

Prevention programs for health-care workers

Health-care workers face a high risk of developing injuries to their muscles, tendons, nerves or other soft tissues of the body. In particular, they are at risk of developing back pain. These types of injuries are known as musculoskeletal disorders (MSDs).

One of the main causes of MSDs in health-care workers arises from handling patients. Activities such as lifting or transferring patients place high levels of force on the low back, far exceeding the lifting limits recommended by the U.S. National Institute for Occupational Safety and Health. Reports from health-care workers confirm this fact. In 2005, for example, 60 per cent of Canadian nurses said their jobs presented high physical demands. Recent research also suggests that injuries in health-care settings may result from activities such as patient-related assaults, slips, trips and falls.

There are a variety of programs that aim to prevent or reduce back pain and other MSDs among health-care workers. The major focus has been the use of mechanical patient lifts or other patient handling equipment. Other examples of interventions are education programs, physical exercise programs and organizational policies.

Surprisingly, except for one review on injury prevention in patient lifting, no systematic reviews have been conducted on this broad spectrum of programs. Facility managers, ergonomic consultants and others must therefore choose programs with limited scientific evidence to show what does and does not work.

The Institute for Work & Health conducted a systematic review to address this gap. The goal

Key messages

There is moderate evidence that prevention programs in health-care settings have a positive effect on protecting workers' musculoskeletal (MSK) health. Moderate evidence means at least two studies of medium-high quality agree on the same findings. There is also moderate evidence that these two interventions have a positive effect:

Patient handling programs with the following three components:

- a worksite policy change, such as zero-lift policies
- new patient handling equipment, such as overhead lifts or floor lifts
- training on the equipment and on patient handling.

Exercise training programs, consisting of aerobic or strength training exercises, or both.

was to identify studies that evaluated MSD prevention or control programs in health-care workers. Specifically, the question the review team addressed was: *Do occupational safety and health interventions (OHS) in health-care settings have an effect on musculoskeletal (MSK) health status?*

How did the review proceed?

An important aspect of the review was to include stakeholders from the health-care sector. We met with representatives from hospitals, nursing homes, government agencies, professional associations, insurance companies and lift manufacturing companies. These meetings were held at Institute for Work & Health in Toronto, Canada and at the University of Texas School of Public Health in Houston, U.S.A. Feedback from these participants helped ensure that our research question and final messages would be relevant.

The review team searched six electronic databases for research articles in English, Spanish, French or Swedish. We sought articles that had been peer-reviewed by independent scientists. Our search strategy combined terms that fell under the following three categories: intervention, health-care setting and musculoskeletal health outcome. An example would be “work safety” and “nursing homes” and “tendonitis.” In total, 8,465 potential articles were identified. We excluded 8,350 studies after looking at the titles and abstracts as they lacked relevant information to answer the research question. We reviewed the full paper for the remaining 115 studies. We excluded another 67 articles because they lacked relevance and pooled eight articles that reported on the same study.

Forty studies remained. In the next stage we assessed the quality of the methods in these studies. We used 19 quality criteria, assigning a weight to each one based on its importance. For example, one quality criterion was the question, “Were concurrent comparison (control) group(s) used?” It had the highest weight of four.

Each study was then scored. Based on the score, it was ranked from high quality to limited quality (see Table 1). We chose studies ranked medium-high or high for our analysis. Although the information from both medium and limited quality studies was considered relevant, we were concerned that the methods reported in the papers did not provide enough confidence to support their findings. A further 24 relevant studies of medium or limited quality were then excluded.

Table 1: Quality ratings

Quality rating	Required score (%)	Number of studies
High	80 or higher	2
Medium-high	60-79	14
Medium	40-59	20
Limited	less than 40	4
Total		40

This left 16 studies. We recorded details from each study to summarize results and to develop our overall conclusions.

What were the main findings?

In answer to the overall research question, we found a moderate level of evidence for the effect of OHS interventions on MSK health status in health-care settings (see Table 2). This means that at least two medium-high quality studies showed that there were programs that had a positive effect. Some examples of positive effects reported in different studies were: reductions in injury rates requiring time off work or improvements in self-reported low-back pain. We did not find evidence that any program from the 16 studies had a negative health effect.

Table 2: Levels of evidence

Level of evidence	Minimum quality	Minimum number of studies	Consistency of findings
Strong	High	Three or more	All high-quality study results converge
Moderate	Medium-high	Two or more	Majority of medium-high quality study results
Mixed	Medium-high	Two or more	Medium-high and better quality study results are inconsistent

We found moderate evidence that two specific programs had a positive effect: patient handling with multiple components and exercise training.

Multi-component patient handling: Multi-component patient handling interventions included three components:

- a policy change at the worksite (e.g. zero-lift policies)
- the purchase and implementation of new

patient handling equipment, such as overhead lifts or floor lifts

- training on the new equipment and on patient handling

We found three studies of medium-high quality that evaluated interventions with all three components. Two studies showed positive effects. In one study, the positive effects were reductions in lost or restricted workdays, in injury rates and in workers' compensation rates 36 months after the intervention began. In the second study, there was a reduction in low-back and shoulder pain reported by workers after 12 months. The third study showed no effects.

Exercise training: Six studies evaluated exercise training programs. Most of these were targeted at health-care workers who already had pain. Four studies described exercise training as general "physical fitness" or "calisthenics," while two described exercises that specifically improved strength / endurance. Two studies were high quality and four were medium-high quality. All six studies showed positive health effects. Specifically, there were declines in pain symptoms reported by workers. These symptoms included, for example, reductions in the frequency, intensity or duration of pain.

With respect to other interventions, there was insufficient evidence that they had an effect in preventing MSDs. The reason is because only one study evaluated them. "Insufficient" did not refer to their quality. Future research might strengthen the evidence for any of these programs. Some examples are:

- an ergonomic training program for the back and exercise training
- cognitive behavioural training, such as relaxation training
- an intensive off-site MSD prevention program including exercise, ergonomic and behaviour training

What is a systematic review?

A systematic review is a type of study. It aims to find an answer to a specific question using existing research studies. Reviewers will assess many studies, select relevant, quality studies, and analyze the results. The review normally includes the following steps:

- determine the question
- develop a search strategy and search the research literature
- select studies that are relevant to the research question
- assess the quality of the methods in these studies and select studies of sufficient quality
- systematically extract and summarize key elements of the studies
- describe results from individual studies
- combine results and report on the evidence

To help shape the research question and frame our findings, we rely on feedback from non-research audiences who are interested in specific topics.

The Institute for Work & Health has established a dedicated group to conduct systematic reviews in workplace injury and illness prevention. Our team monitors developments in the international research literature in this field and selects timely, relevant topics for review.

We appreciate the support of the Ontario Workplace Safety & Insurance Board (WSIB) in funding this four-year Prevention Systematic Reviews initiative.

Sharing Best Evidence is prepared by the Knowledge Transfer & Exchange staff at the Institute for Work & Health. Each issue is available on our website. To request to be notified of new issues, send a request to info@iwh.on.ca.

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The Institute for Work & Health operates with the support of the Ontario Workplace Safety & Insurance Board.

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What was missing in the research?

Based on our criteria, at least three high quality studies with consistent findings were needed to have “strong evidence” supporting prevention programs. Overall, we only found two high quality studies.

Future research

Three issues of interest emerged while conducting this review. In raising these issues, we hope to inspire future researchers conducting systematic reviews to solve problems creatively. We also hope it will help readers interpret review findings and in decision-making.

In this review, we worked with “administrative outcomes.” Examples of administrative outcomes are insurance claims or injury reporting records required by regulation. We think these outcomes are important to many decision-makers who rely on them for regulatory reporting. For example, workers’ compensation claims can be used to estimate the economic burden associated with workplace injuries. (In comparison, another type of outcome is self-reported outcomes, such as a worker’s report of pain.)

We need to be cautious in using administrative outcomes. Many studies using these types of records reported information from the workplace as a whole. A study with a stronger design would instead track a program’s effect on individual workers who are present at the start of the program. Injured workers may leave their jobs and new, healthy workers may replace them during a study. This would not be captured by looking at overall workplace injury records, and the prevention program may seem to work better than it actually did. These studies may be biased by what is known as a “healthy worker effect.”

Conclusions and recommendations

The review team felt that stronger levels of evidence were needed before making any policy or best practice recommendations. However, given the evidence found, we considered it feasible to recommend several “practices to consider.”

The first practice to consider is **multi-component patient-handling interventions**. The intervention components must include a change in policy at the worksite, the implementation of new patient handling equipment and training. Because these intervention components are bundled, we cannot comment on whether one component on its own is as good as the bundle.

The second practice to consider is **exercise training programs**, with either aerobic and strength training exercises or both. Exercise has the added benefit of improving general health and reducing the risk of many chronic diseases.

An important message is that the current state of peer-reviewed research has limited high quality evidence to support the MSK health benefits of prevention programs in hospitals, long-term care facilities and other health-care establishments.

Given the known problems with MSDs among health-care workers, we are frustrated that we are unable to make stronger recommendations. The overwhelming message from our review is that more high quality research must be produced. We consider this a priority. Well-designed studies, in which measurements are clearly described, are sorely needed before policy conclusions on specific interventions can be made.

These findings are based on the report *Interventions in health-care settings to protect musculoskeletal health: A systematic review* by Benjamin C. Amick III, Jessica M. Tullar, Shelley Brewer, Emma Irvin, Lisa Pompeii, Anna Wang, Dwayne Van Eerd, David Gimeno and Bradley Evanoff.

The full report is available at www.iwh.on.ca

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