Elementary School Teachers' Working Comfort while Using Computers in School and at Home

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This survey of Oregon's elementary school teachers addressed four questions. First, to what extent do teachers use computers in school and at home? Second, what tasks do they perform? Third, how comfortable are they when using the computer? Fourth, if they are uncomfortable, do they know how to adjust their workstations ergonomically? Two hundred and eighteen elementary school teachers surveys were returned (a response rate of 32%). Teachers on average used the computer between 1-2 hours in school and 2-3 hours at home. They created lesson plans and material, performed administrative tasks, did Internet searches and used e-mail. Forty three percent used the computer as a teaching tool. Eighty percent responded that they have experienced discomfort during computer use both in school and at home. The discomfort was primarily in the neck and shoulders, lower back, wrists and eyes. It is suggested that ergonomic awareness training needs to be included in teacher training and in school districts in service programs.

Introduction

With the introduction of computers in schools teachers have received a new tool to prepare their work and educate students. Ninety-nine percent of U.S. schools have access to computers in computer labs and classrooms and the student computer ratio, averaged across the nation, has reached of 5:1. (NCES, 2001). According to the Report from the President's Committee of Advisors on Science and Technology (1997) this ratio level is adequate to allow for effective use of computers in schools. Computer availability has resulted in an increased computer use by teachers but not in an increased use of this technology as a teaching tool (OTA, 1995, NCES, 2000).

Teachers' comfort during computer use has not been addressed in previous surveys of teachers' computer use. Working comfort experienced by computer users in offices has been studied extensively (NIOSH, 1997, Tittiranonda, Burastero, and Remple,

1999). A majority of these studies show that inadequate ergonomic design of the computer workstation is one factor that contribute to the development of musculoskeletal illness and injury as well as computer vision syndrome (Sheedy, 1992). When office employees receive ergonomics awareness training and workstation adjustments are made to fit their individual needs, working comfort improves and risks for developing illness and injury are reduced (Tadano, 1990, Carter and Banister, 1994, Aaras et al 1998, OSHA, 2000). Teachers do not receive any computer ergonomics instruction in their educational technology education programs or in their professional development training. Eighty-eight percent of elementary school teachers in Oregon lack knowledge about ergonomics (Williams 2000). If computer use among teachers keeps increasing ergonomics awareness will become important for this population too.

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Method

Six hundred eighty-four surveys were sent to a representative sample of 228 elementary schools in Oregon. The schools administered the surveys to their teachers, information specialists, and librarians. The survey was divided into five sections that addressed the following areas:

1. Teachers concerns over their own and students' workstation set up and work habits.
2. Perceived postural and visual comfort among students as reported by teachers and among teachers themselves.
3. Students and teachers daily computer use.
4. Teachers computer skills and ergonomics background.
5. Teachers views on introducing an ergonomics program in elementary school.

Williams et al, (2000) discussed issues related to the students' computer use and teachers views on introducing an ergonomics education program for students in elementary school.

Results

Two hundred eighteen surveys were returned (32% of total surveys distributed). Fifty one percent were from teachers in grades K-6th, 10% computer teachers, 18% librarians, 13% information specialists, and 8% principals. The number of computer teachers, librarians, and information specialists that responded was too small to make statistically meaningful comparisons. The subgroups are thus collectively referred to as teachers.

Teachers computer use

In school, teachers used the computer for 1-2 hours (on average), mostly divided into a few 15-30 minute periods of continuous use per day. Ninety-one percent of these elementary school teachers in Oregon have computers at home. There, they used the computer on average between 2-3 hours, mostly broken down into 45 - 60 minute periods of continuous use.

Type of computer tasks

In school, 85% of teachers made lesson plans and teaching materials for their classes. Fifty percent prepared their student/parent /teacher conference reports and 76% accessed the Internet. Less than half of the teachers, 43%, used the computer as a teaching tool in their classroom or in the computer lab. At home, 73% prepared their lesson plans and made teaching materials for class. Only 30% prepared their conference reports and 69% accessed the Internet. These findings have the same trends as reported in NCES's report "Teacher' tool for the 21st century" (2000).

Working comfort

Although teachers were using computers for a shorter period of continuous time in school compared to home they experienced an equal amount of discomfort in both places. Figure 1 shows the percent of teachers that experienced discomfort in different parts of their body during computer use in school. The primary areas of concern were neck and shoulders, 38% and 37% respectively, back, 20%; wrists, 24%; and eyes, 34%.

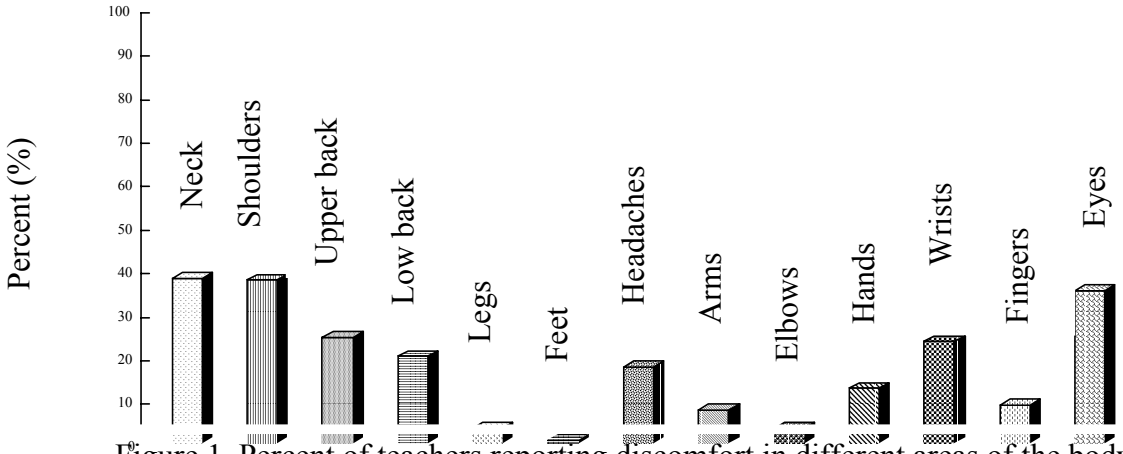

Figure 1. Percent of teachers reporting discomfort in different areas of the body during computer use in school (N=218)

parts of their body during computer use at home. The primary areas of concern were also neck and shoulders, both 35%, back 20%, wrists 21% and eyes 33%.

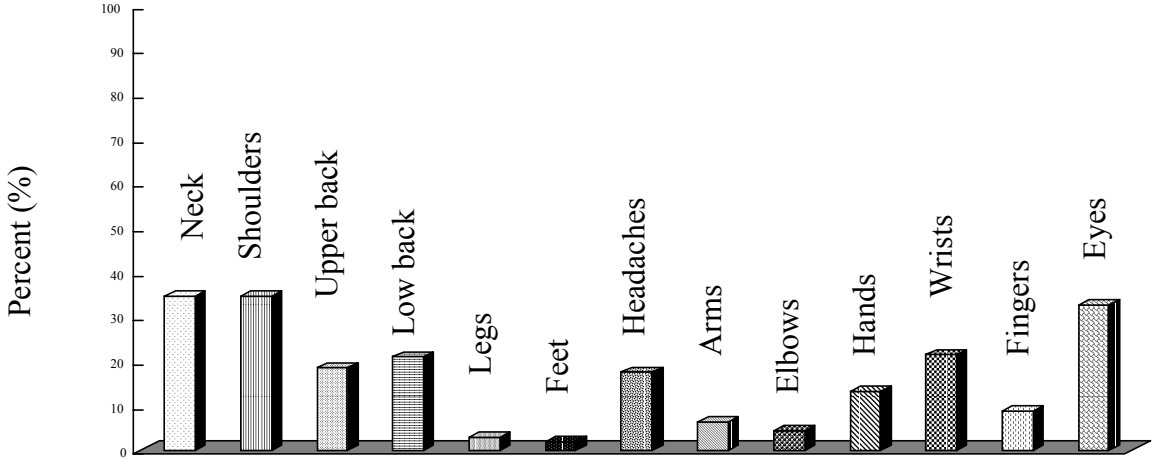

Figure 2. Percent of teachers reporting discomfort in different areas of the body during computer use at home (N=197)

Teachers' areas of discomfort are similar to those of an office population who use computer for extended periods of time.

Ergonomic knowledge

In school, 44% had concerns about their computer workstation set up. Table and keyboard heights, chair sizes and types are primary features of the workstation that created concerns. At home, 30% had concerns with their set up. Here the type of chair they use is the primary feature.

Seventy one percent thought it was important to introduce a computer ergonomics program for teachers. Fourteen percent said it might be important, 32% marked important, 25% reported it as very important. Fourteen percent would like to see that ergonomics training for teachers becomes mandatory.

Discussion

It is important to stress that we did not ask if teachers had musculoskeletal disorders, only if they had experienced *discomfort during computer use*. The presence of discomfort does not imply that these teachers are at risk for developing musculoskeletal disorders during their computer use. We have several more questions to ask in order understand the underlying reasons for their discomfort and to assess if they are at risk at all. Williams and Rodgers (1997) found that information about presence of discomfort, by itself, could be misleading. Both frequency and intensity measures of discomfort are required to obtain a fair measure of its severity. However, the fact that teachers are uncomfortable and show similar concerns to those reported by office workers warrants that we take a closer look at their computer workstation conditions both in school and at home.

There are numerous ergonomics awareness training programs available to office employees to help them improve working comfort. Similar programs need to be adapted to teachers work environments in school and at home. The ergonomic problem solving they will need to adopt cannot and need not require purchase of expensive office equipment. An ergonomically sound workplace does not require expensive equipment but depends on an understanding and proper application of practical ergonomic principles.

A practical ergonomics education program could be included in school districts in service training. Such an approach would benefit both teachers and their students and the training could immediately be applied in classrooms and compute labs. A pervasive approach to reduce musculoskeletal disorders among computer users could capitalize on our school system to provide early intervention and proactive education. Through our schools we can increase ergonomic awareness just as we do in health education programs on healthy nutrition, exercise, personal safety and drug use. Using computers safely should become a reflex, just like using a seat belt in a car.