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*Computer use and computer related repetitive strain injuries
among students of Medical University of Lublin*

In the twentieth century computers began to be introduced and applied in industry, offices, in our homes, schools and universities. With increasing hours in front of the computer using the equipment that is rarely set up correctly for the user's size, office workers and students are at risk of computer related repetitive strain injuries and other health problems. It may also lead to a limitation of leisure and the time for socializing, which is crucial for building appropriate family and social relationships (6). Among the most common computer related repetitive strain injuries are: carpal tunnel syndrome, extensor and flexor tendinitis, bursitis, ganglion cysts, tendosynovitis, DeQuervain's syndrome, trigger thumb, thoracic outlet syndrome, myofascial pain syndrome, cubital tunnel syndrome (in forearm region), lateral and medial epicondylitis (in elbow region), bicipital tendinitis and rotator cuff tendinitis (in shoulder region), trapezius myositis and paraspinal or rhomboid spasm (in neck and scapular region) as well as Guyana's and radial canal syndromes, cervical radiculopathy and visual disfunctions like asthenopia, dislocation of near point of convergence, dryness of eyes ("gritty" feeling in the eyes), eye fatigue and changes in colour perception (6, 7). All these problems occur when particular movements are repeated for long hours thus doing damage to tendons, nerves, muscles and other soft body tissues. A wrongly set up computer workstation and lack of necessary breaks during the hours spent in front of it, wrong typing technique and posture, the use of pointing devices like mice and trackballs are the causes of computer related repetitive strain injuries. Staying long in an awkward position, thousands of repeated keystrokes, clutching and moving the mice – all these cause accumulated damage to the body.

The aim of this study was to find out how most medical students use computers, have access to the Internet and experience computer related repetitive strain injuries.

MATERIAL AND METHODS

We interviewed 167 third-year medical students (107 women and 60 men, 20 to 29 years old) of Medical Department at Medical University of Lublin by means of a especially designed questionnaire. Participation in the investigation was voluntary and anonymous. The students were asked to answer 23 multiple and single choice questions.

RESULTS

86% of all the interviewed students used personal computers (83% of men and 88% of women). 83% of those who used PCs had access to the Internet (71% of the whole group, 68% of women and 77% of men). A vast majority of them used their PCs for up to one hour per day (Tab.1). Most of them (46% of women and 36% of men) used computers to acquire information via the Internet, for e-mail correspondence – 43 and 23%, respectively, composition of text files, tables, counting – 28 and 8%, playing computer games – 22 and 26%, and professionally (at work) 1 and 2%, respectively. In the female group 11% answered that they did not use computers at all, none in the male group did so. A vast minority of the students knew the occupational safety regulations that must be respected at computer workstation – those were 30% of females and 7% of males only. Women turned out to be more susceptible to computer related repetitive strain injuries, as 37% of them confirmed having such symptoms occasionally or chronically, whilst among males 32% did so. Those who had suffered computer related health problems usually enumerated 2–4 symptoms. They were: face rash (in 2% of women and 3% of men), red eyes

Table 1. Hours spent daily working or playing with computers by the interviewed students

Hours	Women	Men
none	13	0
up to 1 hour	72	33
up to 2 hours	16	13
up to 4 hours	5	2
up to 6 hours	1	2

(17 and 13%, respectively), dry eyes (26 and 10%), vertebral column aches and pains (13% in both genders), chronic fatigue syndrome (10 and 6%), carpal tunnel syndrome (no women, 6% of men). Moreover, 1% of the students complained of headaches and dizziness after use of PCs. In spite of those complaints not too many students used screens for computer monitors (57% of women and 38% of men). When asked if a pregnant women should use computers without time limits 39% of women and 33% of man answered "yes", 36 and 40% "no", 25 and 27% had no opinion. When asked if prolonged work with a computer could aggravate chronic health problems or cause acute ones 82% of women and 87% of men answered "yes", 7 and 3% "no", 25 and 10%, respectively, did not know. 11% of women and 23% of man admitted that playing or working with computers deprived them from the time that they would like to spend in different ways (e.g. sports, studying, reading books and newspapers, spending time with their families, watching TV, going out with friends). A vast majority (85% of women and 72% of men) did not lose the grip with real life because of computers, whilst 4 and 5%, respectively, had no opinion about that. The interviewed students' expectancy for the future necessity of PCs use was as follows: 57 and 70%, respectively, expected to be obliged to work longer hours with PCs in future, 21 and 12% expected the hours to be shorter, 22 and 18% had no expectancies. When asked if they felt computer dependent, 5% of women and 3% of men answered "yes", 94% of the group as a whole answered "no", 1 and 3%, respectively, had no opinion about that.

DISCUSSION

It was thoroughly studied and analyzed what upper extremity and neck disorder risk may stem from over - or misuse of computer related facilities. A group of Dutch investigators studied

the effects of mental and physical demands on muscular activity in the use of the mouse and keyboard in computer work in a time-pressed situation. They examined twelve females in four combinations of computer related tasks. Concurrently they performed electromyography (EMG) recorded for forearm, shoulder and neck muscles. They found that in mentally demanding conditions all the muscles, for which EMG recordings were made, showed increased muscular activity. The level of activity varied from 0.3% of the maximum EMG for the right trapezius muscle to 2.6% for the extensor carpi ulnaris. The use of the mouse caused increased muscular activity in neck extensors (up to 3.5% of the maximum EMG), which was statistically significant in comparison to neck muscle activity in keyboard use (2.8% of maximum EMG) (2).

Lincoln et al. performed a case-control evaluation of the effects of a 2-day training program for nurse case managers designed to facilitate the implementation of workplace accommodations within a workers' compensation health care delivery system. Their patients or claimants were workers returning to work after computer related strain injuries. The trained nurses were more likely to recommend accommodations addressing workstation layout, computer related improvements, furnishings, accessories and lifting aids, whereas the untrained nurses were more likely to suggest light duty and lifting restrictions (4).

A team of Spanish researchers searched for the relationship between amount of nearwork, asthenopic symptoms and visual function in a group of office workers engaged in telemarketing. Their daily hours of reading hard copies and computer use were 5.84+/-2.02h in computer use and 2.87+/- 2.13 in reading. Asthenopic symptoms present in the workers twice or more times a week were: headaches (16%), pain in the eyes (17%), red eyes (18%), blurred vision (10%), double vision (3%), burning eyes (19%), and watery eyes (19%). The authors found a statistically significant association between the amount of hours spent by the workers on computer use and red eyes, blurred vision and change of near point of phoria. They suggest that near point convergence should be routinely measured in workers engaged in long lasting computer work as it is associated with asthenopic symptoms (1).

A Polish author – Majka – emphasises that occupational risk could be considered “any” in office workers, i.e. comparable to the risk at home or at any public place, except for computer related risk as it is much more health threatening with prolonged time of computer use (5). When it comes to computer related occupational health hazards in medical occupations, it is of great importance for preoperative nurses who are known to suffer frequently from carpal tunnel syndrome after the introduction of computerized patient record systems. Economic loss, physical disability and emotional distress are frequent outcomes of not using adjustable computer workstations and of computer related illnesses (3).

CONCLUSIONS

1. A vast majority (86%) of third year medical students of Medical University of Lublin use computers and the Internet (83% of PCs users).
2. Most of them use PCs to acquire information via the Internet or to send and receive e-mails.
3. 32% of interviewed women and 37% of men complain of computer related repetitive strain injuries.
4. Most frequently students report eye strain with red eyes and “gritty” feeling in the eyes and pains in the vertebral column.

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SUMMARY

The aim of this investigation was to find out what percentage of medical students use computers, have access to the Internet and experience computer related repetitive strain injuries. Even though they do not spend too long hours using their PCs, most of them doing it for one hour daily, they complain about eye and vertebral column strain symptoms.

Zastosowanie komputerów i występowanie objawów wynikających z przeciążenia zajęciami przy komputerze wśród studentów medycyny Akademii Medycznej w Lublinie

Wraz z rozpowszechnieniem użycia komputerów w przemyśle, biurach, szkołach oraz uczelniach wyższych ich użytkownicy są coraz bardziej narażeni na występowanie objawów i chorób wynikających z przeciążenia układu ruchu, układu nerwowego oraz oka i jego aparatu mięśniowego. Wynika to z niedostosowania stanowisk pracy przy komputerze do wymagań użytkowników (nieergonomiczne stanowiska pracy), braku znajomości przepisów BHP, niedoboru szkoleń w tym zakresie i braku ekranów ograniczających emisję promieniowania jonizującego przez monitory. Celem naszej pracy było poznanie odsetka studentów trzeciego roku medycyny Akademii Medycznej w Lublinie, którzy mają dostęp do komputera i Internetu, częstości występowania i charakteru objawów wynikających z przeciążenia pracą przy komputerze oraz świadomości wpływu, jaki komputery mogą wywierać na stan zdrowia ludzi. Z przeprowadzonych badań wynika, że 86% ankietowanych studentów korzysta z komputerów, a 83% z nich ma dostęp do Internetu. Najczęściej wykorzystują oni komputer do uzyskiwania informacji ze stron WWW i korzystania z poczty internetowej. 37% ankietowanych kobiet i 32% mężczyzn zgłaszało okresowe lub przewlekłe odczuwanie dolegliwości związanych z przeciążeniem zajęciami przy komputerze. Najczęściej były to zaczerwienienie oczu i uczucie piasku pod powiekami oraz bóle kręgosłupa.