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Effects of a work injury prevention program for housekeeping in the hotel industry

Merrill Landers[a,*] and Lynn Maguire[b]
[a]*Department of Physical Therapy, College of Health Sciences, University of Nevada, Las Vegas, NV 89154-39029, USA*
E-mail: merrill.landers@ccmail.nevada.edu
[b]*Mountain View Hospital, Las Vegas, NV, USA*

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Abstract. *Objective:* The aim of this retrospective study was to determine the effectiveness of a work injury prevention program in the housekeeping department of a hotel. Studies have validated the use of different injury prevention strategies to decrease the incidence of work-related injuries. Few studies, however, have reported the efficacy of an on-site work injury prevention program by a physical therapist.
Study design: In 1995, implementation of a work injury prevention program by a physical therapist to 50 housekeeping supervisors, 60 house persons and 340 guest room attendants at a large hotel began. This program included a detailed work risk analysis of the work environment, development of job descriptions, identification of injury-related problematic work situations, and implementation of a job specific supervisor-training program. Supervisor, house person and guest room attendant training was also conducted at the end of 1995 and the beginning of 1997.
Results: Data of injury reports in 1995, 1996, and 1997 were analyzed to determine the results of the program. There was a reduction in total injury claims, total medical expenses, total lost work time and total restricted duty time.
Conclusion: These results demonstrate the cost effectiveness of implementing a work injury prevention program for housekeeping guest room attendants in the hotel industry.

1. Introduction

Occupational injuries are a serious problem, resulting in considerable morbidity to the worker and considerable cost to the employer. The United States Bureau of Labor Statistics reported 5,287,600 total recorded injury cases in private industry in the year 2000 [7]. Of that total, 1,584,000 cases involved time away from work and another 1,003,000 cases involved time spent in restricted work activity. These staggering numbers have resulted in considerable expense to employers through costs associated with workers' compensation claims.

The total cost of health and safety in the workplace has been estimated to be more than $418 billion dollars in direct costs (see Table 1) and another $817 billion in indirect costs [6] (see Table 2). Sources of this economic drain include workers' compensation costs (medical treatment and indemnity), risk management, lost or decreased productivity, overtime associated with compensating for injured workers, work-site modification, recruitment and retraining of replacement workers, human resource department costs for managing injuries, temporary disability, litigation and disability settlements [1]. Worker absenteeism not only effects productivity and the need for replacement workers, it may also drive costs higher due to increased managerial involvement, deadline and delivery difficulties and motivational problems with replacement workers [29]. Regardless of the costs associated with work-related

*Corresponding author.

Table 1
Direct costs related to specific injury [6,27]

Medical Care
– Physician, other provider services (inpatient and outpatient)
– Clinic, hospital services (inpatient and outpatient)
– Ancillary diagnostic services (laboratory, radiology, MRI, CT scan, electromyography, nerve conduction velocity testing, etc.)
– Patient-specific medical supplies, equipment
– Medications, pharmacy services
– Rehabilitation, occupational/physical therapy
– Employee assistance counseling
Other Direct Injury-Specific Costs
– Worker's compensation payments
– Sick pay
– Other benefits (as applicable)

Table 2
Indirect costs related to specific injury [6,27]

Indirect Employee-Specific Costs
– Costs of temporary employee to accomplish tasks of the injured worker
– Case management costs
– Case-specific human resources or personnel costs
– Costs of specific accommodations required by the Americans with Disabilities Act
– Cost of compliance with Occupational Safety and Health Administration reporting
– Vocational rehabilitation counseling
– Case-specific litigation costs
Reduced Productivity
– Absence of injured worker
– Shift in activities of coworker to accomplish absent worker's work
– Increased supervisor effort to cope with absence of employee
– Temporary or long-term absence of corporate memory processed by the ill or injured employee
– Start-up and training time for replacement employee
– Start-up and training time for injured employee
– Time and costs associated with prevention training
– Development of a limited work position, i.e. light or restricted duty, for the injured worker
– Reduced effectiveness of "nearby" coworkers
– Overtime pay
Other Direct Injury-Specific Costs
– Potential for reduced customer satisfaction because of absent employee and effects of employee's absence
– Effect of greater-than-projected medical costs
– Increased risk of injury by temporary, replacement employee because of limited time for hazard or safety training, or other factors
– Increased insurance premiums
– Increased overtime costs
– Increased training and retraining costs
– Increased legal costs, including class-action defense, coordination of new policies to respond to event or prevent recurrence, and similar costs
– Loss of senior management time as required to respond to event
– Reduced performance and effectiveness of returning injured worker
– Effects on labor relations, including requests for hazardous pay, new safety programs or equipment, strike potential, adverse media coverage
– Effect on worker morale (which also impacts productivity)
– Requirements for increased quality cont as required, for replacement or returning employee
– Increased human resources and personnel department costs associated with efforts to replace the injured worker
– Medical, industrial hygiene, safety costs involved in investigation of accident
– Risk-management activities involved with respect to investigation of accident or other activities

musculoskeletal disorders, these injuries represent a significant opportunity for cost reduction since these incidents are often manageable and in many instances may be preventable [1].

Reducing the incidence of occupational musculoskeletal injuries is one way to help control the rising costs of injury claims. Golaszewski et al. concluded that reducing injuries through prevention programs can achieve a benefit-to-cost ratio of 3.4 or more [15]. In another study, Melhorn et al. demonstrated an average 4 year benefit-to-cost ratio of 16.5 to 1 [27].

The key to reducing the costs of occupational injuries is an understanding of the etiologies, risk factors, treatments, and preventions of these injuries. Of these, prevention is considered the best approach in reducing the incidence of musculoskeletal disorders [26].

Traditional occupational prevention consists of three types: primary, secondary and tertiary [1,9,14,19]. The goal of primary prevention is to eliminate or decrease the risk of injury through the recognition of high-risk activities and the control of workplace hazards. This may include providing education and counseling about accident prevention, employee screening tools, direct measures such as back belts, ergonomic design and worksite hazard identification. The goal of secondary prevention is to detect the injury in the early stages, to intervene and limit its adverse affects. Tertiary prevention consists of rehabilitation, job accommodation, light duty, and other efforts that seek to decrease disability and to hasten the recovery from occupational disorders. Tertiary intervention may also include developing a return to work plan, and designing job site accommodations.

In an effort to help control the rising cost of occupational injury, some employers have established work injury prevention programs. One such program was developed by the second author in conjunction with a large hotel in Las Vegas, Nevada. The goal of this work injury prevention program was to reduce the incidence of occupational injury through primary and tertiary prevention. It was hoped that this would help reduce the financial strain on the employer by decreasing reported claims, medical costs, lost days, and workers' compensation costs. This retrospective study is an analysis of this program and its results.

2. Methods

The initial goals of this work injury program included the following [17]:

- To decrease the cost of disability (short and long term) for work related injuries
- To decrease the number of lost work days due to work related injuries
- To reduce the number of restricted days due to work injuries
- To decrease recordable injuries
- To decrease the number of injuries associated with an aging work force
- To reduce the risk of lawsuits
- To increase productivity
- To increase employee morale.

With these goals in mind, the first phase of the work injury program was initiated. This program started with conceptual implementation by hotel management and the second author [29]. The result was a contract between the two entities with the latter to manage the implementation of the prevention concept. The first step, in accordance with concept implementation, was to conduct an analysis of work conditions [29].

One of the most critical components of an effective work injury prevention program is to accurately identify and quantify the physical requirements of the job [17]. Therefore, the first phase consisted of an analysis of the daily work requirements for a guest room attendant (GRA) in a standard day. This included analysis of the worker, the work and the worksite using still and video photography of the various postures and positions that were assumed during daily job tasks.

Calculations of the frequency and duration of these various postures and positions were also conducted. A force gauge was used to document the forces required to lift, lower, push and pull loads. GRA injury reports for the year 1995 were analyzed to determine the mechanisms of injury as well as to identify tasks that placed employees at risk. Based on this analysis, a detailed job description including identifying postures and positions that placed the worker at risk for injury was developed. An analysis of employer productivity requirements was also conducted. With the aforementioned information, the essential tasks of a GRA in a standard day were outlined as were the daily physical demands. Job tasks that were determined to produce injury-related problematic work situations included the following:

A. Making beds (repeated forward trunk flexion and rotation)
B. Moving cleaning carts (pushing and pulling)
C. Lifting and lowering loads (repeated trunk flexion/extension and rotation with poor body mechanics)
D. Cleaning bathroom, i.e. tubs, floor and toilet (repeated forward trunk flexion and rotation, poor body mechanics, lifting)
E. Vacuuming, dusting and cleaning (poor body mechanics, lifting, forward trunk flexion and rotation)
F. Trash removal and lifting/repositioning furniture (repeated lifting with trunk flexion/extension and rotation)

The second phase of the work injury program was to develop an instructional program to target the 50 housekeeping supervisors, 60 house persons (HP), and 340 GRAs. In October of 1995, a job specific training program for the 50 housekeeping supervisors was im-

plemented. This training included both didactic classroom and practical on-the-job education, practice and testing. It was conducted over two sessions lasting two hours each. The main focus of the education was to teach proper technique, positioning, posturing and body mechanics with the aforementioned job tasks determined to be of high risk. Education also included information about various injuries and preventative measures (i.e. daily stretching, warm-up, and mandatory assistance with moving furniture, etc.). Practicing the proper positioning and posturing was conducted to enhance retention. Supervisors were also instructed in preventative stretches (standing back bend, forward squat stretch, and standing hamstring stretch) to teach and perform with the employees during their daily prework briefings and to encourage employees to perform them throughout (hourly) the work day. Positive and constructive feedback, which has been shown to enhance training intervention, was utilized during and after training to reinforce the newly learned work practices [18]. Didactic and practical testing was implemented to hold employees accountable for the information that was being taught. To decrease the passive decay of information learned in the education sessions, the housekeeping supervisors were then instructed to support the program by monitoring and reminding the housekeeping attendants during their daily job tasks.

GRA and HP education began following the conclusion of the supervisor training (January 1996). This training again included the 50 supervisors with the addition of 60 HPs, and 340 GRAs. The job specific GRA/HP training program was conducted for each employee over one two hour session. Multiple training sessions were conducted so that class size was small. Education of the GRAs and HPs included job site instruction, education, practice, coaching, and testing. This instruction was consistent with the education and practice that the supervisors had received. The direct supervisors were also present and assisted in the instruction during the training. The main focus of the GRA/HP training was interactive practice and coaching. Again, practical testing was performed to assess the level of their understanding and to hold them accountable for the information that was being taught.

Those who demonstrated poor safety and/or poor body mechanics during the practical testing were identified to their supervisors as 'at risk' employees. Supervisors were advised to continue training with close monitoring and supervision during work tasks of these 'at risk' employees. Following the training session, each employee signed a form acknowledging their participation in the session. Job specific supervisor and GRA/HP training was again conducted in June and August of 1997 and included a larger group of employees (50 supervisors, 60 housepersons and 386 GRAs).

Modification of the work environment was also conducted. GRA standard attire initially was a tight knee length skirt, which prevented adequate hip and knee excursion during bending, stooping, squatting and lifting. Workers compensated for the loss of hip and knee flexion by using a more high-risk trunk strategy (i.e., asymmetric forward trunk flexion and rotation) to bend, stoop, squat, and lift. This risky posture was particularly evident when cleaning toilets, tubs and picking up objects from the floor. Modification was made to the uniform skirt design and a longer skirt with wider distal circumference was fabricated. This design change allowed for proper desired worker performance of squatting and kneeling tasks during work by the GRAs.

Tertiary prevention consisted of a light duty program. Employees participating in this program made gift baskets while sitting or standing. While on this program, they received the industry standard of 80% of their salary. This program was implemented so that those with varying levels of injuries would be able to participate at a level that would not be deleterious to their condition. The goal of this program was not productivity, but rather to keep the injured employee on the job. Work by Cats-Baril and Frymoyer demonstrated that keeping an injured worker at work decreases the likelihood of disability [8]. It has also been shown in the literature that the longer one is away from work, the greater chance one has of developing long-term disability [16,24].

3. Results

In order to determine the effectiveness of the implemented work injury prevention program, analysis of the housekeeping department (supervisor, GRA and HP) injury reports was conducted. The four outcomes that were analyzed for the years of 1995, 1996, and 1997 include the following: total claims, medical expenses resulting from a work-related injury, lost work days as a result of work-related injury, and restricted or reduced work days resulting from a work-related injury. Outcome measurements for the years following this were not analyzed because a different work site prevention format was put in place.

The results of the four outcomes are included in Table 3. The years 1996 and 1997 were compared to

Table 3
Outcomes

	1995 300 GRAs 35 supervisors 60 house persons	1996 340 GRAs 50 supervisors 60 house persons	1997 386 GRAs 50 supervisors 60 house persons
Total injury claims	98 claims	68 claims	37 claims
Direct medical expenses	$136,336	$23,041	$16,197
Total lost work time	718 days	97 days	25 days
Total restricted duty	2079 days	521 days	913 days

1995, as this was the year previous to the implementation of the work injury prevention program. Data from previous years was unavailable secondary to administrative changes at the hotel which came about after the initial data were collected.

Statistical analysis of the data was not conducted due to the nature of the data. That is, Chi-square testing could not be conducted because the assumption that each of the observations was independent could not be made. In other words, some employees within the housekeeping department may have worked during all three years of the study and, therefore, could not be assumed independent for one particular year. However, the decrease in all four of the variables is considerable. The percentage decrease in each of the variables represents a decrease in yearly totals compared to 1995, which was the year before the prevention program implementation (see Table 4). The decreases in the outcome variables are actually more impressive considering that there was an increase in the number of GRAs and supervisors in 1996 and 1997 (see Table 3).

Based on the data from the study, it is estimated that the total savings over the two years of the program was $233,434. Management and implementation of the prevention program cost the hotel $26,350 over the same two year time period. From these numbers, the benefit-to-cost ratio was calculated to be 8.86 to 1.

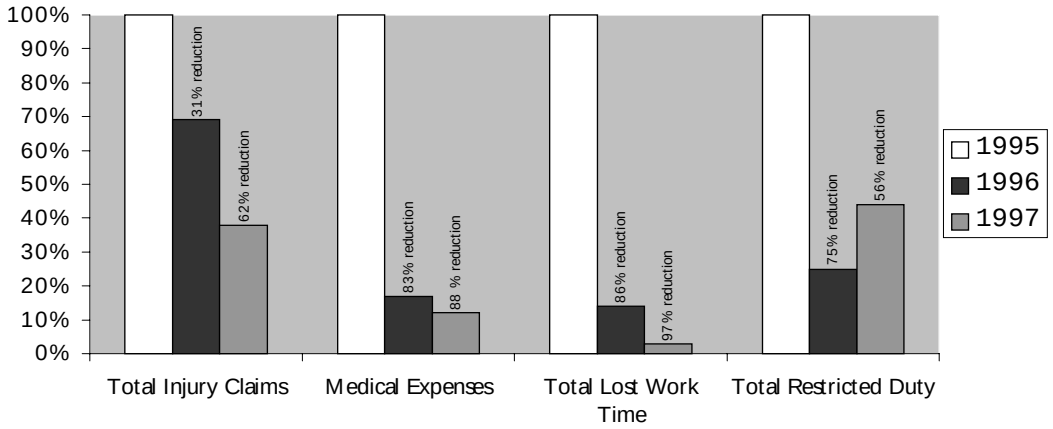
4. Discussion

The results of this retrospective study demonstrate the effectiveness of a work injury program in the hotel industry. The four main outcome variables all showed a substantial decrease in each of the following two years. Of particular note, is the decrease in direct medical expenses from $136,336 in 1995 to $23,041 and $16,197 in 1996 and 1997, respectively. Direct medical expenses can be measured with some degree of certainty. However, indirect costs are much more difficult to assess because they are, in many cases, intangible and cannot be directly measured with any certainty (see Table 2). In this study, only direct costs associated with medical care were analyzed (see Table 1). Other injury-specific direct costs were not calculated. Some, however, estimate that indirect costs may be two to ten times the direct health and safety costs [3,4,30]. Therefore, it would be reasonable to speculate that the financial drain from direct and indirect costs was actually higher than that reported in Table 3.

The estimated total savings over the two years of the program was $233,434, which was an appreciable savings to the employer. Based on the implementation of the prevention program, the benefit-to-cost ratio was calculated to be 8.86 to 1. Thus, for every dollar spent on prevention, there was $8.86 in direct medical expense savings. These numbers are consistent with ratios reported by Golaszewski et al. (3.4 or more to 1) [15] and Melhorn et al. (16.5 to 1) [27].

We feel that the success of this program was due largely to the decrease of injury-related problematic work situations or activities that put an employee at risk. Strong support from management, including participation in training sessions with guest room attendants, was key to the success of this program. Supervisors were instructed to continually monitor the GRAs and limit postures, positions and tasks that deviated from that which was taught in the training sessions. Some GRAs suggested that some of the success of this program was due to a sense of increased managerial support, job satisfaction, and perceived caring from the company. This notion is not without merit as studies have demonstrated this very point. In fact, there is strong evidence to show that job satisfaction is a strong predictor of the incidence of low back pain in an industrial setting [2,5,8,12,21,23,28,33]. Linton, in a systematic review of the literature, states that there is mounting evidence that psychological workplace factors, i.e. job satisfaction, monotonous work, work relations, work demands, stress, and perceived ability to work, are related to episodes of back pain and subsequent disability [22]. Work relations were also improved especially during training sessions as workers perceived that there was genuine concern for their well-

Table 4.
Percent reduced outcome compared to benchmark year 1995



being from the company. Also, perceived ability to work following an injury may have been effected by instruction during training sessions on common injuries, and what one can, and should do following an injury.

It is also interesting to point out that all of the GRAs were female and all of the HPs were male. During any significant lifting task, the GRAs were required to get the assistance of a HP to perform or help in the lift. It should also be noted that while the HPs were included in the training, there were no HP injury claims filed for any of the years that were studied.

Of primary interest in this program was prevention of low back pain, as this was determined to be the most common musculoskeletal injury in 1995. Deyo and Bass reported that low back pain is the second leading cause of work absenteeism in the United States and the most expensive in terms of lost productivity [10]. They also reported that 60% of back injuries are caused by lifting and 20% are caused by push/pull type activities. Both lifting and push/pull type activities are fundamental to the nature of housekeeping and, thus, considerable attention to proper mechanics with those tasks was a focus of the training. Also, if we accept that back injuries have a biomechanical basis affected by force application, effective exposure to force exertion, and the extent and range of motion in these activities, then it is possible to prevent the occurrence of these injuries [13, 20,31]. Preventative education has been shown to be effective in work-related low back pain. Versloot et al. demonstrated a reduction in absenteeism in industry by implementing an educational program consisting of information on back care, physical fitness, nutrition, stress, and relaxation [34].

While physical therapists are not unique to designing ergonomic programs, we feel that therapists, i.e. physical and occupational therapists, offer a unique perspective in the prevention of work injury because of their background in anatomy, physiology, human biomechanics, and musculoskeletal pathology. This background allows therapists to make recommendations beyond basic work place re-design to include strategies to improve problematic biomechanics/posture, and to provide exercise and stretching protocols that will decrease tissue damage, improve work tolerance, and limit damage to involved tissues. Furthermore, the therapists' knowledge of musculoskeletal pathology allows them to provide training about commonly encountered injuries (e.g., low back injury), and what an injured worker can, and should do following an injury.

Reduction in the incidence of musculoskeletal injuries resulted in an immediate, palpable savings in direct medical costs as represented in Table II. Indeed, many companies concentrate on short-term cost-containment strategies rather than long-term prevention programs that may not result in immediate savings. However, the real windfall of prevention is the decrease in costs associated with disability claims. In a study by Hashemi et al. of a large workers' compensation company's database for 1992 low back pain claims ($n =$ 106,961), it was reported that only 7% went on to be disabled greater than 12 months. However, this 7% represented 75.1% of the overall total costs and 84.2% of the overall total disability days [16]. Furthermore, after one year of disability, the probability of being off disability at the end of the second year was 40%. In the same study, it was also reported that 28.4% of the claimants received at least one indemnity payment.

Studies have suggested that primary prevention is the most effective strategy for preventing work-related

disability [11,16]. Employers, though, have become reluctant to undertake prevention strategies because of concerns that the education may result in an increase in the reporting of OSHA 200 events (defined as any injury, i.e., cuts, fractures, sprains, amputations, etc., that results from a work accident or from a single instantaneous exposure in the work environment [32]), an increase in requests for medical care, and an increase in workers' compensation claims [27]. This study supports work by Melhorn that these claims are unwarranted [25]. Industry reform should focus on prevention as the most appropriate step in accommodating the worker's injury, that is, before they become a claimant [1].

Limitations of this study are inherent to the nature of retrospective studies. Namely, a controlled prospective study would lend significant validity to the cause and effect relationship of this prevention program. It is possible that the year prior to the intervention had an abnormally high incidence of work injuries and that the subsequent two years were actually approaching a more normal distribution. This phenomenon, called regression toward the mean, cannot be ruled out, but at the same time cannot be supported either due to the lack of information, i.e. only three years of data available. Because this study was retrospective, it is unlikely that the Hawthorne effect is an explanation for the significant decline in the dependent variables. Another possible limitation is that the study was initiated in 1995. Because ergonomic intervention has evolved since that time, these results should be carefully generalized. However, we feel that main focus of the intervention provided in the present study is consistent with current knowledge.

Although the results of this study are compelling, it cannot be said with certainty that this prevention program caused the decrease in the four dependent variables. However, we feel that this retrospective study sheds some light on this relationship and lends support to the studies in the literature demonstrating the effectiveness of prevention programs. In the least, results from this study warrant further investigation into the effectiveness of work injury prevention programs.

5. Conclusion

The number of work-related musculoskeletal injuries account for considerable morbidity to the worker and ultimately result in a substantial source of economic drain to the employers, employees and consumers. Results of this study suggest that a work injury prevention program, developed by a physical therapist, can help to decrease the incidence and associated costs of occupational musculoskeletal injuries in the hotel industry.

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