Occupational injuries of physiotherapists in North and Central Queensland

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The National Occupational Health and Safety Commission of Australia has identified musculoskeletal injuries in the health industry as a key area of concern. There is little data available on injuries to physiotherapists. This study aimed to investigate the nature, prevalence, job risk factors and consequences of occupational injuries, with particular focus on musculoskeletal injuries, experienced by physiotherapists in North and Central Queensland. A work-related musculoskeletal injury was defined as pain lasting more than three days that the respondent felt was caused by their work as a physiotherapist. Fifty-five percent of respondents had experienced a work-related injury and 40% had experienced injury in the previous year. The most injured body areas were the low back, hands and neck. Over half (56%) of the initial episodes of injury occurred within five years of graduation. The job risk factors of most concern to injured respondents were sustained demanding postures, manual therapy techniques, repetition, working while injured and excessive workloads. Injured respondents chose to work while injured and not to take time off on workers' compensation or have surgery. Following injury, 38% of respondents changed work settings. Most injured physiotherapists modified their techniques to continue working. Further research is needed to develop effective preventative strategies. **[West DJ and Gardner D (2001): Occupational Injuries of physiotherapists in North and Central Queensland. *Australian Journal of Physiotherapy* 47: 179-186]**

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Introduction

In 1994, the National Occupational Health and Safety Commission of Australia identified musculoskeletal injuries in the health industry as a key area of concern (Worksafe 1994). This study aimed to investigate factors associated with such injuries in one group of health care workers: physiotherapists. There is little statistical information available in Australia for physiotherapists. In Queensland for the year 1996/7, 3133 new claims (or 51%) were from hospitals. Public sector physiotherapists were included in these figures but could not be separated out. Only 10 claims or 0.16% of new claims for 1996/7, were from private physiotherapy services (WorkCover Queensland 1999). It has been reported (Cromie et al 2000, Mierzejewski and Kumar 1997, Molumphy et al 1985) that physiotherapists tend not to report their injuries through the workers' compensation system. If so, then what official statistics there are will not give a clear picture of occupational injury in this profession. Accurate information is needed on the prevalence of injury amongst physiotherapists in Australia.

Other studies into the occupational health and safety issues affecting physiotherapists in Australia and overseas have identified a number of key areas of concern.

Firstly, high incidence rates of musculoskeletal disorders were found in this group. For instance, Cromie et al (2000) from a survey physiotherapists in the state of Victoria, Australia, found that work-related pain or discomfort had been experienced by 91% of respondents, while Bork et al (1966) identified an incidence of 61% of work-related musculoskeletal disorders among physical therapy graduates from the University of Iowa, USA.

Secondly, injuries to the low back were the most prevalent. Other commonly injured areas were the wrists, hands, upper back and neck (Bork et al 1966, Cromie et al 2000). A number of studies specifically investigated low back injuries among physiotherapists. Mierzejewski and Kumar (1997) found that 49.2% of physical therapists in Canada reported work-related low back pain. Scholey and Hair's (1989) British sample reported a lifetime prevalence of 57% and a "last 12 months" prevalence of 38% of back pain. Molumphy et al (1985) in California, USA found 29% of respondents reporting work-related low back pain.

The third area of concern raised in the literature is the risk factors associated with physiotherapists' work-related musculoskeletal disorders. Lifting patients, bending, twisting, stooping, carrying, pushing or pulling, prolonged standing and working in a hospital setting were factors associated with back pain (Bork et al 1996, Mierzejewski and Kumar 1997, Molumphy et al 1985, Scholey and Hair 1989). Using manual therapy techniques was associated with wrist and hand symptoms (Bork et al 1996, Cromie et al 2000). Age was also a factor. Bork et al (1996) found that respondents aged more than 50 years had the lowest rate of work-related injuries (Bork et al 1996). Scholey and Hair (1989), Mierzejewski and Kumar (1997) and Molumphy et al (1985) found that most respondents first developed symptoms before the age of 30 years and that more than half of these initial episodes occurred within five years of graduation.

Fourthly, the research indicated that injured physiotherapists tended not to take time off work due to their disorders (Bork et al 1996) or to seek sick leave or workers' compensation (Mierzejewski and Kumar 1997, Molumphy et al 1985). Most therapists treated themselves or sought treatment from a colleague (Bork et al 1996). As a consequence of injury, 18% changed work settings and 12% decreased patient contact time. The respondents reported a recurrence rate of 63% (Molumphy et al 1985).

There is little information on the work-related musculoskeletal injuries of physiotherapists and no information on injuries to student physiotherapists. Injury is defined in the Oxford Dictionary as "harm or damage". Thus work-related injury can be harm or damage as a result of one's work. In the literature there is no data on non-musculoskeletal occupational injuries for physiotherapists in Australia. Some job risk factors for injury have been identified. Further information is needed on the consequences of injury for Australian physiotherapists. It is postulated that physiotherapists are unlikely to report their injuries to the workers' compensation system. In the long term, injured physiotherapists may change the type of clients they treat and alter their work setting as a consequence of their pain. This study used a self-administered questionnaire to fulfil the following aims:

1. To establish the prevalence of occupational injury for physiotherapists in North and Central Queensland.
2. To investigate which body areas are the more prevalent sites of occupational musculoskeletal injury amongst physiotherapists in North and Central Queensland.
3. To explore the relationship between musculoskeletal injury and years of work as a physiotherapist.
4. To investigate the relationship between injured body areas, type of patients predominantly treated and work setting.
5. To identify the job risk factors that are considered a problem by injured physiotherapists.
6. To determine if injured physiotherapists report their injuries to the workers' compensation system.
7. To describe the most prevalent consequences of injury of physiotherapists in North and Central Queensland.

Method

Subjects All physiotherapists on the Queensland Physiotherapists Registration Board list for 1997/98, who lived in the North and Central regions of the state (postcodes ranging from 4565 to 4886), were sent a questionnaire. An additional 49 physiotherapists in this same geographical area who had dropped off the registration list in the last three years were also sent a questionnaire, in order to reach those who had recently left the profession or retired. In total, 445 questionnaires were mailed but 23 were returned having not reached their intended recipient (total 412 received). Two hundred and seventeen respondents returned completed questionnaires, giving a response rate of 53%.

Questionnaire Most of the literature reviewed used the survey method to ascertain the occupational health problems and risk factors within a population. A self-administered questionnaire is a valid and relatively inexpensive way to establish baseline risk identification information for an occupational group. Previous researchers have used a variety of definitions for work-related pain, making comparisons difficult. Several studies collected data for pain lasting three days or more (Cromie 2000, Molumphy 1985, and Scholey and Hair 1989). Also, when investigating "injuries" and using a recall period that spanned a career, just "pain" was considered insufficient. Thus the operational definition of work-related injury for this study was stated in the questionnaire as "pain lasting more than three days that you feel was caused by your work as a physiotherapist (or student physiotherapist)". The questionnaire was divided into two sections. Part A was completed by all respondents (n = 217) and yielded information on age, sex, year of graduation, work history, current hours per week of direct patient contact and type of patient currently being treated. Part B was answered only by those who had experienced a work-related musculoskeletal injury, as defined above (n = 119). Injured respondents were asked to choose the one area of injury which they considered had had the greatest impact on their career and answer subsequent questions about that injury. Here information was sought on the onset of the injury (age, years of work, work setting, direct patient contact and type of patient treated) and recurrences of the injury. Injured respondents were also asked to rate 17 job risk factors (similar to those used by Bork et al 1996) according to their importance, and to provide information on the consequences of injury.

The study was approved by the Ethics Committee of the University of New South Wales. The questionnaire was pilot tested. The final nine-page questionnaire was mailed out with a covering letter assuring confidentiality, a consent form and a postage paid return envelope. A reminder letter was sent three weeks later.

Results

Thirty-nine respondents (18%) were male and 178 (82%) were female (n = 219). These figures compare closely with the Physiotherapists Registration Board of Queensland, figures for the whole state, in which 19% of registered physiotherapists were male and 81% female. Similarly, the age distribution of therapists who answered the questionnaire was very similar to the age distribution of all registered physiotherapists in Queensland. In terms of age and sex, the study sample closely matched the population of registered physiotherapists in Queensland.

Table 1. Prevalence of injury for each body area.

Area	Previous 12-month prevalence	Career prevalence	Body area chosen as major injury
Neck	20%	24%	20%
Mid Back	11%	19%	13%
Low Back	22%	35%	41%
Shoulder	10%	14%	3%
Elbow	3%	6%	3%
Hand	14%	25%	19%
Hip	3%	4%	0%
Knee	3%	5%	0%
Ankle/Foot	2%	2%	1%

Table 2. Prevalence of hand injuries (n = 119).

Site of Hand Injury	Number	Percentage
Wrist - carpal joints (including thumb CMC joint)	41	34%
Thumb - 1st metacarpo-phalangeal joint	44	37%
Thumb - interphalangeal joint	16	13%
Fingers - metacarpo-phalangeal joints 2-5	7	6%
Fingers - interphalangeal joints proximal and distal 2-5.	15	13%

The prevalence of non-musculoskeletal occupational injury Respondents were asked if they had experienced any work related injuries that were not musculoskeletal. Eighteen (8%) answered yes. Six respondents stated that they had experienced stress-related illnesses they felt were caused by their work as a physiotherapist or student physiotherapist. Five respondents indicated they had suffered colds, flu or chest infections as a result of their work. Dermatitis was reported by two respondents. Other problems mentioned were emotional trauma, infertility due to the effect of short wave diathermy on an intrauterine device, electric shock, needlestick injury, depression and anxiety. If the stress-related illnesses (6) are considered with the emotional trauma (1) and the depression (1) problems, this group totals eight and accounts for the largest group within the non-musculoskeletal injuries.

The prevalence of musculoskeletal injury More than half of the respondents (119 out of 217, 55%) had experienced a work-related musculoskeletal injury during their career. Eighty-six respondents (40%) had experienced an injury in the last 12 months. Sixty eight per cent (68%) of those injured had experienced injury to more than one body area during their career.

Area of injury The low back was the most common site of injury, with a career prevalence of 35% (76/217). The hand was the second most prevalent site of injury (25%), followed by the neck (24%) (Table 1).

Therapists were asked if they had found their work as a physiotherapist had aggravated any injuries caused by other activities. Forty-five per cent of the answers (98/217) were yes. Again, the low back was the most prevalent area (16%) followed by the neck with 15% and the hand with a prevalence of 12%. The prevalence of knee injuries aggravated (but not caused) by physiotherapy work was 9%.

Comparison of demographics for injured and non-injured respondents No significant differences were found between the injured subjects and the uninjured subjects for age, sex, or amount of full-time or part-time work which they had done during their career. There were also no significant differences when comparing direct patient contact hours, year of graduation, current work setting or type of patient predominantly being treated at the time of the survey.

Injured subjects Part B of the questionnaire was completed only by those physiotherapists who reported a pain lasting more than three days that they considered was caused by their work as a physiotherapist or student physiotherapist. Of the 119 respondents who reported a work-related musculoskeletal injury in this section of the questionnaire, 49 (41%) stated it was a low back injury which had the greatest impact on their career. Neck (20%) and hand injuries (19%) were in second and third places, (Table 1). None of the injured respondents chose the hip or knee as the location of their major injury.

Of the injured physiotherapists, more than half (61 out of 119, 51%) had experienced hand pain. Of these respondents, 37% had experienced pain in the metacarpo-phalangeal joint of the thumb and 34% in the wrist (all carpal joints including the first carpo-metacarpal joint of the thumb). Table 2 shows the prevalence of pain for the joints of the hand. Respondents were able to choose more than one area.

Onset of the major injury *Age and years of work* On average, respondents were 28.5 years old (SD 8.5 years) when they first experienced their major injury. The average age of all respondents at the time of the survey was 38.1 years. If the injury areas are considered separately, the average age of onset is very similar for injuries to the neck, mid back, and low back but slightly higher at 30 years for the hand injuries. The low back has the lowest minimum age of injury at 17 years (Table 3).

Table 3. Age in years at which the major injury was first experienced.

Area	Average age	Maximum age	Minimum age
Combined	28	55	17
Neck	28	50	20
Mid back	28	50	19
Low back	27	43	17
Hands	30	50	20

Figure 1. Number of years working when major injury first occurred.

All respondents were registered physiotherapists. Of the 119 respondents with a work-related injury, 19 (16%) had first experienced their worst injury whilst still a physiotherapy student. Of the 99 who were graduates when they first experienced their worst injury, 47% (47/100) first experienced their worst injury in the first five years of work. In total, 66 (19 when students and 47 when graduates) or 56% of injured respondents initially experienced their worst work-related injury within the first five years of working as a physiotherapist (see Figure 1).

Work setting Information was obtained on the work settings in which injured physiotherapists were practising when they first experienced their major injury. Significantly more respondents worked in a hospital at the time of injury than at present and significantly fewer were working in non-hospital settings at the time of injury than at present ($\chi^2_1 = 16.15$, $p < 0.005$). This suggests a shift out of the hospital work setting. Similarly there is a significant shift out of the wards for injured therapists between the time they are first injured to the time of the survey ($\chi^2_1 = 10.79$, $p < 0.005$). There are other factors, such as age, that will influence such a shift of work setting and it is not within the scope of this study to ascertain the reason for these personnel movements.

Recurrences Of the 116 respondents who answered this question, 102 (88%) had experienced recurrences of their major injury that lasted more than three days. Half of the injured (58/116) experienced a recurrence of their major injury several times during the year.

Job risk factors Injured physiotherapists were asked to consider 17 job risk factors and indicate how much of a problem (if any) each item was for their major injury. They selected a number on a scale of 0 (no problem) to 5 (major problem). To ascertain which factors were considered a problem, the scores of 4 and 5 were combined and given as a percentage of the total of responses for each factor (see Table 4). Six factors were chosen by 50% or more of the injured physiotherapists as being a problem.

The job risk factor that the largest number of injured physiotherapists (58%) considered to be a problem was "working in the same position for long periods (eg standing, bent over, sitting, kneeling)". This was followed by another static posture factor, "working in static postures where flexion and/or rotation of the spine are greater than 20 degrees from neutral". Continuing to work while hurt was considered by 51% of injured respondents to be a problem. Performing manual therapy techniques was chosen by 50%. In the questionnaire, "manual therapy" was not specifically defined. It is assumed the physiotherapy population would include mobilisations, manipulations, and massage in its concept of manual therapy. Repetition, ie "performing the same task over and over" and "treating an excessive number of patients in one day" were considered a problem by 50% of injured respondents. The factor the respondents considered had least impact was "inadequate training on injury prevention". Lifting or transferring dependent patients was considered a problem by 35% of injured physiotherapists, while carrying, lifting or moving equipment was a problem for 25% (Table 4). The response rate varied slightly between factors.

When the respondents with different major injury were considered separately from each other, this pattern of response remained the same for the low back, mid back and neck. In contrast, however, respondents with hand injuries chose using manual therapy techniques (82%), repetition (77%), and treating an excessive number of patients a day (73%) as their three most important risk factors. There was a significant difference between the number of hand-injured physiotherapists who considered performing manual therapy techniques a problem and the other injured respondents who did not ($\chi^2_1 = 10.70$, $p < 0.005$). There was also a significant difference between hand-injured physiotherapists who considered repetition as a problem compared to hand injured respondents who did not consider it a problem ($\chi^2_1 = 7.58$, $p < 0.01$).

Respondents whose major injury was to their low back

Table 4. Job risk factors rated as a problem.

Job Risk Factors	Number	Percentage
Working in the same position for long periods (eg standing, bent over, sitting, kneeling)	67/116	58%
Working in static postures where flexion and/or rotation of the spine are greater than 20 degrees from neutral	59/116	51%
Continuing to work while injured or hurt	59/116	51%
Performing the same task over and over	58/115	50%
Performing manual therapy techniques	58/115	50%
Treating an excessive number of patients in one day	58/116	50%
Lifting or transferring dependent patients	41/117	35%
Unanticipated sudden movements or fall by patient	39/117	33%
Not enough rest or pause breaks during the work day	38/116	33%
Bending or twisting movements of your back greater than 20 degrees from neutral.	38/116	33%
Reaching or working away from your body	39/117	33%
Working near or at your limits	38/117	32%
Carrying, lifting or moving heavy materials or equipment	29/116	25%
Assisting patients during gait activities	26/116	22%
Work scheduling (overtime, irregular shifts, length of work day)	26/117	22%
Working with confused or agitated patients	24/117	21%
Inadequate training on injury prevention	7/117	6%

considered lifting or transferring dependent patients as a significant risk factor ($\chi^2_1 = 9.46$, $p < 0.005$). When the injured therapists whose major injury was to their spine (ie neck, mid and low back) were considered as a group, there were three risk factors which were significant problems. They considered working in the "same position for long periods" ($\chi^2_1 = 17.91$, $p < 0.005$) and "bending and twisting movements" ($\chi^2_1 = 11.74$, $p < 0.005$) as significant problems compared with the other injured respondents, who did not consider these risk factors a problem. "Working in static postures where flexion and/or rotation of the spine is greater than 20 degrees from neutral" was also reported as a significant problem when compared with respondents with non-spinal injuries ($\chi^2_1 = 25.40$, $p < 0.005$).

Consequences of injury Respondents indicated which consequences had occurred as a result of their injury. Table 5 lists the consequences and the percentage of respondents who experienced that consequence as a result of their work-related injury. The consequences can be grouped into two types: 1) medical or treatment consequences for the physiotherapist as a result of the injury and 2) the chosen actions of the physiotherapist which enabled them to continue to work with their injury. Of the medical consequences described, most respondents (90/117, 77%) sought physiotherapy treatment, 45% took prescribed medication and 42% saw a doctor. Only 3% of respondents (3/117) chose surgery (Table 5).

Of the injured therapists who answered this question in the survey, 24% took time off on sick leave but only 4% (5/117) took time off on workers' compensation. Thus it appears very few injured physiotherapists in North and Central Queensland reported their injuries to the workers' compensation system.

As Table 5 shows, the most chosen of all the consequences was an action affecting the workplace with 86% (101/117) of respondents needing to modify their own physiotherapy techniques. More physiotherapists chose to change their techniques than to seek any form of treatment. Forty-one percent of respondents changed their duties (48/117) and 39% changed their work setting. Thirty-one per cent of respondents decreased patient contact hours and the type of patient treated was changed by 29%. Very few injured physiotherapists retired early (n = 1) or left the profession (n = 3) as consequence of their injury. The survey was sent to physiotherapists who had left the registration list over the previous three years. However, the results for "left the physiotherapy profession" and "retired early" may still be low, due to the survey sample being biased toward registered physiotherapists. It is reasonable to expect that physiotherapists who have left the profession or retired will have withdrawn from the registration list and be difficult to contact.

When the consequences are considered based on injury site, some trends and variations can be seen. Respondents

Table 5. Consequences of injury.

Consequences	Number	Percentage
Modified your physiotherapy techniques	101/117	86%
Sought physiotherapy treatment	90/117	77%
Taken prescribed medication	53/117	45%
Consulted a doctor	50/118	42%
Changed your duties	48/117	41%
Changed work setting	45/117	39%
Had diagnostic imaging (X-rays, MRI, CT etc)	37/118	31%
Decreased patient contact hours	36/117	31%
Changed type of patient predominantly treating	34/117	29%
Time off on sick leave	28/117	24%
Sought alternative treatments	26/117	22%
Used braces, splints or other orthoses	25/117	21%
Exercise or posture program	14/117	12%
Time off on workers' compensation	5/117	4%
Had surgery	3/117	3%
Left the physiotherapy profession	3/117	3%
Other consequences	2/117	2%
Retired early	1/117	1%

whose major injury was to their low backs overwhelmingly (92%, 45/49) modified their physiotherapy techniques as a consequence of their injury and 47% (23/49) changed their duties. The majority (71%, 35/49) sought physiotherapy treatment and 45% consulted a doctor.

Of the respondents whose major injury was to their hands, 91% (20/22) needed to modify their physiotherapy techniques as a result of their injury. More than half of the hand-injured respondents (55%, 12/22) had used braces, splints or other orthoses. The majority sought physiotherapy treatment and 45% were seen by a doctor. All twenty-three respondents whose major injury was to their neck (ie 100%) sought physiotherapy treatment. The majority of those whose major injury was to their neck (56%) had taken prescribed medication and 43% had consulted a doctor. Again, a large proportion of this group (78% or 18/23) modified their treatment techniques.

Discussion

More than half (55%) of the physiotherapists who responded to the survey had experienced a work-related musculoskeletal injury (pain lasting more than three days that they considered was caused by their work as a physiotherapist) during their career. Cromie (2000) reported that 91% of respondents had experienced work-related pain or discomfort at some time but Cromie used a broader definition than this study, which may explain the larger prevalence. Forty-five per cent of respondents indicated that their work as a physiotherapist had aggravated injuries caused by other activities. Eighteen (8%) respondents had experienced work-related injuries that were not musculoskeletal. The largest group of these was stress and depression-related illnesses. These aspects of work-related injury for physiotherapists have not been studied previously.

This study found the low back was the most prevalent site of work-related injury amongst physiotherapists. These results are consistent with the findings in previous research. The career prevalence for hand injuries was 25%, with the thumb and the wrist most commonly affected. Bork (1996) found a third of his respondents had a problem with work-related wrist and hand symptoms in the previous 12 months. In Victoria, Cromie (2000) reported a lifetime prevalence of 19% for pain in the thumbs and wrists lasting three days or more. These studies highlight the extent to which physiotherapists suffer from hand pain as a result of their work.

Of the injured therapists in this study, 41% reported that the low back injury was the injury that had had the greatest impact on their career. The neck was chosen by 20% and the hands by 19%. These are very similar to Cromie's (2000) findings for the most significant area of pain, with the low back 48%, neck 12% and the hands (wrists and thumbs) 19%.

This study supports other research that shows that the onset of work-related injury tends to occur early in a physiotherapist's career. Of the injured physiotherapists in this study, 16% first experienced their injury as a student and 56% of respondents initially experienced their worst work-related injury within the first five years of working as a physiotherapist. These results are comparable with those of Cromie et al (2000), Bork et al (1996), Molumphy (1985) and Mierzejewski (1997). These findings tend to suggest a strong survivor bias (Bernard 1997). As few physiotherapists leave the profession, and few enter the compensation system, those who are injured early in their career must have taken effective action to avoid serious re-injury.

One quarter (25%) of the physiotherapists surveyed had experienced a hand injury during their career. The majority of these suffered thumb and wrist pain. Respondents whose major injury was to their hands were on average 30 years old (minimum 20 years and maximum 50 years) when they first experienced their injury. There is a marked predisposition for females to develop osteoarthritis of the first carpo-metacarpal joint (base of the thumb) with 20% of all women over the age of 40 likely to suffer from arthrosis of the thumb (Fredriksson 1995). The trend in this study of physiotherapists appears to be more injuries to the thumb and at an earlier age than would be expected by normal age changes. There were insufficient males in this study to make a comparison between the sexes.

The six job risk factors considered by the majority of injured respondents to be an ongoing problem were: working in the same position for long periods; working in static postures with flexion or rotation; continuing to work while injured; performing manual therapy techniques; treating an excessive number of patients in a day; and repetition of task. Respondents felt that inadequate training was the least important risk factor.

Hand-injured respondents considered performing manual therapy techniques and repetition to be significant risk factors. This may well be a result of the combination of repetition, force and the position in which the wrists and thumbs are held when performing manual therapy techniques. Those respondents whose major injury was to the spine (neck, mid and low back), considered working in the same position for long periods, static postures with flexion and/or rotation, bending and twisting movements and treating an excessive number of patients to be significant problems. The low back injured respondents as a separate group considered lifting or transferring dependent patients as a significant risk factor. These results are consistent with others findings (Cromie 2000, Molumphy 1985, Scholey and Hair 1989).

Few injured physiotherapists in this study had taken time off on workers' compensation (4%), whereas 24% had taken time off on sick leave. Cromie (2000), in her Victorian study, reported that 7% of those reporting pain had lodged a workers' compensation claim, compared with 14% who had taken sick leave. Further research is needed to determine the reasons and attitudes behind this trend. To reveal the true extent of occupational musculoskeletal problems, physiotherapists should be encouraged to report their injuries. In Australia, the workers' compensation system is the official body that deals with occupational injury and rehabilitation. Some method of injury surveillance is necessary for physiotherapy departments and businesses to be able to develop and evaluate risk control measures. In the states of Queensland and Victoria, there is a legal requirement to record musculoskeletal injuries in the workplace (Brooks 1993). Certainly the official workers' compensation figures are inaccurate as a measure of occupational injury for physiotherapists, due to under-reporting and the non-separation of physiotherapists' claims from other professions in the health care industry.

The consequences of injury for respondents gave some insight into attitudes to injury and favoured personal methods of risk control. Modification of physiotherapy techniques was an option taken by most of the injured therapists (86%). Cromie (2000) states that 73% of physiotherapists in her survey experiencing pain, changed or modified treatment at some time. Research into which techniques or treatments are modified and how they are changed would provide valuable risk analysis information.

Many of the injured physiotherapists changed their duties (41%) or their work setting (39%), reduced patient contact hours (31%) or changed the type of patient treated (29%). Few had left the profession (3%) or retired early (1%). The survey carried out in Victoria reported that 3% had left the profession altogether as a result of work-related musculoskeletal disorders (Cromie 2000). Even though the Victorian study samples a population of physiotherapists predominantly more metropolitan than in this Queensland study, the results are very similar. This shows that flexibility within the physiotherapy profession in Australia has helped many injured therapists to continue working. Because physiotherapists are able to work in various settings, with different types of patients, they have a certain amount of freedom to steer their careers into areas where their injuries are not aggravated. Thus career path change within the profession (ie change of work setting and type of patient treated) is a consequence of injury and worthy of further investigation. As other factors not dealt with here can be involved, additional research is needed to determine how important injury is as a cause of personnel movement between physiotherapy work settings and speciality areas.

This survey is limited by a small sample size (n = 217). It is drawn from a population of non-metropolitan physiotherapists who service a huge geographical region of Queensland. One of the main problems with a retrospective questionnaire is the length of the recall period that is used. In an attempt to improve recall, the definition of injury as pain lasting more than three days was used, so that respondents were remembering a significant period of pain.

Conclusion

This study presents descriptive data on the occupational injuries of physiotherapists in North and Central Queensland. They have a prevalence of work-related musculoskeletal injury in excess of official statistics but showing similar trends to studies reported in Victoria (Australia), United Kingdom, USA and Canada. More than half the respondents had experienced a work-related injury. Some respondents had experienced non-musculoskeletal injuries that they considered were work related. The low back musculoskeletal injuries predominate with the initial episode of injury usually occurring in the first five years of practice. Neck and hand injuries, especially injuries to the base of the thumb and the wrist, are also prevalent. The job risk factors injured physiotherapists are most concerned with are static postures, repetitive actions, treating an excessive number of patients, working while injured and performing manual therapy techniques. Hand-injured physiotherapists are especially concerned about using manual therapy techniques and repetition. Low back injured physiotherapists are particularly concerned about lifting and transferring dependent patients. Physiotherapists who have injured their spines have identified static postures with and without flexion and rotation as significant contributors to their ongoing problems. Injured physiotherapists in the survey chose to modify their treatment techniques and work environment. As a consequence of injury, many changed the type of patient treated and their work setting. They chose to work while injured and not to take time off on workers' compensation or have surgery.

The official measures of occupational injury do not include most of the work-related musculoskeletal injuries of physiotherapists in this survey. More emphasis needs to be placed on the reporting of injuries by physiotherapists themselves. Perhaps a more appropriate injury surveillance method should be developed and implemented by the profession. Most injured therapists reported that they had modified their treatment techniques as a consequence of injury. Further risk analysis is required on the physiotherapy techniques that are modified and the job risk factors that concern therapists. From this information, effective control measures could be developed and introduced into the profession. Changing work setting and patient type is a consequence of injury for many injured respondents. Further research is necessary to determine the importance of injury as a factor in personnel movement between specific physiotherapy work settings.

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