

# What You Need To Know: Work with Visual Display Units – What are the Health Concerns?

S F Ho

The 21st century workplace will see a shift towards a knowledge-based economy with increasing demand for work with visual display units (VDUs). VDUs will become a common feature in many workplaces, schools and homes. Along with this expanded use, are concerns about the health hazards – both real and potential of such work. The main health-related issues frequently raised are radiation risks and the occurrence of visual, musculoskeletal, dermatological and stress-related complaints.

## Radiation and adverse pregnancy outcomes

Most VDUs in use today are based on the cathode-ray tube (CRT). As such, there is potential X-ray emission. Other types of radiation include ultraviolet and infrared rays produced when the electron beam interacts with the phosphor coating of the CRT, radiofrequency radiation and ultrasound generated mainly by the flyback transformer of VDUs and microwave radiation. Measurements done worldwide on the outside of display screens showed these emissions to be either well below the normal background levels or below the detection capability of the instruments used. Reports on VDUs causing adverse pregnancy outcomes, in terms of spontaneous abortion, miscarriage or birth defect can thus be discounted even if a person works full time on the VDU throughout her pregnancy<sup>(1)</sup>.

## Electrostatic and electromagnetic fields and skin rashes

Multicolour terminals operate at high voltage. Electrostatic fields can be generated from the high voltage tension as well as the VDU user. The electrostatic field of the VDU screen is positively charged, while a user's field is negatively charged, thereby creating a strong electrostatic charge between them. In the absence of good ventilation and in low humidity conditions, the resultant electrostatic field cause charged particles and air contaminants to be deposited on the skin, resulting in itch or even rashes, especially of the face and forearms<sup>(2)</sup>.

Electromagnetic fields (EMF) are non-ionising radiation. While EMF can be detected at very low levels at the surface of VDU, these levels fall off rapidly with increasing distance from the screen. At a viewing

distance of between 45 to 70 cm from the VDU, the EMF levels are either low or not detectable at the position of the user.

## Cataracts and visual complaints

Radiation emitted from VDUs is so low that there is no evidence that it causes cataracts. Visual complaints of tired eyes, blurring/double vision and headaches are common especially among users whose vision is not adequately corrected and among those who work long hours on the VDU<sup>(3,4)</sup>. These complaints were found to be related to the flickers, brightness and contrasts of display characters and lighting conditions at work. The symptoms are usually transient, disappear rapidly after stopping work and do not lead to permanent impairment of vision<sup>(3,4)</sup>. However, the reading requirements for presbyopic users are of concern. As the main visual functions of VDU work are accommodation and adaptation, these users may have visual discomfort if their prescribed bifocal glasses are corrected for the standard reading distance of 33 cm instead of the 45 cm – 70 cm recommended viewing distance for VDU.

## Photosensitive epilepsy

There are no known reports of fits from VDU work. Electro-encephalogram studies showed that VDU work failed to induce fits in such people.

## Musculoskeletal problems

VDU users who remain for long periods in the same position in front of the screen are more prone to tiredness. In most cases, the presenting symptoms were fatigue, pain, stiffness, cramps, numbness and weakness involving different sites, in particular, the shoulders, arms, neck and upper back. The terms repetitive strain injury, occupational overuse syndrome and cumulative trauma disorder were coined to imply a cause and a pathology of these musculoskeletal problems although in most cases, neither a specific pathology nor clear signs can be found.

In Singapore, there were only four cases of VDU-related health problems confirmed by the Department of Industrial Health, Ministry of Manpower from 1986 to 1997<sup>(5)</sup>. They had complaints of pain,

Department of  
Industrial Health  
Ministry of Manpower  
18 Havelock Road  
#05-01  
Singapore 059764

S F Ho  
Senior Assistant Director  
(Medical)

swelling, numbness and weakness of the hands after repetitive data entry work. One also had difficulty in carrying out normal activities such as combing hair, brushing teeth and rinsing clothes. This small number was in sharp contrast to incidence rates reported in many countries and could be due to under reporting, difference in terminology and criteria of diagnosis used. VDU operators may under report for fear of losing their jobs, while physicians may face the inherent difficulty of making a work-related diagnosis in view of the vague presentations, absence of clear signs and the lack of direct investigative tools. The true local incidence of VDU-related problems will continue to remain unknown unless physicians, surgeons and occupational therapists take time and effort in getting a detailed medical history to relate the symptoms to the occupation.

#### **Stress-related complaints**

VDU-related health problems are found to be related to factors such as age, past musculoskeletal injuries, emotional stress, family problems and off-the job activities such as games and hobbies. Psychological problems such as job monotony, work pressure or a poor relationship with people at work also play a part in symptom presentation. VDU users who admitted that they were more stressed, bored or dissatisfied with work, reported an increased frequency and severity of health complaints<sup>(3,4)</sup>. The recognition of this multifactorial etiology poses further difficulties in establishing the cause-effect relationship and patient management. On the other hand, the physician's perceptions and interpretations of the nature of complaints may start the medico-legal process of compensation and bargaining rights for the VDU user.

#### **A multi-disciplinary approach**

Many international and national bodies and product manufacturers have drawn up guidelines on how to work safely with VDUs, including one produced locally<sup>(6)</sup>.

The recommendations include the provision of a suitable workstation and work environment, good work technique and work schedules and pre-employment and periodic health examinations for the detection and correction of personal impairments. VDU users and employers need to determine the practicability of these guidelines by taking into consideration the current state of technology and what could be regarded as economically feasible. Whether these guidelines will suffice in the light of the rapid advancement in the field of microelectronics and information processing has yet to be evaluated, especially in the application of smaller portable computers such as laptops, notebooks and palmtop computers. One should however, note that these guidelines are of limited use when moving beyond technical hazards to wider issues of health and safety. The approach then, should be management of a whole person, giving sufficient consideration to his capacity, ability and limitations so as to enhance his total well-being and his effectiveness at work. This is especially important in the management of patients where their symptoms persist and cannot be discounted from among the health complaints.

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