

# The occurrence of musculoskeletal injuries in nursing professionals: An analysis of Portuguese hospitals

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## ABSTRACT

The motivation to perform this particular research comes from a need which we feel exists for further research in this area. It is necessary to answer a set of questions both empirical (observed over the years in the area of health and safety) and theoretical (following an analysis of the international literature) relative to the dimension of the problem of musculoskeletal injuries resulting from the exercise of the nursing profession in a hospital context. Research questions addressed include: 1) Are there complaints associated to the performing of nursing tasks? 2) How serious in terms of absolute numbers are musculoskeletal injuries? 3) What sort of influence does the environment (namely buildings) play, as well as technology / equipment, and work organization? Furthermore, 4) What should be present in the workplace but is not? After analyzing survey (of 168 active nurses in Portuguese hospitals) and interview data and having observed nurses at work, accompanying them in their day-to-day tasks, there is a global tendency to consider that, over the last twelve months of work, in a hospital context, nursing professionals have felt pain or musculoskeletal discomfort in a part of their bodies. Research results point also to more training and more adequate working spaces being needed in order to decrease musculoskeletal injuries amongst nurses. Furthermore, the more widespread usage of technological means which are lacking in some hospitals (such as beds with adjustable height, trapeze-type supporting bars attached above beds, patient transferring lifts and transferring belts) or in bad condition (such as wheels on beds, wheelchairs, and stretchers, which makes moving patients difficult) could also reveal itself to be an important aid, presenting itself as a solution to the problem discussed herein, on the one hand due to the number of injuries on the other due to the need for more professionals.

**Keywords:** Nurses, Portuguese hospitals, musculoskeletal injuries

## INTRODUCTION AND BACKGROUND

This study is related to ergonomics in the nursing profession. Ergonomics is defined herein as being "a formal branch of learning" (Wilson, 2000, p.557), more specifically as being a modern science based on "the theoretical and fundamental understanding of human behaviour and performance in purposeful interacting socio-technical systems, and the application of that understanding to [the] design of interactions in the context of real settings" (Wilson, 2000, p.557). Nursing on the other hand is seen to be "a holistic approach to people... [involving] the prescription of interventions and the monitoring of results" (Paiva, 2006, p.27).

The motivation to perform this particular research comes from a need which we feel exists for further research in this area. It is necessary to answer a set of questions both empirical (observed over the years in the area of health and safety) and theoretical (following an analysis of the international literature) relative to the dimension of the problem of musculoskeletal injuries resulting from the exercise of the nursing profession in a hospital context. These concerns have been consistently reinforced by various studies developed by different researchers, of which Rogers and Salvage (1988), Pheasant (1991), Owen (2004) and Collins and Menzel (2006) are examples. Research questions addressed include: 1) Are there complaints associated to the performing of nursing tasks? 2) Which tasks are these? 3) How serious in terms of absolute numbers are musculoskeletal injuries? What sort of influence does the environment (namely buildings) play, as well as technology / equipment, and work organization? Furthermore, what should be present in the workplace but is not?

Following the introduction to the article, to be found below, the reader will find a review of the literature which is seen to be closely related to our area of interest. This is followed by a discussion of our methodology for the research, an exposition of the results of the study, and finally a discussion of our findings and other concluding remarks. We have not intended to simply write a theoretical paper and so some practical solutions to the problems encountered are advanced at the end of the paper. These solutions are connected to technology (for example to take some of the physical workload off nurses) which, as some nurses in our study pointed out, is not very commonplace - technology tends more often than not to be associated to doctors rather than to nurses. This is thus seen to be another novelty introduced by our research.

## A REVIEW OF THE LITERATURE

Ergonomics has earned an independent status "as a discipline in its own right" (Wilson, 2000, p.557) related to the design of interactions (Wilson, 2000) and basic ergonomic concepts are relevant to the nursing profession. Ergonomics training and musculoskeletal health have been focused on in the literature (see for example Robertson et al., 2008, though in this case the study is applied to a computer-based office setting rather than to the nursing profession). We see that the topic of ergonomics training is closely related to musculoskeletal health in the nursing profession, as we discuss below. Much as Robertson et al. (2008) found, we believe that positive, significant effects will result from ergonomics training efforts. Robertson et al. (2008) found that ergonomics training coupled with technology (a highly adjustable chair) lead to lower musculoskeletal problems. In this paper the focus is on technology as an alternative solution to the problem of musculoskeletal injuries. Technology

referred to herein as the "theoretical and practical knowledge... used to develop products... the outcome of development activities to put inventions and discoveries to practical use" (Burgelman et al., 2009, p.2). Vieira et al. (2006) refer also to training and to lifting devices (or technology) as a solution to reduce injury amongst the nursing population.

Dul and Neumann (2009) go further and relate ergonomics to business performance and not just to occupational health and safety "in order to strengthen the position of ergonomics and ergonomists" (Dul and Neumann, 2009, p.745). We also see that ergonomics training can improve the performance of nurses in hospital settings as healthier nurses (e.g. injury-free) will be able to attend to patients' needs with more care and attention, especially in tasks which involve moving and transferring patients, nurses' main functions (Collins and Menzel, 2006).

Nursing is a profession with a high incidence of back pain (Rogers and Salvage, 1988; Vieira et al., 2006; Vieira, 2007; Branney and Newell, 2009; Vieira and Kumar, 2009). Rogers and Salvage (1988) refer that lower back pain in particular is the most frequent injury in nursing, this seen to be due to biomechanical demands (Vieira and Kumar, 2009). Rogers and Salvage (1988) refer still further that one in six nurses will experience back pain or injury each year, nurses thus having almost twice the absenteeism levels due to back pain than the rest of the working population. Rogers and Savage (1988) estimate a loss of 764.000 work days per year (National Health Service, UK) due to this disorder in particular.

Collins and Menzel (2006) refer that in a study done in 1985 by a team led by Harber who examined more than 500 nurses in a hospital in California that more than half had had back pain in the last three months. Collins and Menzel (2006) refer further to a study by Owen (1989) involving a random sample of nurses who worked in Wisconsin in which they found that 52% of the hospital nurses referred that they had felt lower back pain over the previous year. In this same study 48% of these nurses stated that lifting and re-positioning patients in bed had led to their lower back pain. Collins and Menzel (2006) refer still further to a study by Lee and Chiou (1994) involving 3.159 younger nurses in Taiwan (average age of 24.8 years) that 69.7% had in their first year experienced back pain symptoms.

Other related studies include Daraiseh et al. (2003) who refer that nursing professionals, in view of evidence presented by several studies, are more exposed to musculoskeletal symptoms (MSS) than the rest of the working population, though there are "workload differences between nursing jobs" (Vieira et al., 2006, p.79). Vieira et al. (2006) studied low back problems and possible improvements in nursing jobs in a hospital environment and state that "the literature shows that low back injuries are common among nurses, and intervention programs are needed to address this problem." (Vieira et al., 2006, p.79). A later study by Vieira (2007) also addresses why nurses have a high incidence of low back pain and advance a solution to this "most frequent and costly musculoskeletal disorder" (Vieira, 2007, p.141) which will involve "fitness for work, job modifications, and training programs" (Vieira, 2007, p.141). Finally, Pompeii et al. (2009) also study "musculoskeletal injuries resulting from patient handling tasks among hospital workers", a study culminating in "the implementation of a minimal manual lift policy".

## METHODOLOGY

The present study adopted both a quantitative and qualitative approach and followed the research process as outlined by Bouma and Atkinson (1995): 1) A clarification of the issue resorting to the literature and the subsequent selection of a research method; 2) Data collection; 3) Analysis and interpretation.

The main research question is: How serious are musculoskeletal injuries in the nursing profession in a hospital context in Portugal? In particular, nurses are seen to be "a high-risk group for low back pain... attributable to the physically demanding nature of their work" (Pheasant, 1991, p.291). At the same time nurses reveal themselves as having "high levels of stoicism" due to the comparatively low sickness absence that they register despite this high prevalence of back pain (Pheasant, 1991). Can we improve the safety and health at work of nursing professionals, namely resorting to technology and lifting aids? This may require "a fundamental change of thinking: at the moment, the use of lifting aids is the last resort" (Rogers and Salvage, 1988, p.128).

Other studies have applied questionnaires for the analysis of musculoskeletal symptoms and functional disability. Kitis et al. (2009) do so for industry workers and more specifically concerning upper-extremity musculoskeletal complaints. Vieira et al. (2006) administered a questionnaire to nurses in hospitals with "questions on workload, history of back injuries, problems, possible solutions and psychophysical measures of exertion." (Vieira et al., 2006, p.79). Our study is different in so far as it applies a questionnaire coupled to further interview interactions.

Survey responses from active nursing professionals were gathered in our study from January to December of 2010. Our study involved nurses from a number of hospitals rather than focusing on only one hospital, as was the case for example in Martins (2008). The hospitals where the nurses surveyed work are located in the following regions: *Trás-os-Montes e Alto Douro* (one hospital), *Douro Litoral* (nine hospitals), *Minho* (three hospitals), *Estremadura* (two hospitals), *Ribatejo* (one hospital), *Beira Litoral* (two hospitals), and the *Algarve* (one hospital). Of note is that some of the surveys were gathered in face-to-face interactions, others while using a video-conferencing tool, while still other respondents sent responses by e-mail and by post. A number of the respondents who answered the survey face-to-face (sixty two respondents) also gave other insights into their profession - after the survey was finished the interaction continued in the form of an interview (averaging a further 40 minutes), following on from issues raised during the survey (some of the interviews were tape-recorded, especially those conducted outside hospital premises) which adds to the interest of the findings of the study.

Results included herein are thus concerning a survey, as well as interviews, of active nurses. We thus combine distant (quantitative research) and close (qualitative research) relationships between the researcher and subject (Bouma and Atkinson, 1995). The survey has been tested and applied in other studies of Portuguese nurses (see for example Martins, 2008) and involves questions about biographical data, musculoskeletal occurrences, complaints, and symptoms, the perception of the development of injuries and other musculoskeletal disturbances, and work conditions. The interviews were performed by a single researcher (as opposed to a team of interviewers), thus minimizing the bias throughout (Bell, 1999).



The sample includes 168 active nurses working in Portugal, 15% of whom male and 85% of whom female. Most of the sample (64%) had ages between 20 years and 30 years of age, 39% of these having ages between 26 and 30 years. 51% of the sample works in the Internal Medicine Unit of hospitals, units where older people with various health problems and conditions stay for what often could turn out to be prolonged periods of time. Given that older people tend to have mobility problems the strain on nurses in these units tends to be greater, thus younger and more able nurses often starting out their careers are the norm in the Internal Medicine Unit of hospitals.

In the various hospitals where a formal agreement for a more in-depth participation in the research study was reached the nurses who responded were the nurses on duty that day. Outside these hospitals the sample of nurse respondents was random.

## RESULTS

A summary of the research findings follows below:

- As their professional category 65% of the nurses surveyed referred that they are "level 1" nurses, while only 8% indicated that they belong to the category "specialist nurse".
- The nurses surveyed can be divided into three categories, according to the number of years in the profession. Thus we have: a) Less than one year: 20%; b) Five years in the nursing profession: 38%; c) In the nursing profession for over ten years: 23%.
- Despite the time in the profession as indicated by the surveyed nurses being mainly between one and five years, the time dedicated to their current duties shows that it doesn't pass over the two-year mark in the same service.
- Most of the surveyed nurses (sample), a total of 91% of the answers, perform "care-taking duties" and only 3% perform "management" duties.
- 86% of the sample indicated that their time schedule rotates.
- 92% of the sample revealed that their time at work during the week is between 35 hours and 42 hours, however 3% have a working time schedule which is over 42 hours.
- On average the ratio nurse/patient reaches nine to ten patients per nurse, however the night shift presents a higher ratio with an average of 12 patients per nurse.
- Relative to the existence of work accidents which are related to musculoskeletal origins, 75% of the sample did not manifest that occurring.
- Of the 25% who indicated having had work accidents with musculoskeletal origins, 32% did not present sick leave due to incapacity, however 68% presented a two day to over one month's incapacity, with particular relevance to 32% of the sample who indicated work incapacity of between one and two weeks.
- As concerns the type of work accident suffered 48% revealed lower-back injuries and 20% manifested muscular injuries in the superior members.
- Although the majority of the sample had not manifested work accidents as having a musculoskeletal origin, 81% had symptoms and presented pain or discomfort of this same origin in a part of their bodies during the last twelve months.
- In relation to symptoms 58% presented localized pain and 18% stated that they had a tickling as well as a numb feeling.
- The region of the body most affected, with 40% of the answers, is the lower-back region followed by the cervical (20%) and dorsal (18%) regions.
- 58% of the sample confirmed that they had used some form of treatment due to symptoms associated to musculoskeletal injuries.
- Of the 58% of the sample who confirmed having used treatment associated to musculoskeletal symptoms, 35% affirmed having used self-medication, 25% used physiotherapy, 24% used prescribed medication and only 2% needed to resort to surgery.
- For 39% of the sample the tasks that they perform are able to be performed by them however they will originate problematic musculoskeletal symptoms; 34% need rest during a rest period at work to recover and 22% need really to slow down the work rhythm or to alter the way work is performed.
- As concerns availability of support equipment for transferring patients, 51% of the sample stated that they have at their disposal and use a patient transferring lift, 43% stated that they have and use a transferring board for transferring patients to a stretcher, but 59% referred that they have no transferring belt at their disposal.
- As concerns the availability of equipment for moving patients including for hygiene activities, it is relevant to refer that there are no walking sticks (25%), no crutches (21%), and there is no stool for bathing (15%). There are however wheel chairs (18%) and hygiene chairs for bathing (17%).
- In relation to the existing equipment for helping to move patients in bed, 50% of the sample indicated the existence of beds with adjustable height, though 34% indicated that there are no trapeze-type supporting bars attached above the beds.
- Relative to the knowledge about the risk of developing musculoskeletal injuries and their consequences, 98% of the sample stated that they are aware of the risks.
- About 32% of the sample indicated that the knowledge of the risks involved (of developing musculoskeletal injuries) was acquired during academic training, 20% stated that they acquired this knowledge through reading scientific journals and articles, and 18% revealed that this knowledge was passed on to them during on-job training.
- In relation to the situations that the sample consider contribute to the risk of developing musculoskeletal injuries, 13% indicated that moving and manually positioning patients is the main factor while 10% indicated that the lack of support material and equipment is the main cause.

- 26% of the sample revealed that reaching and holding weight away from their bodies are the postures that most contribute to the risk of developing musculoskeletal injuries, followed by 22% and 21% respectively for movements involving inclining the body forward and rotating the body while standing.
- When faced by excessive weight the interventions adopted by 42% of the sample involve using support equipment and searching for a better working posture, while 26% stated that asking for the help of colleagues is their preferred solution.
- 54% of the sample indicated that there are shift periods during which it is not possible to have pauses but during those periods they count on the collaboration of colleagues to carry out their activities.
- 33% of the sample revealed that beds, wheelchairs, and stretchers have wheels in bad condition which makes moving patients difficult. 23% of the sample indicated that there is equipment that they do not know how to use, so training is needed.
- The situations which condition the nurses' posture during work are the inadequate availability of space (work rooms, nursing rooms, patients' WCs) and the difference in height of the bed and stretcher when transferring patients (44% of the sample).
- The interventions in the workplace which can reduce the risks of developing musculoskeletal injuries are the use of transfer lifts (14% of the sample) and diminishing the patients/nurse ratio as well as hiring more nurses (again 14% of the sample).
- Figure 1 below characterizes the discomfort caused by working as a nurse.

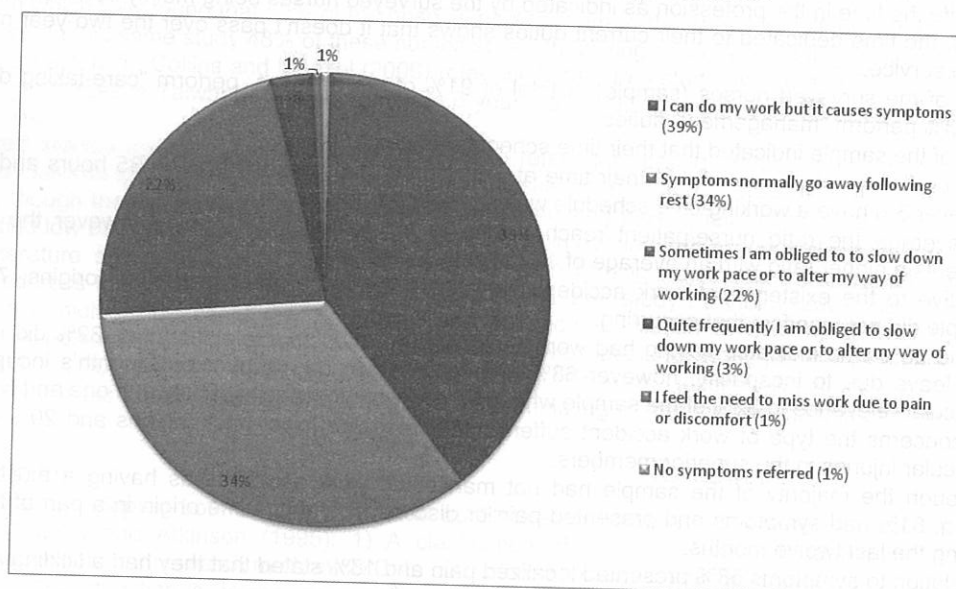


Figure 1 – A characterization of the discomfort caused by working as a nurse

## DISCUSSION AND CONCLUSIONS

Relative to the existence of work accidents which are related to musculoskeletal origins, 75% of the sample did not manifest that occurring. This is seen to be related to the fact that musculoskeletal injuries are not usually considered to be work accidents. Furthermore, only a medical doctor can consider musculoskeletal injuries to be an occupational disease.

The fact that the time dedicated to their current duties shows that nurses haven't passed over the two-year mark in the same service should be beneficial in the context of musculoskeletal injuries as rotating services will mean that nurses will thus vary their musculoskeletal strain. This in turn should protect them from performing tasks long enough to develop an injury.

Interestingly, after analyzing the survey and interview data and having observed nurses at work, accompanying them in their day-to-day tasks, there is a global tendency to consider that, over the last twelve months of work, in a hospital context, nursing professionals have felt pain or musculoskeletal discomfort in a part of their bodies. However, there are always discrepancies between the number of complaints registered and the number of notified injuries. This leads us to conclude that this type of problem is not always reported by professional nurses and, consequently, is not accounted for by the occupational health services. The precariousness of employment which we currently live under could explain this discrepancy.

Almost the entire sample of nurses are well-informed concerning the professional risks to which they are subject, namely concerning musculoskeletal injuries and their consequences, and this knowledge is acquired mainly through academic training but also through the reading of scientific publications and through on-job training. It was signaled as a relevant factor by the surveyed nurses to distribute the physical weight of patients over a larger number of professionals. The ratio patient/nurse is seen to be a critical factor to prevent occupational injuries. The excess work load has made it impossible to have pauses between tasks, which leads to a greater number of injuries.

During the undertaking of the interviews the nurses referred constantly that training to prevent musculoskeletal injuries was insufficient and late in arriving. One nurse in an internal medical unit at some point stated that: "I have done this training over five years ago and currently feel the need to review many of the procedures, or mistakes even, which I commit in my day-to-day duties, while moving patients and repositioning patients".

Furthermore, having more adequate working spaces (such as patients' WCs) would make possible the adoption of better working postures by nurses.

Finally, the more widespread usage of technological means which are lacking in some hospitals (beds with adjustable height, trapeze-type supporting bars attached above beds, patient transferring lifts, transferring boards for transferring patients to a stretcher, transferring belts, as well as simpler equipment such as walking sticks and crutches) or in bad condition (such as wheels on beds, wheelchairs, and stretchers, which makes moving patients difficult) could also reveal itself to be an important aid in moving and transporting patients, thus presenting itself as a solution to the problem discussed herein, on the one hand due to the number of injuries on the other due to the need for more professionals.

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