

# Back Injuries Among Nurses: Prevalence, Risk-factors and Prevention

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Rehabilitation counsellors have long been interested in back injuries among at-risk occupational groups such as nurses. Back injuries have a high prevalence among nurses, with enormous financial costs being incurred by health agencies and governments. Consequently the prevention of back injuries is a high priority for all concerned. Following a discussion of prevalence studies and risk factors for back injuries, we selectively review research on the effectiveness of multi-component (education and exercises) preventive programs designed specifically for nurses. While there is some empirical support for preventive programs, research in the area is still in its infancy. Looking at the broader picture, we conclude that preventive efforts must ultimately address the design of the workplace and the availability of proper equipment. Importantly, nursing unions and governments are moving towards "no lifting" policies and re-organisation of work practices. For effective rehabilitation, though, of those who do suffer back injuries, the adoption of a Workplace Disability Management approach (rather the traditional OH&S and return to work services provided by health and rehabilitation professionals) is advocated.

Back injuries in the workplace are a major financial and legal problem for employers and governments (Weeks, Levy & Wagner, 1991). The financial costs arising from back-injury-related loss of productivity, medical treatment, and compensation are enormous. For example, annual medical costs for low back pain in America are estimated to be as high as US\$24 billion (Wipf & Deyo, 1995). If disability and loss of work productivity are included, estimates of total annual cost owing to low back pain approach US\$50 billion. Annually, 2% of all American workers have a compensable back injury, and 14% lose at least one work day per year owing to low back pain. According to Victorian WorkCover statistics for 1996, WorkCover nurses account for more than half the claims claims the health industry at a cost of AUS\$26 million (Victorian Workcare Authority, 1996, 1997).

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Although back injuries occur in many occupational groups, experienced rehabilitation counsellors would be aware that nurses have an especially high prevalence of back injuries (Andersson et al., 1990; Hignett, 1996), which is attributed mainly to heavy lifting (Harber et al., 1988). In essence, back injuries interfere with the extent to which nurses can move freely and perform day-to-day duties. Injuries of this kind inevitably compromise patient care and cause a loss in productivity and efficiency (Cato, Olson & Studer, 1989; Garrett, Singiser & Banks, 1992). From a psychosocial viewpoint, it is noteworthy that back injuries are often associated with low self-esteem, tiredness and depression (especially for long-term back injuries) (Walding, 1991). This is not surprising in view of the loss of empowerment and frustration a person experiences in learning to cope with a back injury. Given the physical restrictions and psychological outcomes, back injuries may also have an adverse impact on family life and social relationships for the nurse (McAbee, 1988).

### **Prevalence of Back Injuries**

In order to efficiently prioritise their work and target their efforts within the prevention-rehabilitation continuum, rehabilitation counsellors working in occupational rehabilitation need to be aware of the prevalence of particular conditions both within specific occupations and in particular industries. With respect to nurses and nursing numerous survey studies confirm that back injuries are indeed the major occupational hazard for nurses. For example, in 1988 the Australian Nursing Federation (Victorian Branch) surveyed its membership (approximately 17,000) in relation to back injuries sustained at work (Langford, 1991). Of the 2500 respondents to the questionnaire, 53.7% had suffered a back injury related to work and of these 72% considered their injury to be of a long-term nature. Although the survey response rate was not high (approximately 15%), the findings are consistent with those of other studies. A Queensland study found that nearly half (49%) of all the injuries sustained by nurses were back injuries (Griffin, 1985). In comparison, for the Queensland workforce as a whole, back injuries represented only 26% of all injuries. Findings of a recent investigation of manual handling practices and injuries among Intensive Care Units nurses working in a large tertiary referral medical centre in Australia are especially noteworthy (Retsas & Pinikahana, 1999). The rate of manual handling injuries among the nurses was unacceptably high (52.2%), as was back injury (71.4% of all injuries)

A survey of more than 5000 New Zealand nurses (nearly 80% response rate) found that approximately 12% of respondents experienced current nursing-related back injury (Norton et al., 1995). Obesity was found to be a significant risk factor for back injury in this correlational study, although it must be emphasized that obesity can be a consequence rather than a cause of back injury. It was also found that nurses who had worked in their current position for more than five years were at greater risk of developing back pain.

Stubbs et al. (1983) estimated the annual incidence of back pain for nurses in England and Wales to be 43.1%, based on questionnaires completed by almost 4000 nurses. Forty-four percent of the back pain episodes occurred while the nurses were at work. Seventy-eight percent indicated that their most recent episode involved the lower back. Significantly, more back pain was attributed to patient handling in geriatric, general medical, orthopaedic and district nursing, than in other settings.

A survey of nearly 4000 nurses in Scotland found that one third of the nurses questioned stated that they had acquired injuries as a result of lifting and handling patients, but only half had reported them to management (Cole, 1994). The survey also revealed:

- Untrained staff took more time off with back injuries than did trained staff, and senior ward staff took the least time.
- Sixty percent of nurses did not use mechanical aids, and only 10% had access to toilet aids.
- A quarter of senior staff had not received lifting or handling training in the past 10 years, and 35% of all staff had no such training in the past year.
- Over a third of nurses said that at times they were unable to move and handle patients correctly, either because of staff shortages or lack of equipment.
- Forty-five percent of nurses said that the traditional uniform was a hindrance rather than a help when performing lifts.

Harber et al. (1985), in a survey of 550 nurses in a large tertiary hospital in California, found that 52% of respondents had developed occupational low back pain within the past six months. Comparison with a control group of unit service coordinators, confirmed the work-related nature of the low back pain for the nurses. Twenty nine percent of nurses took medication for their low back pain, and 9% missed work due to low back pain.

In one of the few longitudinal investigations of back pain, Moffett, Hughes and Griffiths (1993) followed up 199 student nurses in British hospitals over a period of 20 months. The student nurses were assessed for physical and psychological factors prior to going on to the wards, and then followed up at intervals of approximately 3 months in the classroom, to collect completed diaries and questionnaires. Thirty-seven percent of the student nurses developed back pain which lasted for at least three consecutive days. The highest reported incidence occurred between 9 and 12 months into training, and coincided with work on wards described as "heavy" by the nurses.

Within this group of student nurses, a combination of personal characteristics were found to be associated with back pain reports. These included attitudes to health as measured by the Health Locus of Control, low levels of trait anxiety, increased neuroticism and emotional disturbance, as measured by the General Health Questionnaire, the strength endurance of the thigh muscles (quadriceps) and height. The results of this longitudinal investigation show that many student nurses are at risk of developing back pain in the early stages of their careers.

Differences observed in survey findings regarding the prevalence of back injury in nurses are probably due to variations in sampling, questionnaire formats and data collection methods. Quite legitimately, it has also been pointed out that nurses, like many others, may not always recognise the more subtle signs of back injury and thus underreport this injury. Furthermore, nurses may be reluctant to report back injury perhaps out of fear of being victimised or discriminated against by their employer (Cole, 1994). Thus, the social and industrial relations context of back injury adds to the difficulty of conducting valid survey investigations and to the proper interpretation of results by rehabilitation counsellors. Nonetheless, the survey findings discussed indicate that nurses are definitely an at-risk professional group for work-related back injuries

(Blue, 1996). Thus, for rehabilitation counsellors interested in injury prevention and early intervention, work with this group (or with employers of nurses) should be worthwhile in reducing the incidence, costs, and sequelae of back injuries among nurses.

## **Risk Factors for Back Injury**

A number of risk factors for back injury have been identified by researchers. The major risk factors for nurses are described below. Some of these are beyond the immediate influence of rehabilitation counsellors (e.g., age of worker) but many (e.g., previous injury) provide opportunities for educational initiatives or counselling to promote safe practices by individual nurses at work.

**Age.** Age is a risk factor in two different ways. As pointed out in the literature (e.g., Owen, 1986) younger nurses are definitely at risk because of their inexperience in lifting and patient transfers. On the other hand, older nurses are at risk as a result of the ageing process. Research shows that flexibility decreases as adults age due to changes that occur in the connective tissues of the body (Bell & Hoshizaki, 1981; Videman et al, 1984).

**Weight.** Many studies (e.g., Deyo & Bass, 1989; Norton et al., 1995) indicate that obesity increases the likelihood of a nurse sustaining a back injury. There are several reasons as to why obesity is a risk factor. Clearly, being overweight adds to the biomechanical stress on the spinal column, particularly when lifting patients. Obesity can also indirectly contribute to back injury through tiredness, fatigue and poor cardiovascular fitness (Pope et al., 1991).

**Previous back injury or back weakness.** A previous back injury is a significant etiological risk factor for the development of back pain in nursing personnel (Blue, 1996; Pope et al., 1991). Research shows that a previous back injury sets up a physical weakness or vulnerability making it likely that a further back injury will occur when the nurse is subject to biomechanical stress such as in patient lifting. In addition, a previous back injury might also produce some tentativeness or lack of confidence in being able to execute proper patient lifting manoeuvres (Cato et al., 1989). In other words, psychological factors may also come into play for this particular risk factor.

**Heavy lifting.** Much research shows that heavy lifting is a risk factor for the development of back injury (Love, 1996; Stobbe et al., 1988; Stubbs et al., 1983). Given that nursing involves a considerable amount of patient handling and heavy lifting, this is a major risk factor for nurses (Buckle, 1987; Harber et al., 1988; Love, 1996).

**Lifting Technique.** The use of incorrect lifting techniques or lack of use of appropriate lifting aids, as frequently happens in patient transfers, adds to the biomechanical and physiological stresses on the body (Lee & Chiou, 1994; Smedley et al., 1995). Thus a poor lifting technique increases the chances of developing a back injury.

**Staffing Levels.** Studies have found a direct link between nurse-patient ratios and the incidence of back pain or injury. As the nurse-patient ratio decreases, the back pain or injury rate increases (Howie, 1982). One study found that an insufficient number of staff for patient lifting and transferring, coupled with the time pressures involved with other health care procedures, contributed to the higher incidence of back pain or injury (Marchette & Marchette, 1985). A study of 95 back-injured nurses found that many nurses were forced to lift alone when assistance was not immediately available. Lifting in emergency situations is one such example. Nurses

in the study felt under pressure to rapidly complete their work, especially when the unit was busy or short-staffed. The same study found that the nurses would often attempt to lift alone even though they knew that the procedure was inappropriate and dangerous both for the patient and the staff (Rodgers, 1985a, b).

**Length of time in position.** The more frequently a nurse is exposed to heavy lifting, the higher the risk of back pain or injury. Hence, the length of time a nurse spends in a position is an important consideration. In one investigation the mean years of employment on nursing units where frequent lifting was required was 8 years for nurses with back pain or injury in comparison with 4.5 years for the non-injured nurses. Thus, the longer nurses work on units that require frequent lifting, the greater the risk of back injury (Owen & Damron, 1984).

In reviewing the studies on risk factors for back injury it became apparent that there are a number of methodological issues threatening the validity of the findings (see also discussion by Hignett, 1996). In particular, nearly all studies focussed on back-injured nurses with an almost exclusive reliance on retrospective reports about risk factors and events associated with back injury. Therefore, claims regarding causal relationships can be questioned. Clearly there is a need for prospective, longitudinal investigations of nurses in the search for a better understanding of the risk factors. Research of a prospective nature would also facilitate investigation of the interaction of risk factors and back injury, an issue not well understood at the moment. Finally, another important finding for rehabilitation counsellors is that it is likely that more than one risk factor is involved in the development of a back injury (Hignett, 1996; Moffett et al., 1993). Thus, rehabilitation counsellors wishing to assist individuals or groups will frequently need to involve other health professionals (e.g., ergonomists, physiotherapists, treating doctors) in the development of effective treatments or other broader interventions.

### **Prevention Programs of Interest to Rehabilitation Counsellors**

Given the prevalence and seriousness of back injuries among nurses, cost-efficient and effective interventions are urgently required in the workplace (Blue, 1996; McAbee, 1988; Pope et al., 1991). In response to this need a number of back injury preventive programs have been developed specifically for nurses. In essence, these intervention programs share two main components — education and exercises. The educational component usually includes information on the causes of back injury and need for nursing staff to take personal responsibility for their backs. This component might also address correct lifting techniques to be followed in the hospital or other workplace. The exercise component usually involves daily stretching and strengthening of muscles directly involved in lifting and patient transfers (Apts, 1992; Bean, 1989; Leonard, 1990). While evaluations of such preventive programs is often not undertaken, some data are available.

Most frequently, "open" trials have been reported in which there is no control group. For example, a back injury prevention program was developed for the Spinal Cord Injury Unit nursing staff at the San Diego Veterans Affairs Medical Centre (Galka, 1991). The preventive program comprised the following components:

- Nursing staff were required to learn and practise proper body mechanics under the supervision of a kinesiotherapist.

- Participation in 5–10 minutes of stretching, warm-up exercises at the beginning of their shift.
- Wearing a lumbar sacral back support while on duty. In addition to offering support to the lower back, this device served as a “mental reminder” to use body mechanics when transferring patients.

Following the implementation of the program, the rate of low back injuries of nurses on the Spinal Cord Injury Unit compared favourably to the rate of injuries of nurses on other main hospital units. The researchers also report an improvement in the number of lost working days. While the findings appear encouraging for the effectiveness of the preventive program, the researchers do not report figures for the criterion measures prior to the introduction of the preventive program thus making the results difficult to interpret.

Coleman and Hansen (1994) developed a multi-component educational program, “Taking Care of Yourself: Promoting a Healthy Back”, for use in hospitals and other workplaces in California. The goals of the program are to:

- increase awareness of prevention of back injury;
- decrease workers' compensation claims resulting from work-related back injury/pain;
- decrease the amount of employee sick leave taken because of back pain;
- increase work productivity through proper ergonomics; and/
- teach staff to take care of their backs at both home and at work.

In the 8-hour educational program, class participants reviewed causes of back fatigue, pain and injuries. Techniques that can be performed in the work site (e.g. stretching, strengthening, disk centralisation and decompression, and rest positions) were introduced and practised. Participants were also encouraged to practise their back exercises at home. Of the many hundreds of nurses who completed the program, 30 were randomly selected for the purpose of evaluating the long term effectiveness of the intervention at 6 and 12 months post-instruction. On the basis of hospital records and questionnaire data, the researchers concluded that the back injury preventive program was successful in achieving its objectives. However as study results were not fully reported, the positive conclusions of the investigators should be viewed with some caution. Overall though, the results of these open trials are encouraging and signal the need for more robust evaluations.

Few controlled investigations have been conducted on the effectiveness of back injury preventive programs. However, Feldstein et al., (1993) report a controlled evaluation of “Back Attack”, an educational program designed to prevent back injuries in nurses, nurses aides and hospital orderlies. This particular trial was conducted in two hospitals of Kaiser Permanent Northwest Region, a large health maintenance organisation in Oregon, Canada. The intervention program consisted of instruction and practice of proper body mechanics and specific techniques for patient transfer. An integral part of the program involved the use of a daily stretching and strengthening routine to deal with mild back discomfort. Relative to a control group, the intervention program was associated with improvements in a patient transfer measure. Reductions in self-reported back pain and fatigue were also found but did not reach statistical significance. Long-term evaluation of the program was not undertaken and are necessary to show whether improvements are actually

maintained over time, a crucial issue in evaluating the effectiveness of rehabilitation, or the stability of rehabilitation outcomes achieved at the end of any intervention program developed.

## **Policy Developments**

Given the complexities of the work environment it is probably naive to expect that staff training programs alone would reliably produce meaningful and long-lasting benefits. Ultimately, it is crucial that the prevention of back injuries be tackled through addressing issues of poor workplace design and layout, the lack of appropriate lifting equipment and aids, unsafe work practices and excessive workload. In the words of Buys and Kendall (1998), an "institutional-analysis" is really required by rehabilitation counsellors. Stating this more broadly, rehabilitation counsellors intending to work in this area need to form partnerships with interested stakeholders (e.g. employers, relevant unions) so as to tackle the problem from within a Workplace Disability Management approach. Such an approach has been estimated to achieve improvements in lowered worker compensation and other disability costs in the order 30–50% (Shrey & Hursch, 1999). Nursing unions, governments and hospitals appear to be moving in this direction with the adoption of "no lift" policies and systems. The Australian Nursing Federation recently introduced a no lifting policy which states that the manual lifting of patients is to be eliminated "in all but exceptional circumstances" (Morison, 1998). It would seem that this "macrolevel" intervention approach has merit, although research is now required on the implementation and effectiveness of no-lift policies, ideally developed within a comprehensive workplace-based approach (see Murphy, Athanasou, & King, in press; Murphy, Foreman & Young, 1997).

## **Conclusions**

The literature review established that back injuries are prevalent among nurses and constitute a significant problem considering factors such as medical costs, loss of productivity, days off, and staff morale (Hignett, 1996). Consequently, the prevention of back injuries and early intervention post injury should be seen as a high priority by all concerned, including rehabilitation counsellors, nurses, hospital administrators, unions, policy makers and insurance providers (Cole, 1994; Langford, 1991). According to many authorities, education and back exercise programs afford an appropriate, cheap and easily implemented means of preventing back injuries (Swezey & Swezey, 1990). The review found some empirical support for the efficacy of back injury prevention programs for nurses although most of the published studies are open trials in which there was no control group. Clearly, further controlled investigations need to be conducted before it can be confidently asserted that such an intervention approach is really effective. These conclusions are hardly surprising in view of the infancy of back injury prevention research with nurses (Blue, 1996; Jensen, 1987). Recently, there have been major policy developments that attempt to improve the safety of the workplace environment for nurses. Macro-level initiatives are welcomed as they should generally reduce the incidence of back injuries in the nursing profession, and for the rehabilitation counselling profession this is an area where rehabilitation counsellors working within a

Workplace Disability Management approach, can be shown to make a real, "value added" contribution.

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