

GLOVE USE AND EDUCATION IN WORKERS WITH HAND-ARM VIBRATION SYNDROME

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1. INTRODUCTION

Hand-arm vibration syndrome (HAVS) is an occupational disorder with vascular, neurological and musculoskeletal symptoms in the upper extremity developing after exposure to hand-transmitted vibration. The literature is relatively silent with respect to actual experiences of workers regarding training and education related to the use of gloves in the prevention of occupational diseases such as HAVS.

There is some evidence that anti-vibration gloves, certified according to International Standards, effectively prevent and limit the development of HAVS (Jetzer et al., 2003, Mahbub et al., 2007). The use of work-appropriate gloves not only benefits the employee by improving comfort, reducing fatigue and protecting against disease, but also benefits the employer by improving productivity and decreasing health-related expenditures associated with employee illness (Jaeger, 2006, Garner, 2001, Shibata and Maeda, 2008). It is important to educate workers regarding appropriate glove use as a preventive measure.

Despite the aforementioned benefits of wearing gloves, many workers exposed to hand-transmitted vibration are not compliant with their use. Reasons include bulky glove designs, loss of dexterous movements, decreased ability to manipulate workplace objects, and decreased comfort (Jaeger, 2006, Akbar-Khanzadeh et al., 1995). Furthermore, without appropriate glove education, some employees may use gloves inappropriately. In terms of glove provision, the high costs of specialized gloves and the need for frequent replacement may deter employers from supplying such appropriate safety equipment (Jaeger, 2006, Shibata and Maeda, 2008). The literature is silent regarding the current state of glove use and education for workers who have developed HAVS.

The objective of this study is to describe the current education practices related to glove use and the relationship between glove use education and glove use compliance

2. METHODS

The study was approved by the Research Ethics Board at St Michael's Hospital and the University of Toronto.

2.1. Questionnaire

A self-administered questionnaire was developed for this study with input from the inter-professional research team at the St. Michael's Hospital Occupational and Environmental Health Clinic (SMHOEHC). The questionnaire was 7 pages in length, including a total of 38 questions exploring the following themes: participant demographics, workplace characteristics, workplace exposures, protective glove characteristics, glove use compliance, provision of glove use education, and glove supply characteristics.

2.2. Participants

Participants included consecutive patients presenting to SMHOEHC in Toronto, Ontario for investigation of HAVS. On arrival at the Clinic they received information about the study and the questionnaire to complete. Data collection occurred from March to May 28, 2010, inclusive.

2.3. Data Analysis

One hundred and two of 106 HAVS questionnaires distributed were returned, resulting in a response rate of 96%. Of those 102, 9 were excluded due to incomplete responses or multiple conflicting responses making the questionnaire responses invalid. A total of 93 were used for data analysis.

The data were entered and analyzed using SPSS version 16.0. Frequencies and percentages were calculated on all binary and categorical data. Descriptive statistics were thus performed to: (1) determine percentage of workers presenting with HAVS that wear gloves; (2) determine when education was received by workers; (3) determine methods of education provision to workers; (4) determine content of information provided to workers, and; (5) determine workers' perceived barriers to glove use. To determine if any correlations were present between education of workers and glove use, a Pearson chi-square test (Fisher's Exact test) was performed.

3. RESULTS

The mean age for HAVS workers was 50 years and all were male. Forty two percent were not working at the time

of questionnaire completion, 72% lived in urban regions, and 67% had been employed for more than 20 years. Seventy one percent were employed in the construction sector, and 13% in the electrical sector. Eighty seven percent worked in unionized workplaces. Of those not working, 20% noted that their HAVS was the reason they were not working.

Eighty-eight percent reported the presence of a workplace joint health and safety committee, 87% reported receiving occupational health and safety training, and 97% reported receiving Workplace Hazardous Materials Information System (WHMIS) training.

3.1. Glove Use and Education

Eighty seven percent of HAVS participants have worn protective gloves at some point during their career. Sixty seven percent reported wearing some type of gloves when exposed to workplace hazards, however, 87% of these workers did not wear the most protective form of anti-vibration glove.

A minority of workers received protective glove use education either in school (7%) or work (45%). Predominantly, glove education was provided prior to work initiation (60%), but the second most common time for education provision was more than one year after employment started. Employers were primarily responsible for educating these employees with the most frequent method of delivery being seminars (37%) or videos (25%). The two most common components of education were tasks necessitating glove use (31%), appropriate glove type for a given task (26%), and glove disposal (19%).

3.2. Barriers to Glove Use

The perceived barriers to glove use include, in descending order: lack of supply, decreased comfort, and feelings of restraint and bulkiness. Ninety two percent of patients with HAVS stated employers were responsible for supplying gloves, and 25% of HAVS participants did not receive gloves having requested them from their employer.

3.3. Correlation Between Glove Use and Education

Pearson chi-square analysis revealed a statistically significant relationship between workplace education and glove use; those who reported wearing gloves were more likely to report having received education ($p < 0.005$).

4. DISCUSSION AND CONCLUSIONS

The findings suggest that most workers received basic occupational health and safety training, and training related to hazardous workplace materials. This may be partly due to the fact that the majority of workers worked in unionized environments. Glove education and training was reported by a minority of workers. The reported delivery methods

for training and education varied with the two most common being seminars and videos. Seminars have the potential to allow hands-on training with the workers being able to ask questions. This method would facilitate the opportunity to try on different types of gloves and determine appropriate glove size. Attention to such details might increase workers' use of appropriate gloves.

The barriers workers reported to glove compliance included discomfort and difficulty using the gloves because of restraint and bulkiness. These are similar to what others have reported (Jaeger, 2006; Akbar-Khanzadeh et al., 1995). However, the workers raised the additional issue of lack of availability of gloves. This may be a problem with glove availability at the worksite as well as being readily available at local stores. Both these factors would impede workers from using the appropriate anti-vibration gloves. It also raises the question of who is responsible for supplying workers with their protective equipment. This may vary depending on the jurisdiction. On a positive note, workers who reported receiving training were more likely to report the use of gloves. Whether this is totally due to the training and education they received or whether it reflects other facilitative aspects of their workplace is not known. A workplace that provides training and education may also be more likely to supply gloves and encourage their use than organizations that do not provide education and training. While it is not possible to be certain, it does suggest that the provision of education and training is associated with improved glove use.

REFERENCES

- Jetzer, T., Haydon, P., and Reynolds, D. (2003). "Effective intervention with ergonomics, antivibration gloves and medical surveillance to minimize hand-arm vibration hazards in the workplace," *J. Occup. Environ. Med.*, **45**, 1312-1217.
- Mahbub, M. H., Yokoyama, K., Laskar, S., Inoue, M., Takahashi, Y., Yamamoto, S., and Harada, N. (2007). "Assessing the influence of antivibration gloves on digital vascular responses to acute hand-arm vibration," *J. Occup. Health*, **49**, 165-171.
- Jaeger, E. (2006). "Dexterity in work gloves – a touchy subject," *Occup. Health Safe.*, **75**, 74-78.
- Gamer, L. (2001). "Making sense of hand protection," *Occup. Health Safe.*, **70**, 75-79.
- Shibata, N., and Maeda, S. (2008). "Vibration-isolating performance of cotton work gloves based on newly issued JIS T8114," *Ind. Health*, **45**, 477-483.
- Akbar-Khanzadeh, F., Bisesi, M. S., and Rivas, R. D. (1995). "Comfort of personal protective equipment," *Appl. Ergon.*, **26**, 195-198.

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