatigue, headache, ocular discomfort, dry eye, diplopia, blurry vision) after prolonged exposure.[19] These symptoms may be due to other factors or near vision abnormalities, including poor workplace organization, insufficient lubrication of the corneal surface and inadequate correction of refractive errors.[20] In addition, symptoms may stem from psychological factors, such as dissatisfaction on the job, low self-esteem and group conflicts.[9]

In this study, we found asthenopia to be more frequent among female and older bank employees, matching the findings of Mocci et al. [9] Likewise Rocha et al.[21] evaluated the incidence of eye fatigue among systems analysts in São Paulo and identified a positive association between eye fatigue and female gender. However, Bhanderi et al. [22] found no such association.

Hanne et al.[23] and Agarwal et al. [24] observed a significant difference in the prevalence of asthenopia between subjects working at computer terminals <6 versus >6 hours a day. Likewise Kanitkar et al. [25] found a direct correlation between time spent at computer terminals and ocular symptoms, and greater duration of computer use resulted in longer-lasting complaints of asthenopia, even after discontinuation of use. Many of the bankers in our cohort (27.9%) spent over eight hours a day using the computer on weekdays, and a significant association was found between the prevalence of headache and >6 hours a day working at a computer terminal. Other studies found no correlation between prolonged near work and asthenopia in bank employees. [9,22]

It should be kept in mind that neck pain in employees over 50 years of age may also be due to inadequate correction of presbyopia. Undercorrected presbyopes require greater cervical extension to obtain maximum benefit from multifocal lenses. This association may be confirmed in other study, following ophthalmological examination and, if necessary, prescription of glasses. The banks' occupational safety and health service is advised to provide annual preventive ophthalmological examinations for employees exposed to eye strain from prolonged near work.

In this study we identified a positive association between asthenopic symptoms and gender, age and time spent reading

in a cohort of bank employees in Southeastern Brazil. The most frequently reported symptoms were headache and sore eyes.

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