

and participants can be followed prospectively for incidence of cancer. **Conclusions.** Due to its large size of the cohort, the detailed information on job history and decades of dust measurements in the mine and mills allowing individual cumulative exposure estimation, and the linkage with mortality data will provide informative risk estimates for various causes of death, in particular cancers associated or potentially associated with asbestos exposure. With the prospective expansion of the cohort with current workers and alive veterans more information can be collected to minimize limitations of the retrospective study, especially disentangling the effect of chrysotile exposure from other risk factors and studying cancer incidence rather than mortality. We therefore recommend the continuation as this study is among the most informative ones on health effects related to chrysotile exposure and of immense public health relevance of the affected workers.

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PREVALENCE OF COMPUTER VISION SYNDROME AMONG OFFICE WORKERS**Dundurs J., Rampane D.**

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РАСПРОСТРАНЕННОСТЬ СИНДРОМА КОМПЬЮТЕРНОГО ЗРЕНИЯ У ОФИСНЫХ РАБОТНИКОВ. Дандурс Дж., Рампане Д. Рижский университет им. Страдыня, ул. Дзирциема, 16, г. Рига, Латвия, LV-1007

Key words: *computer vision syndrome; office workers; gender differences***Ключевые слова:** *синдром компьютерного зрения; офисные работники; половые различия*

Introduction. Computer Vision Syndrome (CVS) is described by American Optometric Association as a group of eye and vision-related problems that result from prolonged computer use. Many individuals experience eye discomfort and vision problems when viewing digital screens for extended periods. The level of discomfort appears to increase with the amount of digital screen use. In Latvia more than 95% of companies use computers in their daily work. Many professions, such as economists, accountants, secretaries, administrators etc., work with computers for a whole day. Often they forget about visual hygiene and prophylaxis to prevent changes in vision. A long-term vision discomfort can lead not only to changes in employee health, but also economical disadvantages to the companies. **Aim and research methods.** In the study is collected information about the most common symptoms of CVS, their pathogenesis and prevalence in the world. The aim of the research is to find a prevalence of CVS between office workers in Latvia and to collect information about most common symptoms of CVS, vision hygiene and prophylaxis that is used in offices. **Results.** A total of 116 office workers from different cities, irrespective of their age, gender and working experience took part into this cross-sectional study. The mean age of participants was 38.4 years. As all the participants have noticed at least one of CVS symptoms after a long working with computer, that shows that CVS is very common between office workers in Latvia. The most common visual problems reported among computer users were tired eyes – 80.17% (93/116), neck pain – 54.31% (63/116), shoulder pain 40.52% (47/116) and dry eyes 32.76% (38/116). All participants had at least one of the CVS symptoms. Brightness of computer screen was balanced with amount of light in a room. 90.52% of respondents don't have a permanent reflection of bright objects (such as lights or window) in their screens. 90.52% do not use display filters for computers. There is found that double vision is related to working hours. People, who work with computer four to six hours per day are in a higher risk of developing double vision than others. These data are statistically significant after Chi-Square test ($p=0.015$). Females were found to be at a higher risk to develop neck pain ($p=0.008$). **Conclusion.** Computer vision syndrome is very common between office workers in Latvia. Offices are arranged partly ergonomically, but there is still an urgent need to increase the ergonomic awareness and awareness of vision hygiene and prevention among office workers to prevent development of symptoms that are related to use of computer. Females are in a higher risk to develop neck pain than males and the highest risk to develop double vision is for people, who work with computer for four to six hours per day.

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THE INFLUENCE OF NOISE ON MEDICAL STAFF AND PATIENTS IN RADIOLOGY DEPARTMENTS**Dundurs J., Tarasova A.**

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ВЛИЯНИЕ ШУМА НА МЕДИЦИНСКИЙ ПЕРСОНАЛ И ПАЦИЕНТОВ В ОТДЕЛЕНИЯХ РАДИОЛОГИИ. Дандурс Дж., Тарасова А. Рижский университет им. Страдыня, ул. Дзирциема, 16, г. Рига, Латвия, LV-1007

Key words: *MRI diagnostic; noise***Ключевые слова:** *МРТ; шум*

Introduction. Radiological diagnostic abilities are expanding nowadays. It is necessary for detecting of serious diseases in the early stages, but it is always associates with patients' high levels of stress. So, person whose basal level of stress is high, in most stressful situation such as magnetic resonance imaging (MRI), is unable to adequately withstand in this diagnostic test. **Aim and research methods.** Aim of the study is to explore the noise influence on medical staff and patients in the Departments of Radiology. In the study attended 150 patients, who had MRI. Data were systemized and analyzed using IBM SPSS Statistics 20.0 (US). **Results.** Patient age was from 19 to 83 years, mean age 44.04 (Std. Deviation 17.215). After the

patient gender division: 106 women (70.7%, mean age 42 years) and 44 men (29.3%, mean age 48 years). The reasons why so often both genders are attending MRI associated by CNS disease (32.7%), spinal disease (32%) and bone-joint system diseases (16.7%). 46% of patients didn't feel any discomfort during MRI procedure, but 54% of patients felt some discomfort using MRI, while women associate the discomfort with noise more often ($p=0.036$). The machine noise and lying still were mentioned by patients as more frequent reasons of discomfort, as well as claustrophobia was noted. Women are afraid of MRI more often ($p=0.05$) but men are sedated before MRI screening more frequent ($p=0.009$). Also, men tend to sleep during MRI ($p=0.062$). There is statistically significant correlation by age groups (Spearman's rho) between the expressions of discomfort and age: the older women mentioned the general discomfort ($p=0.01$), headaches / dizziness ($p=0.013$) and unpleasant vibration feeling ($p=0.023$). Women have panic attacks more often ($p=0.001$), they also tend to take sedatives more frequent than men ($p=0.08$). 94% of patients never had uncompleted MRI because of the subjective discomfort. It is proved correlation between magnetic field strength, medical staff working day and acute transient symptoms as dizziness or metallic taste in the mouth: the stronger magnetic field or a longer shift, the more intensive symptoms will be developing. **Conclusions.** The most part of patients notes discomfort during MRI, which can be reduced by different ways. The most popular way to avoid it is to sedate patient or give him earplugs. These methods are quite effective but it is necessary to improve the cooperation of doctor-patient that is proven as one of the most effective methods.

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THE USE OF EYE TRACKING METHOD FOR WELL-BEING OF COMPUTER USERS**Grinberga S.**

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ИСПОЛЬЗОВАНИЕ ОКУЛОГРАФИИ ДЛЯ СОХРАНЕНИЯ ЗДОРОВЬЯ ПОЛЬЗОВАТЕЛЕЙ КОМПЬЮТЕРОВ. Гринберга С. Рижский университет им. Страдыня, ул. Дзирциема, 16, Рига, Латвия, LV-1007

Key words: *eye tracking; software ergonomics; well-being***Ключевые слова:** *окулография; эргономика программного обеспечения; благополучие*

The increased use of information technology at work can affect computer users' wellbeing in different ways. The most common health disturbances of computer users are musculoskeletal problems, visual discomfort, as well as stress-related disorders. Undoubtedly, a great role is played by physical ergonomics, in how correctly or incorrectly the monitor, keyboard, the table, the chair or document holder is positioned. Computer mice and keyboard design are also important, i.e. how easy it is to work with it. However, no less important is the role of software ergonomics, where the software usability is central. Poorly designed software can be extremely annoying to users; it can cause stress that contributes to both muscle tension and dissatisfaction with the work that can contribute to various psycho-physiological changes in the employee's body. To improve the well-being of the employee, to increase job satisfaction, as well as positive emotions and mindfulness, software ergonomics must be improved. Various subjective and objective usability studies are carried out for this purpose. Eye tracking is one of the usability testing methods which helps understand the user experience while using information and communication technologies. Eye tracking shows the **instantaneous** reactions of computer users, as well as the dispersion of their attention in an interface. Eye tracking can be used with a variety of other research methods, such as observations, interviews, and retrospective think aloud. However, eye-tracking, as an objective study method provides much more information about the user than other subjective methods, such as the retrospective think aloud method. The reason for this is that the test participant may not remember his activities during the test, because behavior is unconscious, or they are quickly forgotten, or they cannot verbalize the reasons for their behavior. Whereas through examination of eye tracking data, visualisations and replays the causes for behavior can be found more precise and specific. In eye tracking of special interest are points of "**fixation**" — areas in which a user's gaze stops moving and "**saccade**" — the movement of a user's eyes between fixation points. The data of eye tracking can be visualised and interpreted to **reveal** behaviour that is otherwise invisible, including: an ordered list of fixations which shows what the user sees; an unordered list of unnoticed elements, which shows what the user does not see; time to reach any fixation. This may be related to how easy or difficult it is to find the element; fixation time which may be related to how appealing or comprehensible an element might have been; the number of fixations per element which can be related to how confusing, useful or inconsistent an element might have been. It is important that the eye tracking method can provide data that would be considerably more difficult to obtain with other testing methods.

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ASSESSING EXPOSURE TO OCCUPATIONAL CHEMICALS IN LARGE-SCALE EPIDEMIOLOGICAL STUDIES ON OCCUPATIONAL CANCERS**Hans Kromhout**

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ОЦЕНКА ВЛИЯНИЯ ХИМИЧЕСКИХ ВЕЩЕСТВ НА ПРОИЗВОДСТВЕ В ШИРОКОМАСШТАБНОМ ЭПИДЕМИОЛОГИЧЕСКОМ ИССЛЕДОВАНИИ РАКОВЫХ ПРОЦЕССОВ, ОБУСЛОВЛЕННЫХ ПРОФЕССИОНАЛЬНЫМИ ВРЕДНОСТЯМИ. Ханс Кромхут. Институт исследований по оценке риска, Университет Утрехта, ул. Ялелаан, 2, Утрехт, Нидерланды