



Occupational Safety and Health Training for Teleworkers: *Findings from a Research Study Conducted for the National Institute for Occupational Safety and Health*

The purpose of this research study was to reduce the risk of occupational injury and illness to employees who telecommute from their homes (telework). Researchers at Harrington Software Associates, Inc. developed and evaluated a web-based safety training program for teleworkers, titled *Home Office Safety*. The program consisted of five courses: (1) *Accidents, Security, and Disaster Planning*, (2) *Electrical Safety*, (3) *Ergonomics*, (4) *Fire Safety*, and (5) *Indoor Air Quality*. Each course included text, graphics, animation, and sound to create a fully-interactive, media rich learning environment.

Researchers evaluated the program in a national field test with 380 teleworkers from 12 federal and state agencies and 42 private companies. Participants teleworked in 37 states and the District of Columbia. The research study was funded by the National Institute for Occupational Safety and Health, as part of a SBIR grant R44 OH 007461.

NOTE: This study was conducted pursuant to the Centers for Disease Control & Prevention, National Institute for Occupational Safety and Health, Grant Number 2 R44 OH07461. The statements and conclusions herein are those of the authors and do not necessarily reflect the views or policies of the sponsoring agency.

Findings resulting from this research are summarized below:

1. *There is a need for teleworker safety training.*

Prior to completing the teleworker training, participants in the study completed a registration form and pretest. At registration, thirty-eight percent of teleworkers reported experiencing work-related discomfort, soreness, or pain while teleworking. People who teleworked more days per week reported a greater incidence of work-related discomfort ($r = .315$, $p = .0005$). The most common complaints were pain to the back, wrists, neck, and shoulders.

Researchers found that 120 participants (32%) purchased all of their own office equipment. Without training, participants may make poor ergonomic choices when selecting equipment. A survey of ergonomic devices at registration found that while 90% of participants ($n = 342$) reported having an adjustable office chair in their

home office, fewer than half of participants had a document holder (42%, $n = 160$), wristrest (41%, $n = 156$), adjustable task lighting (40%, $n = 152$), adjustable keyboard tray (37%, $n = 141$), mousepad (29%, $n = 110$) or telephone headset (29%, $n = 110$). Participants reported spending 76% of their teleworking time using a computer, underscoring the need for correct ergonomic practices.

At pretest, participants did not know many basic safety concepts related to ergonomics, fire safety, electrical safety, indoor air quality, and accident prevention. More than half of the participants ($n = 220$, 58%) reported at registration that they did not have a home disaster plan and nearly half ($n = 160$, 42%) did not have a home fire emergency plan. Six participants (2%) reported having a home office accident serious enough to result in an injury. Two participants (1%) reported having a home office fire.

2. *Despite the need for training, most teleworkers have not received teleworker safety training.*

Three hundred and thirteen participants (82%) had not received previous teleworker safety training. Of the 67 participants who had received training, 38 had completed training in preventing accidents, 54 had completed ergonomics training, 35 had completed fire safety training, 30 had completed electrical safety training, and 8 had completed indoor air quality training.

3. *“Home Office Safety” significantly improved the safety knowledge, attitudes, and practices of teleworkers.*

Participants who completed the training significantly increased scores from pre- to posttest for each course and each subtest (knowledge, attitudes, practices). Overall, participant scores improved 35% for knowledge, 11% for attitudes, and 16% for practices.

4. *After completing the “Ergonomics” course, teleworkers reported significantly less work-related pain and discomfort.*

Participants who completed the ergonomics course reported significantly less discomfort in their shoulders and wrists one month after completing the ergonomics training. Specifically, the severity of their shoulder pain ($t=2.11$, $df = 30$, $p=.043$) and the overall discomfort index for the shoulder decreased significantly ($t=2.53$, $df = 30$, $p=.017$). The severity of wrist pain ($t=2.18$, $df = 30$, $p=.037$), frequency of wrist pain ($t=2.80$, $df = 30$, $p=.009$), and overall discomfort index for the wrist ($t=3.07$, $df = 30$, $p=.005$) also decreased. When the total discomfort scores of participants who completed the ergonomics training were compared to those of a Control Group (no training), the trained participants had significantly less self-reported discomfort ($F(1, 73) = 5.0917$, $p = .027$).

5. “Home Office Safety” led to positive changes in work habits, home office design, and the prevalence of safety devices.

Researchers found that safety training can lead to positive changes in work habits, home office design, and the prevalence of safety devices. In a follow-up study, 66% of participants reported making changes to their home offices or work habits after completing the training. The most commonly reported changes were:

- organized, cleaned, and reduced clutter;
- organized electrical cords and cables;
- ergonomically adjusted office chairs;
- evaluated and/or modified office lighting;
- adjusted and/or relocated computer monitors;
- evaluated and/or relocated desks to eliminate glare on computer screens;
- removed candles from home office;
- evaluated the electrical load and relocated electrical devices to reduce the load;
- replaced batteries in smoke alarms;
- tested smoke alarms;
- inspected fire extinguishers;
- developed fire emergency plans;
- improved the home office air circulation;
- tested for radon; and
- removed extension cords.

The most common changes participants reported making to their work habits were:

- maintained an increased awareness of hazards and safety issues;
- added ergonomic stretches and exercise to the daily work routine;
- maintained an increased awareness of posture;
- conducted regular safety inspections and assessments;
- kept exterior doors locked when working at home;
- closed office blinds at night;
- discontinued burning of candles in the home office; and
- monitored office temperature and humidity levels.

In a survey of specific devices in home offices at registration and follow-up, participants reported having significantly more safety devices one month after the training than they had reported at registration. Participants reported having added:

- smoke alarms;
- flashlights;
- fire extinguishers;
- document holders;
- wristrests;

- adjustable task lighting;
- keyboard trays;
- headsets;
- carbon monoxide detectors;
- temperature gauges; and
- humidifiers.

6. Participants positively evaluated “Home Office Safety”.

At the conclusion of the training, participants responded to seven statements about the usefulness and format of the program. The choice of responses were: “Agree,” “Disagree,” and “No Opinion.”

Home Office Safety Training Course Evaluation Results

Evaluation Items	N	Agree	Disagree	No Opinion
1. The training program was useful to me as a teleworker.	186	179 (96%)	2 (1%)	5 (3%)
2. The information in this program was interesting to me personally.	186	179 (96%)	1 (1%)	6 (3%)
3. The prevention ideas were useful.	185	182 (98%)	0 (0%)	3 (2%)
4. I learned a great deal from this program.	186	162 (87%)	5 (3%)	19 (10%)
5. I will recommend this program to others.	186	163 (88%)	1 (1%)	22 (11%)
6. I would like to use the computer for future training courses.	186	176 (95%)	2 (1%)	8 (4%)
7. The computer was easy to use for training.	185	185 (100%)	0 (0%)	0 (0%)

In conclusion, while there is a clear need for teleworker safety training, a large majority of teleworkers are not currently receiving training in important home office safety topics, such as ergonomics, fire safety, electrical safety, indoor air quality, accidents, security, and disaster planning. The results of this study demonstrate that teleworker safety training can significantly improve the safety knowledge, attitudes, and practices of teleworkers. More importantly, when teleworkers receive safety training, they make positive changes to their home offices and work habits that improve their safety and reduce their work-related discomfort. As the teleworking workforce escalates, it is vitally important for employers to provide safety guidance and training to their home-based workers.