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Manual Handling Injuries in Health Care Workers

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Nursing aides are particularly susceptible to manual handling injuries because they have the primary responsibility for heavy lifting. The aim of this study was to determine why a specific group of nursing aides have the highest manual handling injury rate in their hospital. The study investigated the adequacy of the manual handling training program, knowledge of manual handling, mechanical aid availability, and use of mechanical aids. Results indicated that the nursing aides' manual handling knowledge was adequate but that they rarely used mechanical aids. This lack of use of aids was in part due to an over-reliance on their own strength and abilities. This may have been due to a lack of suitable mechanical aids on the wards or a lack of familiarity with the available aids. This study suggests that neither training alone nor the purchase of equipment alone is likely to resolve manual handling problems.

manual handling health care ergonomics

1. INTRODUCTION

Workers in the health care industry, especially nurses and nursing aides, are known to be particularly susceptible to musculoskeletal injuries due to their patient handling tasks (Cohen-Mansfield, Culpepper, & Carter, 1996; Nelson, Gross, & Lloyd, 1997; Scott, 1995). This susceptibility has been acknowledged for several decades but there does not appear to have been a significant reduction in the number of injuries over this period. A range of factors has

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been identified that may be affecting the safety of workers in this industry. These factors include a possible lack of adequate training in safe work (Cohen-Mansfield et al., 1996; Foster, 1996; Ray & Bishop, 1995; Sinclair, 1988); inappropriate work design or work organisation (Ray & Bishop, 1995), and attitudes and beliefs that may affect safe work performance (Cohen-Mansfield et al., 1996; Persson, 1996; Phillips, Forrester, & Brown, 1996).

There is an increased risk of injury when staff are required to perform duties for which they have not received adequate training (Cohen-Mansfield et al., 1996; Foster, 1996; Ray & Bishop, 1995; Sinclair, 1988). Generally, the aim of safety-related training is to produce staff who are knowledgeable not only about the risks and hazards they face but also about the means of dealing with those hazards. Considerable information is available as to the content of manual handling training programs (Dixon, Lloyd, & Coleman, 1996; Nelson et al., 1997; Phillips et al., 1996). Appropriate training techniques for manual handling include theory lectures, demonstrations, and practice sessions, with printed material provided for later reference (Foster, 1996; Phillips et al., 1996). Training should be ongoing, with refresher sessions at regular intervals (Cowan, 1997; Stubbs, Buckle, Hudson, & Rivers, 1983). However, training alone is unlikely to be sufficient to reduce work-related injuries. Training can build relevant knowledge, skills, and attitudes but whether these are then transferred to the workplace depends on a wide range of factors (Baldwin & Ford, 1988).

Ergonomic approaches can be used to reduce injury rates by redesigning the job to fit the skills and abilities of employees (Garg & Owen, 1994; McGuire & Dewar, 1995). The best ergonomic approach for a hospital is the "no lift" policy (Phillips et al., 1996; Tracy, 1996), in which lifts are performed using mechanical aids rather than human strength. Other aspects of work organisation that may be related to risk levels include workplace layout, availability of appropriate equipment, the physical work environment, work complexity, pace and hours, physical demands of the work, and other factors (Cohen-Mansfield et al., 1996; Daltroy et al., 1993; Nelson et al., 1997; Ringenbach & Jacobs, 1995). Lack of mechanical aids for lifting tasks can contribute to manual handling injuries (Foster, 1996), as can failure to use available mechanical aids to their full potential (Dixon et al., 1996; Goodridge & Laurila, 1997; Moody, McGuire, Hanson, & Tigar, 1996; Venning, 1988).

Further investigation is required to identify the roles that each of these factors may play in contributing to the high injury rate of health care workers. The present study was undertaken to investigate a range of factors

in the safety of nursing aides in a Sydney, Australia, hospital. These factors included

- knowledge of safe manual handling,
- use of mechanical aids for lifting,
- attitudes and beliefs about safe work practices.

2. METHOD

Two approaches, a review of the hospital's injury data and a self-reported questionnaire, were used to gain a comprehensive picture of the scope and possible causes of the nursing aides' manual handling injuries in the hospital.

2.1. Review of Injury Data

The hospital's injury database provided the following information: demographic data concerning the nursing aides who had been injured, the wards and departments in which the injuries had occurred, descriptions of the incidents, the agents that had caused the injuries, and the body parts injured. This data was used to determine the nature of the injuries that the nursing aides were incurring and which tasks were causing the injuries. A total of 40 injuries reported over a 15-month period was used for this data review.

2.2. Questionnaire

A self-report questionnaire was developed and pilot-tested for this study. The questionnaire covered three main areas: firstly, nursing aides' knowledge of manual handling including their manual handling training; secondly, their use of mechanical aids; and, thirdly, work design and job satisfaction issues.

The nursing aides' manual handling knowledge was assessed by a series of drawings showing manual handling tasks being performed (drawings were adapted from Takala & Kukkonen, 1987). Respondents were asked to decide whether the lifting procedure shown in each picture was correct or incorrect and to give a reason for their answer. Respondents' use of mechanical aids was assessed by questions specifying a number of tasks and asking for information regarding the frequency with which each task was performed and whether help from other staff or mechanical equipment was

used to perform each task. The final section of the questionnaire covered the demographics, attitudes, and perceptions of safe work practices, including the work organisation within the hospital, of the respondents.

One hundred and sixty questionnaires were sent out using the hospital's internal mail. The study group consisted of all the nursing aides within the hospital. Respondents were asked to complete the questionnaire and return it anonymously. Reminders about completing the questionnaire were given verbally and by means of signs on notice-boards.

3. RESULTS

3.1. Review of Injury Data

Sixty-three percent ($n = 25$) of the 40 injuries reported were due to muscular effort; the remainder to equipment (18%), falls (4%), sharps (4%), and slips and trips (11%). The most frequently injured body part was the back (43%, $n = 18$) followed by shoulder (18%), leg and foot (13%), arm-hand (20%), neck (3%), and abdomen (3%).

Sixty-two percent ($n = 24$) of the injuries were due to manual handling tasks (lifting patients, pushing patients on beds, moving furniture, removing heavy linen bags, and polishing corridors and floors). The 4 injuries (11%) due to "carrying out normal duties" may also have been manual handling injuries. The remainder were due to slips, falls, cuts, and equipment.

3.2. Questionnaire

Fifty questionnaires (31%) were returned. The average age of respondents was 39 years and ranged from 18 to 63 years. Females accounted for 31% of respondents and males for 56% (13% did not answer this question).

3.2.1. Knowledge of manual handling

All respondents had participated in a two-week induction program. This program covered all aspects of the job, and included a substantial component on manual handling. The manual handling component in particular was competency-based, with emphasis on skills gained. Relevant tasks, skills, and competencies had been identified by a comprehensive analysis of workplace needs in 1995–1996 and this information had been used as the basis



a)



b)



c)



d)



e)



f)

Figure 1. The picture shown to determine the groups manual handling knowledge.

for development of the training program. Trainees were assessed at the end of training to ensure that they had achieved the necessary levels of competency, and further training had been given if required. Training covered back anatomy, function and care; posture; body mechanics; positive lifestyle habits and fitness; first aid; ergonomic principles; manual handling techniques; and use of mechanical aids. Training involved both theory and practice sessions.

In order to evaluate whether respondents had adequate knowledge of safe manual handling, the questionnaire included six pictures of people performing various manual handling tasks (see Figure 1). Respondents were asked whether each task was performed correctly or incorrectly and to specify reasons. Table 1 shows the percentage of respondents stating whether each lift shown in Figure 1 was correct or incorrect.

TABLE 1. Percentage of Respondents Who Considered Each Lift Correct and Incorrect

Lift	Correct (%)	Incorrect (%)	No Response (%)
A	26	66	8
B	68	26	6
C	56	38	6
D	6	86	8
E	84	8	8
F	0	94	6

It can be seen that lifts B, C, and E were considered to be correct by the majority of respondents, whereas lifts A, D, and F were largely considered incorrect. Respondents were able to give a range of reasons as to why each lift was correct or incorrect. These reasons focused on whether the lifters had a straight back, bent knees, good balance, and held the object close to the body. The responses also focused on whether there was adequate patient support.

Overall, the responses to this section of the questionnaire indicated that the group had a good understanding of "proper body mechanics" and were aware of the limitations of the lifting techniques taught.

3.2.2. *Manual handling tasks performed*

Table 2 shows the responses to questions about how often each of the tasks listed had been performed by the respondent in the last week, and what help or aids they had to perform it.

TABLE 2. Performance of Common Patient Handling Tasks by the Nursing Aides

Task	Performed (%)	Had Help (%)	Used a Mechanical Aid (%)	Mechanical Aid Used
Assisted a patient to stand	58	90	10	slide board, walking frame, hoist
Turned a patient in bed	50	88	4	draw sheet
Moved a patient up in bed	50	100	32	draw sheet
Transferred a patient from chair to chair	30	87	13	hoist, draw sheet
Transferred a patient to and from the shower	20	80	50	commode chair, hoist
Transferred a patient to and from the toilet	34	71	41	wheelchair, hoist walking frame, commode chair,
Transferred a patient from their bed to a trolley	36	100	50	slide board, hoist, adjustable trolley

It can be seen that the most commonly performed tasks were assisting a patient to stand and turning or moving a patient in bed. In the great majority of cases respondents had help from another staff member to perform this task. However, mechanical aids were used, at most, 50% of the time. The aids used for each patient handling task can be seen in Table 2. Aids were most likely to be used when transferring a patient to and from the shower, from their bed to a trolley, to and from the toilet, or when moving a patient up in bed. The aids used for these tasks were commode chairs, hoists, slide boards, adjustable trolleys, wheelchairs, walking frames, and draw sheets.

When asked why mechanical aids were not used, a range of responses were given. These are shown in Table 3.

TABLE 3. Reasons Given by the Nursing Aides for Why a Mechanical Aid Was Not Used

Reasons for Not Using a Mechanical Aid	Frequency (%)
Patient light enough not to need a mechanical aid	26
Aide was sure of their own capability to lift, no mechanical aid required	25
No suitable mechanical aid available	18
No mechanical aid available	12
Patient could bear weight, therefore could help	11
No knowledge of mechanical aids	8

The most commonly cited reasons were that the patient was light enough not to need a mechanical aid and that the aide was sure of their own capability to lift, therefore a mechanical aid was not required. Other reasons were a lack of suitable mechanical aids and a lack of any mechanical aids.

Table 4 shows the availability of mechanical aids by department, cross-referenced with the number of injuries that occurred to the nursing aides, in that department, in 1997. It can be seen that overall the departments with the least mechanical aids appeared to have the most injuries (with the exception of Neurosurgery and Accident & Emergency), although there was no significant correlation between number of aids and injuries ($r = -.25$, $p < .05$).

3.2.3. Work organisation factors

Self-report data on work organisation, use of safe manual handling techniques by self and others, and job attitudes was collected to examine whether these

TABLE 4. The Availability of Mechanical Aids Cross-Referenced With the Number of Injuries That Occurred to the Nursing Aides, in 1997

Department	Number of Injuries	Mechanical Aids Available	Total Number of Aids
Cardiology	6	1 × pat slide	1
Maternity	6	1 × pat slide	1
Neurosurgery	4	1 × pat slide, 2 × hoists, 8 × automatic beds	11
Pediatrics	3	none	0
Accident & Emergency	3	4 × easy glide boards	4
Gastroenterology	3	none	0
Renal	3	none	0
Respiratory	1	1 × pat slide, 1 × lifting sheet	2
Radiotherapy	1	none	0
Oncology	1	none	0
Theaters	1	1 × pat slide, 4 × medishields, 5 × easy glide boards, 10 × plastic boards	20
Spinal Wards	1	3 × hoists, 3 × lifting sheets	6
Radiology	1	2 × hoists, 3 × pat slides, 2 × mobilisers	7

factors might contribute to the injury rate. It has already been shown that the respondents had a good knowledge of how to lift safely, so it could be expected that they would report that they did lift safely. Respondents considered that their peers used correct manual handling techniques always (20%) or sometimes (54%). Twenty-two percent said that nurses always used safe manual handling techniques whereas 56% said nurses used such techniques "sometimes." This indicates that the majority of nurses and aides did use correct manual handling techniques. Sixty-six percent of respondents said that nurses considered them to be integral members of the team on the ward, 58% were highly satisfied with their jobs, and 60% said that they had sufficient job rotation and work breaks. These results suggest that these variables are not affecting the safety performance of the majority of respondents and are unlikely to be a major cause of the nursing aide's high injury rate.

Respondents were asked to indicate whether they agreed or disagreed with four statements about why patients might be moved in ways that were unsafe for the lifter. This data is reported in Table 5.

TABLE 5. Reasons for Not Lifting Safely

Statement	Agree (%)	Disagree (%)	No response (%)
I sometimes move patients in ways that I know are not safe for my back because it is easier that way	20	66	14
I sometimes move patients in ways that I know are not safe for my back because there are not enough staff to help me with the lifting	20	66	14
I sometimes move patients in ways that I know are not safe for my back because there is not enough time to lift them safely	14	72	14
I sometimes move patients in ways that I know are not safe for my back because the patients do not like me lifting them the safe way	8	76	16

Data in Table 5 indicate that staff and time deficiencies, patient comfort, and ease of lift were not often the reasons for lifting incorrectly.

4. DISCUSSION

The results suggest that the group's high manual handling injury rate is unlikely to be due to a lack of knowledge of safe lifting procedures. Respondents demonstrated good knowledge of manual handling techniques and "proper body mechanics" suggesting that their manual handling training is adequate. Similarly, self-report data indicated that lack of time and staff, patient comfort, and ease of lift were not major reasons for unsafe lifting. Respondents were satisfied with their job overall and with the amount of job rotation, rest breaks, and other aspects of work organization, suggesting that these motivational issues are unlikely to be contributing to unsafe work practices.

One of the most important findings is that the aides rarely used mechanical aids when lifting patients. The principal reasons for not using equipment appeared to be a belief that a correct lift, or one within the capabilities of the lifter, does not require equipment. These responses suggest that respondents may rely too much on their own strength, which they may be overestimating.

Another key reason for non-use of mechanical aids was a lack of aids or of suitable aids. This may mean that aids were not available on the ward when required, or that the aids available were inappropriate. Previous research has also found that equipment unavailability is the largest factor in whether or not nurses use mechanical aids (Foster, 1996). This suggests that any program aimed at reducing manual-handling related injuries should involve a full task analysis before equipment is purchased, in order to determine exactly what is required and where, so that the equipment purchased fulfills these requirements.

The lack of use of aids is likely to be due to a combination of factors. Manual handling training tends to emphasize practice in the use manual handling techniques rather than the use of equipment, leading trainees to feel more familiar, and possibly more comfortable with these techniques. This, along with a perception that aids are not always available when required or are cumbersome and inappropriate when available, may encourage a perception that aids are seldom necessary. This results in lack of practice with the equipment, which in turn may exacerbate their reluctance to use it.

Although the nursing aides do not readily use mechanical aids, most of their lifting was performed with the help of another person. Therefore, although the aides are not using mechanical aids when lifting patients, they are aware of the dangers inherent in handling patients and rarely lift alone.

This study highlighted that the high injury rate in this particular group of nursing aides was in part due to an over-reliance on their own strength and abilities. This over-reliance may be because of the lack of availability of suitable aids or lack of familiarity with the aids. It is unlikely that more training will overcome these difficulties. To further clarify the results suggested in this study further research is required. A study that includes a comparison of the injuries between hospitals to determine if these results are generalisable would be valuable. However, these results suggest that a more comprehensive approach is required to address manual handling problems in hospitals. Such an approach must combine training with careful analysis of the tasks that staff are required to perform, the purchase of sufficient suitable equipment, training in the use of this equipment, and appropriate supervision. Neither training alone nor the purchase of equipment alone is sufficient to resolve the problem.

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