An evaluation of a "best practices" musculoskeletal injury prevention program in nursing homes

Collins J W, Wolf L, Bell J, Evanoff B

Record Status
This is a critical abstract of an economic evaluation that meets the criteria for inclusion on NHS EED. Each abstract contains a brief summary of the methods, the results and conclusions followed by a detailed critical assessment on the reliability of the study and the conclusions drawn.

Health technology
A "best practices" musculoskeletal injury prevention programme was evaluated in nursing homes. The programme comprised mechanical equipment to lift physically dependent residents, training in the proper use of the lifts, a medical management programme, and a zero lift policy. The medical management programme consisted of a 30-minute section of training and demonstration at the beginning in groups of 10 to 20 nursing staff, then 45 minutes of additional skills based in groups of 2 nursing staff at a time. The zero lift policy stipulated no manual lifting of nursing home residents unless they could be safely transferred by any other means.

Type of intervention
Primary prevention.

Economic study type
Cost-benefit analysis.

Study population
The study population comprised nurses with jobs that regularly expose them to resident handling, such as certified nursing assistants, registered and licensed practical nurses, physical therapists, and restorative aides.

Setting
The setting was a nursing home. The economic study was carried out in the USA.

Dates to which data relate
The effectiveness and resource use data were gathered from January 1995 to December 2000. The price year was not reported.

Source of effectiveness data
The effectiveness evidence was derived from a single study.

Link between effectiveness and cost data
The costing was performed retrospectively on the same sample of patients as that used in the effectiveness study.

Study sample
Power calculations were not reported. During the 6-year period, a dynamic cohort of 1,728 nurses worked a total of 3,714,700 work-hours (1,841,236 hours in the pre-intervention phase and 1,873,549 hours in the post-intervention phase). Of the whole sample of nursing staff, 48% were present for only one year of data collection, 26% for 2 years,
9% for 3 years, 7% for 4 years, 5% for 5 years, and 5% for 6 years. The mean age of the nursing staff was 37.7 years in the pre-intervention period and 38.5 years in the post-intervention phase. The nursing staff were 95% female in the pre-intervention phase and 94% female in the post-intervention phase.

Study design
This was a retrospective comparative study with historical controls, which was carried out in 6 nursing homes with a total of 552 licensed beds and facilities. All of the data were provided from the participating nursing homes. The length of follow-up was not reported, but it would appear that all the participants were followed as long as they formed part of the nursing personnel at the 6 centres.

Analysis of effectiveness
All participants included in the initial study group were accounted for in the analysis of effectiveness. The primary outcome measure used was the rate of injuries (number of claims per 1,000 hours) estimated in the pre- and post-intervention phases. Only musculoskeletal injuries that occurred while lifting or moving a nursing home resident were included. Musculoskeletal injuries attributed to lifting objects and other injuries (such as slips and falls, struck by items, etc.) were excluded. Other outcome measures were the frequency of other injuries, the rate of assault and violent attacks, and lost and restricted workdays.

Three sources of data were used to identify minor and major injuries. These were workers’ compensation claims data, Occupational Safety and Health Administration (OSHA) 200 logs, and first reports of employee injury or illness. At baseline, the study groups were comparable in terms of percentage of work force, and age and gender distributions. Statistical analyses were carried out to adjust for potential confounding factors such as nursing home, age group, job tenure, gender, work status, and shift. Sub-group analyses were also performed in which sub-categories of employee characteristics, such as age, job tenure, and work status, were considered.

Effectiveness results
The adjusted rate of injuries was:

14% in the pre-intervention phase and 5.9% in the post-intervention phase (rate ratio 0.39, 95% confidence interval, CI: 0.29 - 0.55) when workers’ compensation claims were used;

13.4% in the pre-intervention phase and 7.3% in the post-intervention phase (rate ratio 0.54, 95% CI: 0.40 - 0.73) when OSHA 200 logs were used; and

23.7% in the pre-intervention phase and 14.1% in the post-intervention phase (rate ratio 0.65, 95% CI: 0.50 - 0.86) when first reports of employee injury were used.

Reductions were also observed in the frequency of employees reporting repeat injuries.

The adjusted rate of other injuries was significantly reduced in the post-intervention phase (rate ratio 0.65, 95% CI: 0.47 - 0.90) only when workers’ compensation claims were used. Similar results were observed in the sub-group analyses.

The rate of assault and violent attacks was reduced by:

72% (0.76 versus 0.21 per 100 full-time equivalents) when using workers’ compensation claims,

50% (0.65 versus 0.32 per 100 full-time equivalents) when using OSHA 200 logs, and

30% (5.32 versus 3.75) when using first reports of employee injury or illness.

The rate of lost workday resident handling injuries per 100 nursing personnel was 5.8 in the pre-intervention period and 2.0 in the post-intervention period (rate ratio 0.34, 95% CI: 0.20 - 0.60). The total lost workdays were 488 in the pre-
intervention period and 229 in the post-intervention period.

The rate of restricted workday resident handling injuries per 100 nursing personnel was 9.3 in the pre-intervention period and 5.7 in the post-intervention period (rate ratio 0.62, 95% CI: 0.44 - 0.87). The total restricted workdays were 1,314 in the pre-intervention period and 687 in the post-intervention period.

Clinical conclusions
The effectiveness analysis showed that the implementation of the "best practices" musculoskeletal injury prevention programme in nursing homes was effective in reducing the rate of back injuries among nursing personnel.

Measure of benefits used in the economic analysis
The benefit measure used in the cost-benefit analysis was the reduction in total workers' compensation expenses arising from the injury prevention programme, so as to convert injuries into monetary terms.

Direct costs
Discounting was relevant since the costs per participant were incurred during a long timeframe (6 years). The unit costs were not presented separately from the quantities of resources used. The analysis of costs considered only the capital investment for equipment purchases. The cost/resource boundary of the study was not explicitly reported, but it could have been that of the third-party payer. The resource use data was obtained from the sample of individuals included in the effectiveness analysis. The costs were derived from the hospital corporation. The price year was not reported, which would have been useful since the costs were estimated over a long timeframe.

Statistical analysis of costs
The costs were treated deterministically.

Indirect Costs
The indirect costs were not considered.

Currency
US dollars ($).

Sensitivity analysis
Sensitivity analyses were not performed.

Estimated benefits used in the economic analysis
The total workers' compensation expenses were $441,670.11 in the pre-intervention period and $277,060.71 in the post-intervention period. Therefore, the implementation of the injury prevention programme resulted in a reduction of $164,609.40 in total workers' compensation expenses.

Cost results
The total capital investment for equipment purchases was $143,556, while the training cost was $15,000. Therefore, the whole cost of the programme was $158,556.

Synthesis of costs and benefits
The net benefit (benefits minus costs), which was calculated to combine the costs and benefits of the programme,
showed that the extra costs of the injury prevention programme were offset in slightly less than 3 years.

**Authors’ conclusions**
A safe resident handling and movement programme reduced the rate of injuries among nursing personnel. The extra costs associated with capital investment for equipment purchases were offset by reductions in workers’ compensation expenses. These results were confirmed in several sub-group analyses.

**CRD COMMENTARY - Selection of comparators**
The selection of the comparator was clear since the standard care provided before implementation of the new injury prevention programme was considered. However, details of the comparator were not provided. You should decide whether this is a valid comparator in your own setting.

**Validity of estimate of measure of effectiveness**
The effectiveness evidence came from a retrospective comparative study, which usually has several drawbacks. First, owing to the retrospective nature of the study, selection and performance bias could have affected the results of the analysis. The authors carried out some statistical tests to reduce the impact of some potential confounding factors. Second, the outcomes were examined in two different time frames and factors other than the study interventions could have interfered with the prevention programme. In fact, when the other injuries were used as the reference case, the differences between the pre- and post-intervention periods were no longer statistically significant for two of the three sources of data. Third, the cohort was dynamic, which means that the composition of the two groups of participants varied over time. Another issue limiting the internal validity of the analysis was the lack of power calculations. However, the study groups were quite comparable at baseline and sub-group analyses were also performed.

**Validity of estimate of measure of benefit**
Within the cost-benefit framework, a monetary value was given to the injuries suffered by nursing personnel. This was done using workers’ compensation expenses. No details on the method used to determine such a measure were provided.

**Validity of estimate of costs**
The authors did not report explicitly the perspective adopted in the study. Only those costs strictly related to the implementation of the programme were considered. Therefore, the perspective of the non-profit health care system appears to have been adopted. The indirect costs were not included, but the authors stated that their inclusion would have made the return on investment shorter. No information on the cost categories included in the analysis was provided, thus it would be difficult to replicate the study. The source of the data was provided. The costs were estimated over a long timeframe (6 years), but the price year was not reported, which makes reflation exercises in other settings difficult. The costs were treated deterministically and were specific to the study setting. Sensitivity analyses were not carried out.

**Other issues**
The authors stated that their results confirmed the findings from other studies that supported the cost-effectiveness of injury prevention programmes for nursing personnel. However, the issue of the generalisability of the study results to other settings was not addressed. Sensitivity analyses were not performed, which further reduced the external validity of the study. The analysis referred to nursing personnel with jobs that regularly expose them to resident handling and this was reflected in the authors’ conclusions.

**Implications of the study**
The study results supported the implementation of programmes for the prevention of back injuries among personnel in nursing homes.
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None stated.

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Other publications of related interest


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