Editorial

What a wonderful feeling—papers are flowing in to EA! After a long gestation period with periods of despair about insufficient material to meet deadlines, this journal has arrived safely at a stage where there is material under review through to early 2008. The current edition has a focus on occupational overuse syndrome connected to two universities—one in South Australia and the other in Nigeria. The first paper by Sawyer and Penman discusses findings related to computer use within the nursing profession in a developed country, Australia. The second paper addresses the computer industry in a developing country. It is significant that similar problems require prolonged attention and remediation in both sectors. Perhaps the most telling aspect of this research is the reality that standards and guidelines may be published but remain ineffective if unread and widely bypassed—a situation that can be evidenced in too many workplaces in spite of policy recommendations! This reality is not restricted to computer use and may be found across a broad spectrum of occupational ergonomics and health issues. Who checks the checkers if anyone does and their level of knowledge and influence is also highly significant.

The matter of good eye protection for a variety of activities is an unending cause of concern for many individuals and occupations. There seems to be a continuous process of development in knowledge and technology available to assist the achievement of improved visual safety. Australian ergonomists are fortunate to have ready access to a local fount of information in Jenny Long. In this edition of Ergonomics Australia she addresses the new choices available for medium impact eye protection.

Many readers may be aware of the work of Cheryl Lynn Bennett who worked tirelessly to raise the profile of ergonomics in relation to children. For this reason the editor sought and gained permission to print the obituary that appeared on Ergoweb. This is gratefully acknowledged and appreciated. This item is a testament to belief in a necessary goal and a tribute to someone who did so much more that just wait for official endorsement of her ideas. For a sample of her work go to www.iea.cc/ergonomics4children.

The December issue of EA will focus on road and rail safety issues. This is a broad and complex area of concern in all developed and developing countries. It is becoming increasingly evident that solutions will require careful integration of improved road and rail construction technologies along with improved vehicle design, road signage, barriers, signalling, traffic lights and traffic flow control (above and below ground). Software options for improving vehicle performance are likely to be rendered less effective if the human factors relating to individual driver characteristics are not addressed effectively. Thus driver training and continual assessment are becoming more widely appreciated.

In New South Wales the question of additional licensing controls for young and older drivers is presently highly contentious. Two levels of Provisional Licences for new and youthful drivers have been instigated—not without some modification following initial controversy—and the accident rate is being carefully monitored to try to determine the effectiveness of this new control measure. The latest government proposal—to limit older drivers to within 10km of their home—has caused widespread outrage and a very vocal reaction at special meetings and in local newspapers. It is not difficult to appreciate the many reasons that would make this unworkable for individuals or for surveillance. There has been an escalating call for individual skills/medical assessment rather than a blanket age discrimination policy. This is surely an area in which ergonomists should seek a high profile for research opportunities.

In late November there will be an exodus from the eastern states by ergonomists heading to Western Australia for 43rd Annual Conference of HFESA to be held at the AQWA Function Centre at Hillarys Boat Harbour some twenty minutes north of Perth. This event promises an exciting program of intellectual and social interaction. It is significant that managing stress will have a high profile at this conference. This is an issue that is gradually gaining wider recognition as a feature of workplace concern. The twentieth century was slow to formally address the handling of the individual and community impact of post-war stress/trauma and even slower to acknowledge the implications of work/home related stress on health and productivity in working environments. It may be hoped that there will be considerably heightened attention given to this matter in future editions of EA. For more details visit http://www.keynotewa.com/HFESA-2007
The editor was recently given a copy of *From Shellshock to Combat Stress: A Comparative History of Military Psychiatry*, by Hans Binneveld as translated from the Dutch by John O’Kane and published by the Amsterdam University Press in 1997. It makes compulsive reading if you have watched recent television documentaries and have ever given thought to conditions in WW1 and the aftermath of trench warfare and subsequent post-war conditions on the entire social fabric of affected veterans and their community networks. For too long workplace stress has been considered a possible “excuse” for a disgruntled worker—much as battle-scarred soldiers were expected “to get a grip”. A claim for workplace stress should not lead to an automatic assumption that someone is a malingerer and therefore undeserving of proper assessment and treatment along with any necessary modification of prevailing workplace cultures or conditions.

_Shann Gibbs PhD_
_Editor_

---

**From the Internet**

Be careful with email addresses!

A Minneapolis couple decided to go to Florida to thaw out during a particularly icy winter. They planned to stay at the same hotel where they spent their honeymoon 20 years earlier. Because of hectic schedules, the husband left Minnesota and flew to Florida on Thursday, with his wife flying down the following day.

The husband checked into the hotel. There was a computer in his room, so he decided to send an email to his wife. However, he accidentally left out one letter in her email address, and, without realising his error, sent the email.

Meanwhile, somewhere in Houston, a widow had just returned home from her husband’s funeral. He was a minister who had a heart attack and died. The widow decided to check her email, expecting messages from relatives and friends. After reading the first messages, she screamed and fainted. The widow’s son rushed into the room and saw the computer screen which read:

To: My loving wife  
Subject: I’ve arrived  
Date: October 16, 2004

Know you’re surprised to hear from me. They have computers here now and you are allowed to send emails to your loved ones. I’ve just arrived and have been checked in. I see that everything has been prepared for your arrival tomorrow. Looking forward to seeing you then! Hope your journey is as uneventful as mine was.

PS: Sure is freaking hot down here!
It is acknowledged that prolonged computer use may result in visual, musculoskeletal and psychological problems such as headaches, fatigue, eye strain, and pain in the neck and shoulders, arms, elbows, wrists and fingers, lower back, hip, leg, and feet. These have cost the individual in terms of medical expenses, lost career opportunities and reduced quality of life, and organizations in terms of days lost, reduced productivity and increased compensation claims (Grandjean 1987). Prevention of problems must take into account the chairs and equipment used, keyboard use, posture, lighting, temperature, rest breaks, software ergonomics, job design, and job training.

In nursing practice, computers play a major role in facilitating communication between nurses. More importantly, they allow nurses to gain and track information about patients (Bell 1999). Bower and McCullough (2004) argue that automation and the use of technology is becoming part of a comprehensive strategy to address nursing needs. These authors focus on the need to provide nurses with the tools and skills used by other professions so that they can deliver quality care using the most-up-to-date technology available. While computers have been available to health care personnel since the seventies, many nurses lack computer literacy (Pravikoff 2005).

The Internet is allowing nurses quick access to relevant and useful information. “Technological applications are being increasingly used to expand access to continuing professional education, facilitate communication networks, and obtain the most current clinical information” (Sansoucie 2000, pp 1, 2). The worldwide web has enabled access to information on clinical guidelines and standards, various health conditions, patient education materials and educational institutions offering continuing education. The instructional delivery of distance education has also increased information access for students and clinicians. Teaching and learning have been revolutionised by technological advancements and have evolved to include web-based research, student conferencing via electronic discussion groups, chat rooms and electronic mail.
METHOD

Registered nurses currently practising in various capacities at different health care facilities within a regional city were recruited for the study. A list of the health care facilities in the city and the number of nursing staff in each was compiled. The sample also included nursing lecturers working in at a metropolitan and a regional university campus. The selection criteria were that the person was currently registered with the Nurses’ Board of South Australia, practising a nursing speciality, and had consented to participate in the study.

A sixteen-item survey instrument was developed and distributed to the practising nurses through the heads of a regional hospital, the school of nursing in at a metropolitan and a regional university campus, an aged care facility and two doctors’ surgeries located in the regional city. Nursing staff in doctors’ surgeries were included in recognition that these nurses are increasingly using computer technology in health care planning and maintenance of client records.

The questionnaire, based on an instrument developed and previously validated by the first author, collected data relating to demographics; awareness of ergonomics principles; educational and training sessions attended; knowledge about organizational policy on procedures related to ergonomics; ability to recognise poor posture and positioning; taking rest breaks from the computer; and perception of priority given within the organization. The final question invited “any other comments”.

Following written approval from the health care facilities and schools of nursing, introductory letters were distributed outlining the purpose and procedures of the study and the expected benefits of the research. A total of 140 letters of introduction and questionnaires were distributed.

RESULTS

Of the 140 survey instruments distributed, 52 completed questionnaires were received giving a response rate of 37%. Details of the respondents are given in Table 1.

Table 1: Respondents by age, gender and position within organization

<table>
<thead>
<tr>
<th>Variable</th>
<th>Category</th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>18 - 27 yrs</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>28-37 yrs</td>
<td>15</td>
<td>29</td>
</tr>
<tr>
<td></td>
<td>38-47 yrs</td>
<td>25</td>
<td>48</td>
</tr>
<tr>
<td></td>
<td>48-57 yrs</td>
<td>11</td>
<td>21</td>
</tr>
<tr>
<td></td>
<td>over 57 yrs</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Gender</td>
<td>Male</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>49</td>
<td>94</td>
</tr>
<tr>
<td>Position</td>
<td>Clinician</td>
<td>29</td>
<td>56</td>
</tr>
<tr>
<td></td>
<td>Educator</td>
<td>11</td>
<td>21</td>
</tr>
<tr>
<td></td>
<td>Research</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Management</td>
<td>4</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>Community Health</td>
<td>4</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>Doctor’s Surgery</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Non-Responses</td>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>
The majority were female, clinicians, and aged between 38 and 47 years, which reflects the current nursing workforce that predominantly comprises middle-aged females (Armstrong 2004; Australian Health Workforce Advisory Committee 2004). The various positions reported reflect the expanding roles of contemporary nurses; while the majority were clinicians, nurses have extended their roles in education, research, management, community health, and surgeries.

The estimated daily use of a computer ranged from 15 minutes to 10 hours per day, with an average of 3.5 hours. Lecturers and managers generally required more time with computers in an average day than clinicians. However, 33% of respondents used a computer for more than 4 hours per day which is a considerable length of time in terms of the need to be aware of, and to apply ergonomics principles to computer use (Public Service Association of South Australia 1990).

In the questionnaire, respondents were given a definition of ergonomics and the aspects of work to which ergonomics can be applied. They were then asked whether they were aware of the ergonomics principles that relate to the use of computer technology. As shown in Table 2, the majority (61%) indicated they were not aware. This is not surprising from our perspective because the nursing undergraduate curriculum at the University of South Australia does not include the topic in any of the courses (University of South Australia 2004).

Table 2: Respondents reporting whether they were aware of the principles of ergonomics relating to the use of computers

<table>
<thead>
<tr>
<th>Response</th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>18</td>
<td>35</td>
</tr>
<tr>
<td>No</td>
<td>32</td>
<td>61</td>
</tr>
<tr>
<td>Non Responses</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>Total</td>
<td>52</td>
<td>100</td>
</tr>
</tbody>
</table>

Those respondents answering that they were aware of the ergonomics principles were asked how they had received this information. The replies indicated that they had mainly received their knowledge at work, from occupational health and safety personnel, and from reading various forms of literature containing information on ergonomics. However, responses to this question were received from less than half of the respondents.

When asked whether they had attended an educational program/training session provided by their organization that included information on ergonomics and computer use, a large majority of respondents (79%) replied that they had never attended such sessions (Table 3).

Table 3: Respondents Reporting Attendance at Education/Training Sessions provided by their organization

<table>
<thead>
<tr>
<th>Frequency</th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>In the last 12 months</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td>In the last 2 years</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>Over 2 years ago</td>
<td>6</td>
<td>11</td>
</tr>
<tr>
<td>Never</td>
<td>41</td>
<td>79</td>
</tr>
<tr>
<td>Total</td>
<td>52</td>
<td>100</td>
</tr>
</tbody>
</table>

Those respondents, who had attended an educational program/training session provided by their organization, were then asked how they had applied the knowledge of ergonomics received to their work situation. Most respondents did not answer this question. The majority of those who did reply, said they applied the knowledge to the set-up of their workstation, in adjusting their chair and by using a footrest. However, responses were received from only 12% of all respondents, suggesting that ergonomics principles were rarely being applied.

The majority of nurses reported learning their computer skills on the job (50%) rather than via study at an educational institution (27%). Other respondents replied that they learnt to operate a computer at home and were self-taught or “taught by the kids”. Both non-attendances at educational training sessions provided by their employer and lack of formal training from an educational institution, indicate a lack of exposure to the relevant practices of ergonomics.

The questionnaire included two questions, each containing five photographs depicting various scenarios covering work posture and the layout of computer equipment, to assist in determining the nurses’ knowledge of ergonomics related to the use of desktop keyboard-operated computer technology. As shown in the example in Figure 1, respondents were asked to carefully study each scenario and then indicate whether accepted ergonomics principles were being applied, and to give the reason for their response. A correct response and correct reason were assumed to be indicative of knowledge whereas an ‘unsure’ response, incorrect response, incorrect reason, or a question left blank, were assumed to indicate lack of knowledge.
Users can find the desk height that works best for them
Added flexibility for different occupational tasks
Sit or stand while working
Improves employee retention, health, morale and satisfaction
Dynamic, productive and healthier way to work
Quick, effortless and easy adjustment regardless of the weight on the work surface
Reduced absenteeism and employee turnover
Increased productivity (employees can take “micro-breaks” without leaving their workstations)
Reduced costs: Ergonomic programs can reduce workers compensation claims

Alternating between sitting and standing positions is the most effective way to maintain productive workflow
10. Study the diagrams carefully to determine whether accepted ergonomic principles are being applied in relation to posture and the layout of equipment. For each diagram please tick the appropriate response below and indicate the reason for your response. (Please note that “blanks” are treated as being incorrect responses).

(a) Yes □
No □
Unsure □

Reason ..........................................................................................................

..........................................................................................................

Figure: 1 Format of these questions

The responses to the first question in relation to sitting posture and positioning of the arms and wrists indicated that approximately two-thirds of the respondents were aware of poor posture. They generally identified when the seat was too low or desk too high and the elbows too low; when the back was not adequately supported; if the seat was cutting into the back of the knees; and if the body was unbalanced. It is noteworthy that the lowest percentage of correct responses related to the scenario which illustrated the generally recommended posture and positioning with the back supported, feet flat on the floor, body balanced, head slightly inclined, wrists level, and lower arms and thighs a little more than 90 degrees.

The percentage of correct responses to the second question related to posture and the layout of equipment was considerably less. Only two scenarios were correctly answered by more than half the respondents suggesting that, while respondents were generally aware of when the visual display unit was positioned too high in relation to the computer operator, they were not always able to identify when it was positioned too close or when the document holder was positioned too high. It is noteworthy again, that the scenario illustrating the generally accepted posture and layout of equipment had the lowest percentage of correct responses.

The large majority of nurses regarded rest breaks as relevant to computer use (92%). Also, when asked how often they should be taken, the highest percentage replied approximately every 50–60 minutes. However, 25% of respondents were either unsure or did not answer this question. Respondents were asked whether they took rest breaks. While 59% replied that they did, a considerable percentage (33%) did not.

To determine the nurses’ understanding of the purpose of rest breaks, a further question was asked about what tasks were undertaken during these breaks. The responses indicated a good understanding of the role of rest breaks, with many suggesting physical and non-sitting activities and tasks such as filing and photocopying that would require a change of position and allow the body and eyes to recover. It was pleasing to note that very few cited reading and writing activities, which would not rest the eyes and the muscles that had been previously used, as being suitable.

85% of respondents had not read any documents on ergonomics in relation to the use of computers in the last 12 months. This finding suggests that information on ergonomic computer use is not readily available within the workplace or the wider community and that it is not a priority in health care facilities.

Many respondents (69%) did not know whether their organization had a written policy relating to ergonomics and computer use and 29% believed it did not. This again suggests that information on ergonomics is not readily available within the health care facilities. In addition, 58% of respondents believed ergonomics principles relating to computer use were given insufficient priority within their organization. A further 19% were ‘unsure’.

Less than half of the nurses added an additional comment. However, from the comments that were received, it became clear that they thought ergonomics related to computer use was given little priority by their organization. It was commented that work stations had never been assessed, that adjustable equipment was not always available, and that cost was an issue. It was believed that ergonomics was given priority only when staff had a problem. Generally the comments received indicated that the nurses would welcome information sessions. It was suggested that follow-up or reminder sessions could be provided each year in the same way as for lifting principles as part of occupational health and safety.
CONCLUSION
Computers are now an integral part of the health sector and are located in various health care environments. Computers provide nurses with the tools and the skills used by other professions to assist their delivery of quality care. In nursing practice, computers play a major role in allowing nurses to gain and track information about patients; in facilitating communication between nurses; and in addressing nursing needs. Ergonomics can play an important role in the provision of a safe, healthy work environment for these computer users.

This study has identified that the majority of nurses reported not being aware of the ergonomics principles relating to computer use and although most learnt to operate a computer on the job, they had never attended training in ergonomics provided by their organization, and did not apply ergonomics to their computer work. While the nurses were generally aware of good practices relating to posture, their knowledge in relation to the layout of computer equipment was limited, and while many were aware of the need for regular rest breaks away from the computer, a considerable percentage did not take breaks. The majority of nurses did not know whether their organization had a written policy relating to ergonomics and computer use, and had not read any documents containing this type of information in the last 12 months. Nurses generally considered ergonomics related to computer use was given low priority.

The benefits of the information derived from this research were many - among them being a better understanding of the learning needs and support required by nurses in this area. It has also shown that greater management commitment is required if positive attitudes towards ergonomic computer use are to be developed amongst nurses.

Here is where a regional university campus can intervene and provide educational materials and sessions on ergonomics to meet the needs of nurses. Ergonomics and computer use may be offered as a topic in a nursing undergraduate course and to practising nurses as part of their continuing education. Collaboration and partnering with health care facilities is a strategic approach that could be used to increase the awareness of nurses and the commitment of management.

The application of ergonomics in an aging nursing population, especially for its members using computers for extended periods, requires greater priority by health organizations, and the nurses themselves.

REFERENCES


About the Authors:
Dr Janet Sawyer
Business and Regional Enterprise,
University of South Australia
Contact: janet.sawyer@unisa.edu.au

Ms Joy Penman
Nursing and Rural Health,
University of South Australia
2. Occupational overuse syndrome (OOS): a recurring problem in the computer industry of industrially developing countries (IDCs).

A case study at University of Benin, Benin City, Nigeria

Allen E Akhahowa

ABSTRACT
Occupational Overuse Syndrome (OOS) is the name given to a range of conditions usually caused or aggravated by poor work process and unsuitable working conditions. It affects millions of computer users in developed nations. With the rapid embrace of Information and Communication Technology (ICT) and the increase in computer users in Nigeria, the prevalence of OOS is yet to be investigated. This study surveyed the views of computer users in University of Benin, Nigeria on the issue of Occupational Overuse Syndrome (OOS). The data for the study was collected by means of a structured questionnaire administered to respondents (computer users) at the University of Benin campuses comprising staff and students. Four hundred and five (405) completed questionnaires were returned and data analyzed, out of the 417 administered. Our results showed that low back pain, neck pain, headache, shoulder pain and eyestrain, are the most prevalent OOS symptoms/pains. The study recommends the need for computer workplaces to improve on their designs towards finding a lasting solution to the hazardous problem.

Keywords: occupational overuse, pain syndrome, ergonomics, computer, musculoskeletal disorder

INTRODUCTION
Occupational Overuse Syndrome (OOS) is the name given to a range of conditions usually caused or aggravated by poor work processes, environment and unsuitable working conditions. The OOS is otherwise referred to as Carpel Tunnel Syndrome, Tenosynovitis, Repetitive Strain Injury (RSI) or Repetitive Motion Injury (RMI) (Bamber, 1987). Glenn (1995) asserted that the most common areas of complaint among computer users are the neck, shoulder and back pains, and attributed the leading causes of sickness and absence from work to these pains. Several researchers have asserted that repetitive (or forceful) movement and constrained (or poor awkward) posture cause persistent musculoskeletal disorder and pain (Brown et al; 1984; Khaki & Rosemoff, 1993). Gradjean (1981) and Stuart (1995) reported that good circulation provides nutrition to muscles and joints, since muscles need stimulation to grow. Muscles and joints would be deprived of these nutrients when people stay in the same position all day. Prolonged sitting results in a slacking of the abdominal muscle and curvature of the spine, which is bad for the organs of digestion and breathing. These situations may thus affect the person's quality of life (Stuart, 1995). Green & Briggs (1990) reported that a fixed position causes lower back pain because of increased pressure on the vertebra while sitting. The sitting position, the type of chair, and use of footrest also affect the lower back.

Carpel Tunnel Syndrome is the leading cause of occupational illness in the United States with complained absenteeism and medical expenses costing the industry billions of dollars a year. Even in other Western Industrialized Countries, similar complaints involving visual problems and pain have been reported among computer users (Berghqvist et al., 1995; Berghqvist & Knave, 1994). A study conducted by the Department of Human Factor Engineering, University of Occupational and Environmental Health, Japan, revealed that visual strain occurred after merely 60 minutes of video terminal work, which further resulted in lower productivity (Chaffin, 1995). Headaches also result from several things that occur with computer work like screen glare and poor image quality. Nigeria has been making new developments in the IT sector with great emphasis on computer literacy. This is reflected in the emergence and proliferation of cyber cafes. Therefore, the number of computer users in Nigeria is on the rise and it is expected to increase further as the years proceed. In the University of Benin for instance, there is a rapid growth of ICT following the introduction of e-learning centres, cybercafes run by UBTECH, and students online facilities (portals). Thus, staff and students are speedily embracing computer technology with many ignorant of the associated pains which require preventive measures. The number of computer users in the university is therefore on the rise and expected to increase further in the coming years. Complaints of musculoskeletal pain are daily reported in the users' workplaces and there is currently inadequate data aimed at finding a lasting solution to OOS in the university. Also, the problems of OOS are minimally stressed.
With the flood of papers that have already addressed the problems of OOS in developed countries, the reverse is the case for an Industrially Developing Country (IDC) like Nigeria. There are as many confusing alternatives as there are solutions. Many standards, such as those for the viewing distance/angle have been formulated, but with poor consensus amongst experts regarding their effectiveness. Moreover, most of these standards were formulated with samples from developed countries, with different anthropometric dimensions, work culture and degrees of adaptability than those of the IDCs. There is also the lack of guidelines for technology transfers to IDCs to solve the problems relating to OOS. There are currently inadequate library resources and data regarding OOS in Nigeria, and the awareness of the problem of OOS has been minimally stressed considering the fact that many users are suddenly adapting to prolonged computer work. Also, Nigeria an IDC, has work and office cultures of users, and anthropometric dimensions, quite different from those of developed countries hence this study. Therefore, the aim of this study is to evaluate the prevalence of Occupational Overuse Syndrome (musculoskeletal pains) among computer users in Nigeria, an IDC, taking the University of Benin, Benin City, as a case study.

MATERIALS AND METHODS
The fieldwork for the study was carried out in the University of Benin, Nigeria using stratified random sampling techniques. Four hundred and seventeen (417) questionnaires were administered to obtain information from frequent computer users. Each questionnaire administered consisted of six (6) sections. The first section (demographic) elicits general information about respondents. Such information includes sex, age and job title of the respondent. The second section (computer use) was designed to ascertain the mode, pattern and degree of usage of computers. The third section (Work Environment) was designed to obtain an overall assessment of respondents work environment in terms of pressure, friendliness, office type etc. The fourth section (Work Area/Workplace) was designed to assess the installed equipment and facilities in computer workplaces. The fifth section (OOS symptoms) presents an opportunity for the respondents to indicate some of the pains they experienced using computer systems, the severity (if any) and the frequency of symptoms (pain) occurrence. The severity of OOS symptoms was assessed using a 4-point OOS symptoms index namely:

- 0: Never/ No symptom
- 1: Mild symptom
- 2: Moderate Symptom
- 3: Severe symptom

The frequency of OOS symptoms was also assessed using a 2-point frequency index namely:

- 0: Occasionally
- 1: Frequently

The sixth section (Support/Safety measure) was designed to investigate respondent’s awareness of ergonomic guidelines, the presence of formal pain prevention guidelines in workplaces and attempts to introduce new guidelines where available.

Subjects in this study included university employees, students and staff in offices, business centers and cybercafés, at the University of Benin. Subjects who used computers during their working hours and did not complain of severe/advanced pains were also included in the study. None of the subjects had any previous diagnosed disease like rheumatism and arthritis. The study was conducted between January 2006 and July 2006. A total of 405 questionnaires were returned and found useful giving a response rate of 97.1%. The high response rate in the study shows the enthusiasm of users in finding a lasting solution to the pains they experience on a daily basis during computer work. This response rate could be attributed to the following: subjects were assured of the confidentiality of information supplied and were given enough time to fill the questionnaire; reminders were sent regularly to subjects through e-mail; the researcher always confronted subjects that could not submit questionnaires on the spot, since he was always on campus because he worked there.

The returned questionnaires were analyzed using descriptive statistics. The Statistical Package for Social Sciences (SPSS) Software Version 11.0.1 for Windows was used for the data analysis.
RESULTS

Demographic Information of Respondents

The results in Table 1 show that 52.1% of the respondents were males, while 47.2% were female. The respondents’ age ranged between 11 and 60 years giving a mean age of 41.0 ± 8.6 years. The result shows that the majority of the respondents were between 21 and 40 years old.

Table 1: Demographic information of respondents

<table>
<thead>
<tr>
<th>Sex</th>
<th>No. of respondents</th>
<th>Age in years</th>
<th>No. of respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>211(52.1%)</td>
<td>11-20</td>
<td>25(6.2%)</td>
</tr>
<tr>
<td>Female</td>
<td>191(47.2%)</td>
<td>21-30</td>
<td>175(43.2%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>31-40</td>
<td>129(31.9%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>41-50</td>
<td>58(14.3%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>51-60</td>
<td>18(4.4%)</td>
</tr>
</tbody>
</table>

No response 03(07%)

Computer use

Table 2 shows the number of years of computer experience, number of days per week and number of hour per day of computer use by the respondents. The data show that there are low percentages of respondents with more than 14 years of computer experience, less than 4 days of computer work per week and less than 3 hours of computer work per day.

Table 2: Number of years, days and hours /day of computer use

<table>
<thead>
<tr>
<th>No of years</th>
<th>No of respondents</th>
<th>No of days/week</th>
<th>No of respondents</th>
<th>No of hours/day</th>
<th>No of respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-4</td>
<td>142(35.1%)</td>
<td>0-3</td>
<td>107(26.4%)</td>
<td>0-2</td>
<td>34(8.4%)</td>
</tr>
<tr>
<td>5-9</td>
<td>205(50.6%)</td>
<td>4-7</td>
<td>298(73.6%)</td>
<td>3-5</td>
<td>105(26.0%)</td>
</tr>
<tr>
<td>10-14</td>
<td>43(10.6%)</td>
<td></td>
<td>6-8</td>
<td></td>
<td>79(19.5%)</td>
</tr>
<tr>
<td>&gt;14</td>
<td>15(3.7%)</td>
<td></td>
<td></td>
<td>&gt;8</td>
<td>187(46.2%)</td>
</tr>
</tbody>
</table>
Breaks

The data in Table 3 show that 20.7% of the respondents take fixed breaks during their daily computer work, 75.6% do not take fixed breaks, while 3.7% did not do not respond to the question of breaks. The majority of them take a break after 0-3 hours of computer work, thus the average work interval before a break was 2.7 hours. The data as reported by the respondents also show that only 15.5% of the respondents observe fixed breaks to stretch their bodies due to weakness and pains like back pain, wrist pain. The remaining 84.5% observe breaks for some other reason. In general, the data show that only a few individuals observe fixed breaks during computer work and the breaks are usually observed after very long hours of computer work. During these breaks, a majority of these individuals attend to other issues instead of stretching or exercising the body to reduce stress.

Table 3: Breaks, Work interval before breaks and reason for break

<table>
<thead>
<tr>
<th>Fixed break during computer work?</th>
<th>No of respondents</th>
<th>Work interval before breaks(in hr)</th>
<th>No of respondents</th>
<th>Reason for break</th>
<th>No of respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>84(20.7%)</td>
<td>0-1</td>
<td>28(33.3%)</td>
<td>For body stretching</td>
<td>13(15.5%)</td>
</tr>
<tr>
<td>No</td>
<td>306(75.6%)</td>
<td>2-3</td>
<td>39(46.4%)</td>
<td>Others</td>
<td>71(84.5%)</td>
</tr>
<tr>
<td>No response</td>
<td>15(3.7%)</td>
<td>4-5</td>
<td>14(16.7%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>6-7</td>
<td>03(3.7%)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Work Environment

The data in Table 4 gives an overall assessment of the respondents’ computer work environment in terms of workload, tasks design and office type. The majority of the respondents assessed their work load in the office as high while a minority said it was very low. 54.3% of the respondents considered their overall work environment as not friendly, while 42.5% considered it to be friendly. Friendliness of the computer work environment was assessed in terms of task design, management strategies, physical layout (equipment) like antiglare screen, air-conditioner, adjustable chairs, spacious office, and ergonomics guidelines. Thus, friendliness related to available equipment in the computer workplace and not in terms of work colleagues. The most popular office type was a multi-person office. 70% of the respondents employing a multi-person office arrangement reported that they lacked adequate space in the office. As a result, colleagues and users tend to sit closer than visually comfortable on a “too narrow” desk. This in turn impedes their free stretching and movement of body parts to relieve pains. From the results in Table 4, the respondents also reported that when their work extended to long unbroken periods of activity, they invariably stopped working because of the pain experienced in performing this computer work. This pain could be attributed to respondents taking breaks regularly to attend to other pressing issues instead of resting eyes, stretching and exercising for a short period to reduce stress. It could also be attributed to the long period of work before taking breaks as well as the nature of their offices (not very spacious).

Table 4: Work Environment of the respondents

<table>
<thead>
<tr>
<th>Work pressure/ load</th>
<th>Number of respondents</th>
<th>Overall assessment of work environment</th>
<th>Number of respondents</th>
<th>Office Type</th>
<th>Number of respondents</th>
<th>Size of computer room</th>
<th>Number of respondents</th>
<th>Miss/ Abandon work because of pain</th>
<th>Number of Respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very high</td>
<td>84(20.7%)</td>
<td>Friendly</td>
<td>171(42.5%)</td>
<td>Individual</td>
<td>43(10.7%)</td>
<td>Spacious</td>
<td>121(30.0%)</td>
<td>Yes</td>
<td>250(61.7%)</td>
</tr>
<tr>
<td>High</td>
<td>215(53.1%)</td>
<td>Unfriendly</td>
<td>220(54.3%)</td>
<td>Multi-person</td>
<td>263(64.9%)</td>
<td>Tight</td>
<td>284(70.0%)</td>
<td>No</td>
<td>142(35.1%)</td>
</tr>
<tr>
<td>Moderate</td>
<td>86(21.2%)</td>
<td>No response</td>
<td>13(3.2%)</td>
<td>Individual &amp; Multi-person</td>
<td>99(24.4%)</td>
<td></td>
<td>No response</td>
<td>13(3.2%)</td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>18(4.4%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Very low</td>
<td>02(0.5%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**Work Area/Workplace design**

Table 5 gives a summary of the main findings from the respondents’ workplaces/areas. The data in Table 5 show that only 6% of the respondents make use of a moveable or rolling chair, thus 94% of them tend to remain in a static position throughout the period of their computer work because they use a static chair. The majority of the respondents lacked a footrest or height adjustable chair. Also, only few respondents had antiglare screens installed on the monitor and only a few of them had their room well-lit and well-ventilated.

Table 5: Reports/Findings from the respondents Work Area/Place

*Source: Author’s Fieldwork, 2006*

<table>
<thead>
<tr>
<th>S/N</th>
<th>WORK AREA</th>
<th>FACILITIES/THINGS IN PLACE</th>
<th>NUMBER OF RESPONDENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Yes</td>
</tr>
<tr>
<td>1.</td>
<td>User's chair</td>
<td>Static chair</td>
<td>381(94%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Backrest present</td>
<td>373(92%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Footrest present</td>
<td>109(26.9%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Upright chair</td>
<td>241(60%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Height of chair adjustable</td>
<td>15(3.7%)</td>
</tr>
<tr>
<td>2.</td>
<td>Monitor/VDU</td>
<td>Antiglare screen installed</td>
<td>69(16.1%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Monitor facing source of light</td>
<td>184(45.4%)</td>
</tr>
<tr>
<td>3.</td>
<td>Computer room</td>
<td>Room well-lit or illuminated</td>
<td>85(21%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Room well-ventilated</td>
<td>206(50.9%)</td>
</tr>
<tr>
<td>4.</td>
<td>Keyboard</td>
<td>Conventional keyboard</td>
<td>287(95.6%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Height of keyboard adjusted</td>
<td>375(92.6%)</td>
</tr>
<tr>
<td>5.</td>
<td>Mouse</td>
<td>Conventional mouse</td>
<td>390(96.3%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Mouse beside the keyboard</td>
<td>149(36.8%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Mouse close to the user</td>
<td>120(30%)</td>
</tr>
</tbody>
</table>

Table 6 shows that only a few respondents (8.4%) viewed computers at a horizontal angle (at eye level) while the majority made use of either an upward or a downward view.

Table 6: VDU Position/User’s gaze angle

*Source: Author’s Fieldwork, 2006*

<table>
<thead>
<tr>
<th>VDU POSITION FROM THE EYE</th>
<th>NUMBER OF RESPONDENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upward(Above User's eye level)</td>
<td>224(55.3%)</td>
</tr>
<tr>
<td>Horizontal(At User’s eye level)</td>
<td>34(8.4%)</td>
</tr>
<tr>
<td>Downward(Below User’s eye level)</td>
<td>147(36.3%)</td>
</tr>
</tbody>
</table>
## Occupational Overuse Syndrome (OOS) Symptoms

Respondents were asked to specify the pains experienced, their severity and location. Table 7 shows that the highest prevalence of pain was low back pain (73.5%). This was followed by neck pain (72.9%), headache (70.4%), shoulder pain (69.9%) and eye problem/eyestrain (59.3%). Table 7 also shows that shoulder pain, low back pain, eye problem/eyestrain and arm pain had the highest severity, while the highest prevalence of those without pain (never) was for knee pain. This was followed by elbow and general body pains. No respondent experienced severe elbow and knee pains.

### Table 7: OOS Symptoms, Severities and Frequencies of Symptoms

*Source:* Author’s Fieldwork, 2006

<table>
<thead>
<tr>
<th>S/N</th>
<th>SYMPTOMS SEVERITIES &amp; NUMBER OF RESPONDENTS</th>
<th>SYMPTOMS FREQUENCY &amp; NUMBER OF RESPONDENTS (FOR MILD, MODERATE AND SEVERE)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>NEVER</td>
<td>MILD</td>
</tr>
<tr>
<td>1.</td>
<td>Low back pain</td>
<td>26.2%</td>
</tr>
<tr>
<td>2.</td>
<td>Neck pain</td>
<td>27.2%</td>
</tr>
<tr>
<td>3.</td>
<td>Shoulder pain</td>
<td>30.1%</td>
</tr>
<tr>
<td>4.</td>
<td>Elbow pain</td>
<td>92.1%</td>
</tr>
<tr>
<td>5.</td>
<td>Wrist pain</td>
<td>64.4%</td>
</tr>
<tr>
<td>6.</td>
<td>Finger pain</td>
<td>63.2%</td>
</tr>
<tr>
<td>7.</td>
<td>Headache</td>
<td>29.1%</td>
</tr>
<tr>
<td>8.</td>
<td>Arm pain</td>
<td>54.3%</td>
</tr>
<tr>
<td>9.</td>
<td>General body pain</td>
<td>91.6%</td>
</tr>
<tr>
<td>10.</td>
<td>Hip pain</td>
<td>63.0%</td>
</tr>
<tr>
<td>11.</td>
<td>Ankle pain</td>
<td>64.7%</td>
</tr>
<tr>
<td>12.</td>
<td>Knee pain</td>
<td>93.1%</td>
</tr>
<tr>
<td>13.</td>
<td>Foot pain</td>
<td>65.2%</td>
</tr>
<tr>
<td>14.</td>
<td>Eye problem/eyestrain</td>
<td>40.0%</td>
</tr>
</tbody>
</table>
Support/Safety Measures at Computer Workplaces

We also investigated the aspect of precaution or safety at work aimed at avoiding or reducing occupational pains. Table 8 shows that a majority of the respondents (89.4%) were not aware of measures aimed at preventing pain during computer work. Only a very few respondents (1.7%) had formal pain prevention guidelines at their workplaces. 57.2% (04) out of the 1.7% (07) of respondents who had formal ergonomics guidelines for preventing or reducing OOS symptoms at their workplaces reported that there were no attempts by their organizations to introduce new ergonomics guidelines through intended research.

Table 8: Support/Safety measures at workplaces
Source: Author’s Fieldwork, 2006

<table>
<thead>
<tr>
<th>Respondents</th>
<th>Number of respondents</th>
<th>Respondents with formal pain prevention guidelines at workplace</th>
<th>Number of respondents</th>
<th>Attempts by organization to introduce new ergonomics guidelines (through intended research)</th>
<th>Number of respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>43 (10.6%)</td>
<td>Yes</td>
<td>07 (1.7%)</td>
<td>Yes</td>
<td>01 (14.3%)</td>
</tr>
<tr>
<td>No</td>
<td>362 (89.4%)</td>
<td>No</td>
<td>377 (93.2%)</td>
<td>No</td>
<td>04 (57.2%)</td>
</tr>
<tr>
<td>Indifferent</td>
<td>21 (5.1%)</td>
<td>Can’t really say</td>
<td>21 (5.1%)</td>
<td>Can’t really say</td>
<td>02 (28.6%)</td>
</tr>
</tbody>
</table>

DISCUSSION

Problems of productivity, absenteeism and low morale in workplaces have been directly linked to pains experienced (Niland, 2003). The high response rate of 97.1% obtained from the respondents in this study goes a long way to show the zeal and enthusiasm of computer users in developing countries (like Nigeria) in supporting research targeted at finding a lasting solution to the problems of pain associated with computer work. Also, the respondents were assured that all information collected would be kept confidential. The result in this study showed that computer usage in Nigeria became very popular in the last one (1) to ten (10) years. This shows that Nigeria is at the infant stage of the Information and Communication Technology (ICT) explosion.

It has been reported in previous studies that short breaks have a preventative affect over the development of OOS (Berghqvist et al, 1995; Browne et al, 1984; Ortiz-Hernandez et al, 2003; Subratty & Korumtolec, 2005). In this study, it was found that only a few respondents (20.7%) took fixed breaks during their daily computer work. Of this small percentage, only a few (15.5%) took breaks to perform body stretching exercises while many still performed other strenuous tasks during breaks which ignited the occurrence of pain, while majority of them took breaks after a very long period of computer work. Many of the respondents reported that they were not aware of the importance of taking fixed breaks and many reported that they did not take these breaks in order to meet deadlines or targets. This correlates with previous studies by Bammer (1997) and McLean et al (2001). The study also revealed that the work pressure (load) of the respondents was high in a non-spacious and unfriendly work environment consisting of many persons in an office or workplace. As a result of this poor work environment, the majority of the respondents (61.7%) in our study reported that they sometimes missed or abandoned their computer work — running into hours because of pain. This behaviour goes a long way to reducing worker productivity and morale as reported by the respondents. This correlates with a previous study by Niland (2003).

It was also found in this study that the majority of the respondents did not have a footrest in their workplace. Also, almost all the respondents (94%) used a static chair in their workplace while only a few used a rolling/moveable chair. This could be a possible reason for the occurrence of pain — especially low back pain. Our finding is in agreement with previous studies (Gradjean, 1981; Green & Briggs, 1990). Ortiz-Hernandez et al (2003) reported that maintaining fixed positions for a long time causes “Tingling in extremities”. Green & Briggs (1990) had reported that a static sitting position for extended hours increases intradiscal pressure, disc degeneration and poor disc nutrition, and this may be related to the reported back pain. Also, only a few respondents (6.9%) reported using height adjustable chairs in order to ease their view of the VDU and balance their posture. In the present study, only 16.1% had an anti-glare screen...
installed and some respondents still had their VDU screens facing a direct source of light. This bad lighting condition might be a possible reason for the high rate of eye problems/eyestrain reported in this study. Previous studies have shown that computer users are at greater risk of developing eye problems and visual fatigue in relation to the position of the screen (Ankrum & Nemeth, 1995; Ijadunola et al., 2003). This study also revealed that only few respondents had their computer room well lit and ventilated, thereby causing them more strain—especially visual strain. Only few made use of a cordless keyboard and mouse which means they always have to be close to these tools, thereby restricting their mobility during computer work. This goes a long way towards igniting pain.

The findings in this study also asserted that only a few respondents viewed the VDU at eye level (a horizontal angle). This could be a possible reason for the high prevalence of neck pain, shoulder pain and eye strain. Hugo (2003) reported that a higher VDU position would result in a greater dynamic neck strain while a lower VDU position lessens the dynamic neck pain. Burgess-Limerick et al (1999) also reported that monitor height and gaze angle affect the eyes and neck—with a lower monitor height likely to reduce eye discomfort. Our findings are in line with these reports. Low back pain, neck pain, headache, shoulder pain and eyestrain were the most prevalent disorders with 73.5%, 72.9%, 70.4%, 69.9% and 59.3%, respectively. This conforms to a previous study which reported that computer users are at increased risk of having neck and shoulder pain which could be the result of a poor working position—including sitting posture, monitor position and keyboard height (Subratty & Korumtolec, 2005; Wahlstrom et al, 2004). The lowest prevalent pains were knee and general body pain.

We also found that only a few respondents (10.6%) were aware of measures for preventing occupational pains and only a handful of them (1.7%) had formal ergonomics guidelines for OOS prevention in their workplaces. Furthermore, only few respondents (14.3%) with formal ergonomics guidelines at their workplaces reported a willingness or attempt by themselves or their organization to introduce new ergonomics guidelines in their workplaces especially through research. This goes a long way to show the lacklustre attitude of organizations towards embarking on OOS research and also to applying it in their workplaces. Therefore, there is an urgent need to address this through proper research and information distribution.

CONCLUSION

Our findings have generally linked low productivity and morale in computer workplaces to OOS, and thus there is a need for adequate information about its occurrence and prevention. With the digital information explosion and increased computer literacy in the developing countries, many users’ workplaces still lack proper design, management strategies, and task design. This highlights the fact that, to date, there has been minimal attention given to addressing the need for a workplace hazard analysis as part of a risk management program.

In line with this, the following recommendations are made:

- Educational forums and enlightenment program should be created especially in the university communities of developing countries to educate and enlighten computer users about OOS and train them in preventive measures to overcome OOS.

- Computer users should cultivate the habit of taking short fixed breaks during their daily computer work to perform stretching exercises.

- For computer users who experience severe eyestrain and other visual pain, anti-glare screens should be used with the VDUs in order to reduce eye strain. A monitor should not face the direct source of light and uncurtained windows should be avoided. Also, the top of the monitor should be at approximately the user’s eye-level. This may be achieved readily by using an adjustable rolling chair. However, in the absence of an adjustable rolling chair, a foam cushion can be added to the chair to increase its height—or the monitor height can be adjusted. This should help to prevent eyestrain, low back pain and neck pain.

- Workplaces should put proper preventive guidelines in place while those already having ergonomics guidelines should monitor for continual research and improvement.

Therefore, our findings generally recommend the need to improve computer workplaces in terms of design, management strategies and equipment. When this is done, it will go a long way to avoiding poor posture during computer work and thereby reduce the incidence of OOS.
ACKNOWLEDGEMENT

I wish to express my profound gratitude to the staff of Health Education Department and Optometry Department, University of Benin, Benin City, Nigeria, for their assistance and contributions especially during the course of the preparation and administration of questionnaires.

REFERENCES


Chaffin E. 1995. Carpal Tunnel Syndrome research: The Comprehensive guide to computer-related injury management, Gaithersburg, Md.


About the Author

At the time of writing this paper the author was employed in the Department of Computer Science at the University of Benin, Benin City, Nigeria. He has now taken up a position in the Information Technology (Software) Department of Zenith Bank Plc, located on Victoria Island, Lagos, and may be contacted by email: allen.akhahowa@zenithbank.com
Welcome

On behalf of the Human Factors and Ergonomics Society of Australia we welcome you to the Society’s Annual Conference, to be held this year at a venue with a difference – the Aquarium of Western Australia (AQWA). AQWA is located on the coast 20 minutes drive north of Perth city centre and has amazing views of the Indian Ocean.

Western Australia is experiencing economic boom times at present, but we cannot afford to neglect the well-being of the State’s workforce, drawn from many nationalities and diverse cultural backgrounds. The theme of the conference - A Healthy Society: Safe, Satisfied and Productive - is especially fitting with the on-going need to devise, establish and evaluate human-machine systems that are safe, productive and satisfying to use. We hope to satisfy our delegates’ appetites with a stimulating mix of keynote addresses, paper and poster presentations and workshops, and showcase some contemporary products at the trade exhibits.

During the conference delegates will be able to use the facilities offered by AQWA to experience the unique marine environments that constitute the 12,000 km coastline of Western Australia.

We look forward to welcoming you to this exciting conference.

Jenni Miller and Ian Gibson
2007 Conference Co-Conveners
Introduction

In April 2007 a new Australian / New Zealand standard was released: AS/NZS 1337.6: 2007 Personal eye protection Part 6: Prescription eye protectors against low and medium impact (1). Prior to the release of this standard, prescription spectacle wearers requiring protection against medium velocity objects (such as when using a grinding wheel or electric drill) were restricted to wearing plano (non-prescription) eye protectors which fit over the top of prescription spectacles or prescription inserts which fit behind plano eye protectors. The new standard is significant in that there is now scope for supplying prescription eye protector spectacles, that is, prescription lenses fitted to a safety frame with side coverage, which provide medium impact protection.

While there are advantages to prescription eye protector spectacles, it is unlikely that they will totally replace existing eye protection options. It is therefore important that ergonomists and safety professionals have an understanding of the advantages and disadvantages of the different eye protector options so that appropriate choices can be made in the workplace. This understanding will also assist these professionals when dealing with eye care practitioners and optical dispensers for the prescription and supply of these products.

Why has there been a restriction on prescription eye protector spectacles?

Until the release of AS/NZS1337.6: 2007, the Australian / New Zealand Standards stipulated that prescription spectacles are only suitable for low impact protection, irrespective of the impact resistance qualities of the lens or frame material (2). The reason for the restriction on prescription eye protector spectacles is related to quality control. Although spectacle frames and lens materials are in theory capable of withstanding impact at great velocity, it is not always easy to predict how prescription lenses will behave when impacted. For example, due to the differences in edge and centre thickness of different spectacle prescriptions, some lenses have a greater propensity to flex (and thus dislodge from the frame) while others have a greater propensity to fracture upon impact. Testing individual eye protectors for impact resistance is not advisable as the testing procedure itself may render the eye protector unsuitable for use.

The new standard addresses quality control issues and allows for medium impact prescription spectacles provided the manufacturer has:

Type tested their product (i.e. ensured that the impact requirements are met for a range of spectacle lens prescriptions fitted to a particular frame) and conducted random tests on their products to ensure that compliance with the standard is maintained.

What are the current options for prescription lens wearers?

There are three options for prescription lens wearers who require medium impact protection: fit-over-the-top eye protectors, prescription insert eye protectors and medium impact prescription spectacles. Each has advantages and disadvantages related to comfort, cost and suitability for various prescription lenses.

Fit-over-the-top eye protectors

Fit-over-the-top eye protectors are non-prescription eye protectors designed for wearing over the top of regular prescription eye wear. Options include spectacles, full face visors and goggles. Visors may be suitable for protection against higher velocity risks. Some goggles provide medium impact protection in addition to splash protection.

This paper will limit discussion to fit-over-the-top spectacles providing medium impact protection. The advantages and disadvantages of their use are given in Table 1.
### Table 1: Advantages and disadvantages of Fit-over-the-top eye protector spectacles

<table>
<thead>
<tr>
<th>Advantages</th>
<th>Disadvantages</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Cost: They have a relatively low purchase price and so are suitable for</td>
<td>• Some individuals may find wearing an eye protector over their own prescription spectacles</td>
</tr>
<tr>
<td>those who need to regularly replace their eye protectors due to damage.</td>
<td>uncomfortable, particularly behind the ears or across the bridge of the nose.</td>
</tr>
<tr>
<td>• A good alternative for individuals who only require occasional eye</td>
<td>• There is only a limited range of fit-over-the-top designs available. This option is not suitable for</td>
</tr>
<tr>
<td>protection.</td>
<td>all shaped heads and faces.</td>
</tr>
<tr>
<td>• Some individuals may notice reduced optical clarity looking through</td>
<td>• Some individuals may notice reduced optical clarity looking through two pairs of lenses.</td>
</tr>
<tr>
<td>two pairs of lenses.</td>
<td>-----------------------------------------------------------------------------------------------------</td>
</tr>
</tbody>
</table>

### What to look for when purchasing fit-over-the-top eye protector spectacles

Fit-over-the-top eye protector spectacles differ from regular non-prescription eye protectors in that they have a wider cross-section across the brow (See Figure 1). This feature prevents the eye protector from rubbing against and scratching the prescription spectacles underneath. It also offers greater protection from objects approaching from above.

The lens of the eye protector should also be labelled with the letter “I” indicating that they meet the medium impact requirements of AS/NZS1337:1992.

![Figure 1. The spectacles on the right are for wearing over the top of prescription spectacles. The moulded section across the brow is wider than the spectacles on the left ensuring adequate coverage above the eye. It also prevents the eye protector from rubbing on the spectacles underneath.](image)

### Prescription insert eye protectors

Prescription insert eye protectors have two components – an insert to which the prescription lenses are fitted (See Figure 2a) and a non-prescription (plano) eye protector. The insert is designed to clip into place behind the plano eye protector (see Figure 2b). There are many variations on how the insert is designed to attach to the eye protector. Figure 2 is an example of one design.

![Fig 2(a) the prescription insert](image)
Table 2: Advantages and disadvantages of prescription insert eye protectors

<table>
<thead>
<tr>
<th>Advantages</th>
<th>Disadvantages</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Improved fit across the bridge of the nose and behind the ears compared to fit-over-the-top spectacles.</td>
<td>• Cost: The insert is custom fitted with the wearer’s spectacle prescription.</td>
</tr>
<tr>
<td>• The insert can be fitted with various spectacle lens designs including single vision, bifocal and progressive lenses.</td>
<td>• There are only a limited range of prescription insert eye protector designs available. This option is not suitable for all shaped heads and faces.</td>
</tr>
<tr>
<td>• The most likely component to be damaged during wear is the plano eye protector. This can be replaced relatively cheaply and easily by removing the insert and fitting it to a new plano eye protector.</td>
<td>• Some prescription lenses cannot be fitted to the insert due to the lens thickness.</td>
</tr>
<tr>
<td></td>
<td>• Dirt may lodge between the insert and the eye protector. In this case, the insert need would need to be removed for cleaning.</td>
</tr>
<tr>
<td></td>
<td>• Some individuals may notice reduced optical clarity looking through two pairs of lenses.</td>
</tr>
<tr>
<td></td>
<td>• Although the wearer only has one pair of spectacles on their face, the combined weight of the insert and eye protector can be greater than for prescription spectacles.</td>
</tr>
</tbody>
</table>
What to look for when purchasing prescription insert eye protectors

When tested and rated for medium impact resistance the insert and eye protector are tested as a unit. Therefore, only inserts and eye protectors that have been rated compatible by the manufacturer should be used in combination. Fitting an insert to a different model or brand eye protector may not provide the required protection when impacted.

The lens of the plano eye protector should also be labelled with the letter “I” indicating that they meet the medium impact requirements of AS/NZS1337:1992.

Medium impact prescription spectacles

Medium impact prescription spectacles have the appearance of regular spectacles except that they have non-removable side protection. Figure 3 is an example of one design of a medium impact prescription spectacle. The advantages and disadvantages of medium impact prescription spectacles are given in Table 3.

![Figure 3. Prescription eye protector spectacles](image)

Table 3: Advantages and disadvantages of medium impact prescription spectacles

<table>
<thead>
<tr>
<th>Advantages</th>
<th>Disadvantages</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Improved comfort compared to the other two eye protector options since the wearer only has one pair of spectacles on their face</td>
<td>• A custom made product, they are more expensive than the other eye protector options. This can become an issue if the eye protectors are frequently damaged.</td>
</tr>
<tr>
<td>• The frames often have more scope for adjustment than plano eye protectors (e.g. adjustable temples and nose pieces).</td>
<td>• The type testing process may limit the range of suitable prescription powers and spectacle lens designs.</td>
</tr>
<tr>
<td>• Better optical clarity since the wearer is only looking through one pair of lenses.</td>
<td></td>
</tr>
</tbody>
</table>
What to look for when purchasing medium impact prescription spectacles

- The frames should have non-removable side protection
- The lenses should be marked with the manufacturers identifier and with the letters “R” to indicate that they are prescription and “I” to indicate that they provide medium impact protection
- The frames should also be marked with the manufacturer’s identifier and with “AS/NZS1337.6”.
- Tints and coatings for medium impact prescription spectacles

Medium impact prescription spectacles may be tinted provided the colour complies with the coloration limits in the Australian Standards (3, 4). Care should be taken that photosensitive lenses do not create a safety hazard within the workplace (for example, if the colour does not change quickly enough for the working conditions). Therefore a risk analysis of the workplace should be conducted before permitting the use of tinted lenses.

Some coatings, such as anti-reflection coatings, can reduce the impact resistance of lens materials rendering them unsuitable for medium impact protection (5, 6). Unless the manufacturer has type tested their product and proved compliance with AS/NZS 1337: 1992 and AS/NZS1337.6: 2007, then coatings are not suitable for use in medium impact eye protectors.

What information can assist eye care practitioners?

It is sometimes difficult for eye care practitioners to obtain an accurate picture of the hazards in a workplace and the suitability of different forms of eye protection simply by talking to their patient/client. The best way to minimise misunderstandings and to ensure a worker is supplied with products that are suitable and which meet the budgetary requirements of the workplace is to communicate directly with the eye care practitioner and the optical dispenser. Communication is also important for eye care practitioners in the event that an individual’s spectacle prescription is unsuitable for a particular eye protector option and an alternative form of eye protection is required.

Information that eye care practitioners would find useful before prescribing and supplying prescription lenses for use with an eye protector include:

- The nature of the task
- The level of impact resistance required
- Whether tinted or photosensitive lenses are suitable and/or necessary
- Working distances
- Whether the eye protectors will be worn only for specific tasks (such as for close work) or whether the wearer will need them for a variety of tasks and working distances
- The type of eye protection that will be funded by the workplace (which will be dependant on factors such as cost and replacement frequency).

Conclusion

The introduction of the new prescription eye protector standard has expanded the options available to workers who wear prescription eyewear and who require medium impact protection. Choosing the best eye protection option for the workplace will be dependant on factors such as cost, replacement frequency, frequency of use and the wearer’s spectacle prescription.

Developing a line of communication with eye care practitioners and optical dispensers can minimise misunderstandings over the supply of eye protectors to individuals and can assist devising solutions for workers with difficult spectacle prescription needs.

References


Contact:
Jennifer Long B.Optom (Hons) M.Safety Sc. CPE
Jennifer Long Visual Ergonomics, Katoomba, NSW
jlong@visualergonomics.com.au
Also: Adjunct Lecturer,
School of Human Movement Studies
University of Queensland
Noticeboard

VALE—Cheryl Lynn Bennett

Who brought ergonomics to children and schools?

Jennifer Anderson
July 24, 2007

Cheryl Lynn Bennett, remembered best in her profession for untiring efforts to extend the benefits of ergonomics to children, passed away on July 2, 2007, at the age of 56. It was a sudden death, from heart failure, during a vacation with her family. She is survived by husband Charles and daughter Caitlin.

After receiving a B.Sc. degree from California State University in 1981 and M.Sc. in Occupational Health and Safety Engineering from Texas Tech University in 1982, Bennett went to work for the National Aeronautics and Space Administration. She moved to the Lawrence Livermore National Laboratory (LLNL) in 1986, there providing oversight for its Ergonomics Program.

Bennett’s interest in what is sometimes referred to as “schoolhouse ergonomics” expanded during her 21 years at LLNL, and she achieved considerable recognition for her work in the specialty. From 2002-2003 she was instrumental in setting up New Jersey’s Ergonomics in Education Study Commission to advise the state on integrating ergonomics into public school curricula. She noted at the time that studies show approximately 80 percent of children ages eight to 18 regularly use computers, yet tables and desks often have no relationship to the sizes of the students using them.

In her tribute, Dr. Valerie J. Berg Rice, co-editor with Rani Lueder of the handbook “Ergonomics for children ... Designing products & places for toddlers to teens” commended the late ergonomist’s wide contribution to the profession. “Cheryl wrote articles and book chapters on designing for children. She initiated the technical committee for the International Ergonomics Association on designing Educational Environments for Children, served as the committee chair, and arranged the first symposium at the IEA 2000 conference in San Diego. She worked extensively on their website, putting together the objectives, guidelines, a list of references, and a compilation of on-going research.”

The interest started as Bennett watched her daughter and her daughter’s friends during their school time in computer labs and classrooms, according to Berg Rice, and at home with school work and video gaming. “Her first efforts were to visit her daughter’s school, talk with the teachers, and explain to them how to set up a work station and why it was so very important to their health! From these humble beginnings of reaching out to her own family and friends, she moved to encourage her profession to embrace this new and important … domain.” All the while, Berg Rice added, it was more than a domain to her, and she approached the effort with all the love and belief a devoted mother and professional can bring. Most of this contribution was made as a volunteer, Berg Rice noted.

Handbook co-editor Lueder first met Bennett at a Human Factors and Ergonomics Society (HFES) meeting the late ergonomist set up “to further her efforts in creating the IEA Technical Committee on Ergonomics for Children. She was quiet, even shy,” Lueder recalled, “but determined to make a difference.” The HFES rejected my suggestion that we add a specialty category for ergonomics for children, Lueder added, because the area was seen as too specialized, and really not what human factors were about. The Society viewed human factors as really being about adults. “Well, since that time, Cheryl has made a huge difference. Ergonomics for children has become mainstream.”

In 1995 Bennett joined the International Society for Occupational Ergonomics and Safety (ISOES) The president of the society, Dr. Lawrence J. H. Schulze, was closely associated with her during that period, working with her on the IEA’s Educational Environments for Children committee. He expressed his sadness at her passing. “She originated the committee, of which I am a member,” he added, “and grew the committee into a well admired and very respected part of [the Ergonomics for Children and Educational Environments technical committee]. It has led to legislative changes in the United States and other countries focusing on providing proper ergonomic environments in schools to enhance children’s learning environments.”

In his tribute, Dr. Roger Jensen, Past President of ISOES, also commended her volunteer efforts. “Cheryl Bennett’s passing leaves a gap in the ergonomics community; especially among those who work to improve the furniture and learning conditions of schools.” He said her contributions to the ergonomics community through volunteer work as Treasurer of ISOES was not as well known. “After serving for about five years, she had to find a successor because of health problems,” Jensen explained. “... We spoke often that year while implementing the change of records. When I reviewed her records, it became apparent how much time she put in to support of the Society. She was one of the most outstanding individuals I had the privilege of knowing. Her participation in the community of ergonomists will be greatly missed.”
Berg Rice sounded the same note. “I will miss Cheryl, as will many others in our field. Not just because of the work she did or the dedication she brought, but because of who she was and what she brought out in each of us. When you met or talked with Cheryl, she listened. She affirmed. She congratulated. She encouraged. She let you know that she admired your work and how you do it. I left conversations with Cheryl feeling good about her, but also good about our profession, good about cooperatively working with other professions and good about myself. I know others felt the same way. What better legacy could a person leave?”

Like Berg Rice, Lueder was taken with Bennett’s humanity. “She had a huge heart, and the depth of her caring could be felt by anyone who spent any time with her.” Over the years, it became clear that her interest was really an expansion of her own love for her daughter, Lueder added, and a hope that all children could get the attention they deserved. “I will miss her.”

Sources: Dr. Berg Rice; Rani Lueder; Dr. Lawrence J. H. Schulze; Dr. Roger Jensen; IEA; ISOES

This item is copyright © 2007, Ergoweb Inc. Reprinted with permission. The original article can be found at http://www.ergoweb.com/news/detail.cfm?id=2131

STANDARDS AUSTRALIA UPDATE

Jennifer Long has been appointed HFESA Delegate to Standards Australia Committee SF–006 Eye and Face Protection. In November 2006 she was also appointed an Adjunct Lecturer at the School of Human Movement at Queensland University.

Following the Productivity Commission of Inquiry into Standards Australia and its commercial arm, SAI Global, there has been a thorough re-organization of the Sydney office which has moved a large part of its operation to Bridge Street, Sydney. There have been numerous staff changes and considerable disruption to committee schedules. ME-060—Controlled Environments has not been able to hold a meeting so far this year and there is a considerable amount of work pending a decision. In this situation, individual member’s networking with each other and overseas colleagues has been vital to keep abreast of overseas developments. As the editor is on the Institute of Environmental Sciences (IEST) USA mailing list she has been able to forward notices of relevant training courses on various aspects of cleanroom management to the other committee members ... there are no comparable courses being held in Australia at present. If anyone is interested, the next update by IEST will be “What you need to know about ISO 14644 for today and tomorrow” to be held as part of the “Access to Experts” ISO Series Certificate program to be conducted during the IEST Fall Conference, November 11–14, 2007 in Illinois, USA. It will cover three courses:

- Understanding the ISO 14644 Series. (ISO 14644-2)
- Testing to Determine the Classification of Air Cleanliness. (ISO 14644-1)

It would be greatly appreciated if other HFESA delegates to various SA committees would forward a progress report on their committee work for regular updates in Ergonomics Australia.

Shann Gibbs
HFESA Delegate to SA Committee ME-060
SPECIAL GONET

A Special GONET on the topic *Addressing psychosocial risks and work-related stress in countries in economic transition, in newly industrialized countries, and developing countries*, has been posted at:


The English version is in the process of being printed. French and Spanish translations are under way. Please feel free to distribute the Newsletter via email. Further editions of GONET will welcome contributions from interested practitioners offering practical examples from their country on protecting and promoting health in the workplace.

For further information contact:
Evelyn Kortum
Occupational Health Specialist
Interventions for healthy Environments
Department of Public Health and Environment
World Health Organization
Tel Direct: +41 22 792 3531
Email: kortume@who.int

*This information kindly provided by David C Caple, President IEA.*
Conference Calendar

2007

11–14 November 2007 — International Graphonomics Society 13th biennial conference, Melbourne, Australia Contact: Dr Jim Phillips Conference Co-Chair & Organizer IGS 2007 Email: jim.phillips@med.monash.edu.au http://www.graphonomics.com/igs2007/


26–29 November 2007—International Conference on Agricultural Ergonomics in Developing Countries Kuala Lumpur, Malaysia Jointly with: The IEA/ILQ Workshop on Agricultural Ergonomics Checkpoints Sponsered by IEA and ILO Safework Conference Secretariat: Damai Sciences Sdn Bhd www.damai-sciences.com Email: contact@aedec2007.org Tel: +603 2282 9005 Fax: +603 2282 9004 Dr Halimahtun M Kalid General Chair, AEDeC 2007 Chair, IEA Science Technology & Practice Committee Email: mahtun@damai-sciences.com


2008

19–23 February 2008 12th Annual BFE Meeting Biofeedback Foundation of Europe Holistic Approaches to Health Salzburg, Austria University of Salzburg, Faculty of Natural Science Contact: BFE, PO Box 555, 3800 AN Amersfoort The Netherlands Daniel Matto / Senior Administrator Email: d.matto@bfe.org Fax: +31 84 83 84 696

19–21 March 2008 — Organizational Design and Management Symposium IEA Technical Committee on Organizational Design and Management (ODAM) Guarujá, São Paulo, Brazil (a top spot by the beach!) The website for the symposium is: http://www.pro.poll.usp.br/pro/odam2008/ Contact: Patricia Monteiro Depto. de Engenharia de Produção – POLI/USP Tel: (11) 3091-5363 - Ramal 434 Fax: (11) 3091-5399 Horário: 08h00 às 14h00 Email: patricia.monteiro@vanzolini.org.br

14–17 July 2008 — 2nd International Conference on Applied Ergonomics (AE International 2008) Jointly with 12th International Conference on Human Aspects of Advanced Manufacturing (HAAMAHA) Caesars Palace • Las Vegas, Nevada USA Under the auspices of 7 distinguished international boards of 167 members from 29 countries Conference Chair: Gavriel Salvendy salvendy@purdue.edu Program Chair: Waldemar Karwowski karwowski@louisville.edu Conference Administrator: Laura Abell laurajere@peoplepc.com Fax: + 1 502 852 7397 Communication & Exhibition Chair : Abbas Moallem Abbas.Moallem@sjsu.edu URL: www.AEI2008.org
Information for Contributors

Articles published in Ergonomics Australia are subject to peer review.

Editor
Dr Shirleyann M Gibbs
Gibbs + Associates Pty Ltd
25 Melaleuca Drive St Ives NSW 2075 Australia
Tel: +612 9983 9855 Fax: +612 9402 5295
E-mail: shanng@optushome.com.au

The intended deadline for issues in 2007:

March edition February 1
June edition May 1
September edition August 1
December edition November 1

Contributions
Any inquiries about contributions should be directed in the first instance to the Editor.

Information for Advertisers

Inquiries
All advertising inquiries should be directed to the National Secretariat of the Society.

Contact
The Human Factors and Ergonomics Society of Australia Inc
P O Box 7848 Balkham Hills BC NSW 2153
Tel: +612 9680 9026 Fax: +612 9680 9027
Email: secretariat@ergonomics.org.au

Size
The finished page size of the Newsletter is A4 (210mm x 297mm)

Printed column sizes are 165mm x 225mm (double) or 80mm x 225mm (single)

Advertising Copy
Must be camera ready and must arrive at the HFESA Federal Office by the Copy Deadline Submission Date for the Edition in question.

A professional advertising service is available for producing camera ready copy if required. For further inquiries regarding this service contact:

Mr Goro Jankulovski, Acute Concepts Pty Ltd
Tel: 03 9381 9696
Mobile: 0414 605 414
E-mail: goro@acuteconcepts.com.au

Rates for Advertising
These rates are inclusive of GST

<table>
<thead>
<tr>
<th></th>
<th>Full page</th>
<th>1/2 page</th>
<th>1/4 page</th>
<th>1/8 page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single issue</td>
<td>$ 330.00</td>
<td>$ 165.00</td>
<td>$ 82.50</td>
<td>$ 41.80</td>
</tr>
<tr>
<td>2 issues</td>
<td>$ 297.00</td>
<td>$ 148.50</td>
<td>$ 74.80</td>
<td>$ 37.40</td>
</tr>
<tr>
<td>3 issues</td>
<td>$ 264.00</td>
<td>$ 132.00</td>
<td>$ 66.00</td>
<td>$ 33.00</td>
</tr>
<tr>
<td>4 or more</td>
<td>$ 231.00</td>
<td>$ 115.50</td>
<td>$ 58.30</td>
<td>$ 29.70</td>
</tr>
</tbody>
</table>

Enclosures
Pre-printed enclosures (leaflets, brochures) etc are welcome for inclusion with the Journal.

Enclosures should be pre-folded to fit inside the finished Journal.

Rates for enclosures

| Enclosure not requiring folding | $ 412.50 |
| Enclosure requiring folding    | $ 462.00 |
These rates may increase if the enclosure weighs more than the equivalent of 2 standard weight A4 pages. These rates are inclusive of GST.

640 copies should be sent to arrive at the ESA Federal Office by the Copy Deadline Submission Date for the Edition in question.

Address for mailing Advertising copy and/or enclosures
National Secretariat
The Human Factors and Ergonomics Society of Australia Inc.
P.O. Box 7848 Balkham Hills BC NSW 2153

Advertizing copy and enclosure submission deadlines for 2007 are the same as for Contributions – 1st of month prior to publication

<table>
<thead>
<tr>
<th>Edition</th>
<th>Submission Deadline</th>
</tr>
</thead>
<tbody>
<tr>
<td>March</td>
<td>February 1</td>
</tr>
<tr>
<td>June</td>
<td>May 1</td>
</tr>
<tr>
<td>September</td>
<td>August 1</td>
</tr>
<tr>
<td>December</td>
<td>November 1</td>
</tr>
</tbody>
</table>

Circulation
The Journal is published four times a year and is received by approximately 620 professional’s Australia wide working in the areas of ergonomics, occupational health and safety, and design.

Ergonomics Australia On-Line (EAOL)
Advertising and sponsorship opportunities also exist in the electronic version of this journal (EAOL) which is managed by Dr Robin Burgess-Limerick at Department of Human Movement at Queensland University. It is downloaded by more than 100 Australian and International readers each week.

To view EAOL: http://www.uq.edu.au or enter via the HFESA website.

Caveats
The views expressed in the Journal are those of the individual authors and contributors and are not necessarily those of the Society.

The HFESA Inc reserves the right to refuse any advertising inconsistent with the Aims and Objectives of the Society and Journal Editorial Policy.

The appearance of an advertisement in the Journal does not imply endorsement by the Society of the product and or service advertised.

The Society takes no responsibility for products or services advertised therein.

Editor
Shirleyann M Gibbs PhD
E-mail: shanng@optushome.com.au
Surface Mail

If undelivered return:

NSW 2153
Baulkham Hills BC
PO Box 7848
HEFSA

Print Post Approved PP 233744/00112