MUSCULOSKELETAL DISORDERS IN PROVIDING HEALTHCARE AT PATIENTS' HOME: RISK ASSESSMENT AND CONSTRUCTION OF STATISTICAL MODELS FOR FORECASTING

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KEYWORDS

WRMSDs, Nurses, Home Care

ABSTRACT

Work related musculoskeletal disorders (WRMSDs) have been described as the most important occupational health problem tormenting the nursing workers.

Main goals of this work are the characterization and evaluation of musculoskeletal complaints in nurses who provide home-based care in northern Portugal and also development of statistical predictive assessment models.

This work demonstrates a preliminary analysis on the evaluation of responses to a questionnaire based on one developed by Kuorinka and colleagues.

The first results reveal that a great percentage (88.7%) of the respondents provides home health care. The most frequent complaints are in spine (cervical – 74.4%; lumbar – 63.9%; dorsal – 50.4%) and shoulders (48.9%). There is statistically significant association between "musculoskeletal complaints in the lumbar region" and "provide home care" (OR=4.21 ($p<0.05$), 95% Confidence Interval [1.4; 13.2]). There are no statistically significant association between to have musculoskeletal complaints in other body regions and "provide home care", at 0.05 level ($p>0.05$).

Based on these results we can say that nurses who provide home care have a fourfold chance of having musculoskeletal complaints in the lumbar region when compared with the nurses who don't provide home care.

INTRODUCTION

The most recent research is unanimous in finding that the WRMSDs continue to affect a significant proportion of the working people from various professional (Denis et al. 2008; Gauthy 2007). In the EU-27, 25% of workers complain of back pain and 23% of muscle pain (Gauthy 2007). In addition, the WRMSDs are a major cause of incapacity for work resulting in significant financial costs to both the individual and the corporate sector and also society in general. In Portugal, the results of a pioneering study on the impact of back pain of the Portuguese revealed, in October 2009, that the back pain affected 72.4% of the population aged over 18 years. Of these, over 420 thousand missing work during 2008 (in "Jornal de Notícias", 15 October 2009).

For professionals in the health sector, various professional groups come to be strongly affected by WRMSDs, including the nurses for whom this type of injury is identified as the main problem of occupational health (Barroso et al. 2007; Bos et al. 2006; Smith et al. 2006).

In general, studies conducted on this subject have been carried out in the hospital context. There is little information regarding the WRMSDs in providing home care (Simon et al. 2008). For example, Cheung and colleagues found that there is a large gap in respect of research to study the problem of back pain in nurses who provide home-based care (Cheung et al. 2006). In Portugal, there is no knowledge of any study on WRMSDs in the provision of home care. Moreover, currently, the home-based care are of increasing importance as the population is rapidly aging, contributing therefore to a greater demand for such services. Seniors over 80 years are already about 450 thousand in Portugal and it is expected that by 2060 this number will triple (Giannakouris 2008)

Based on the above arguments, and since the activities in the home care settings are developed, in general, in a work environment substantially different from that found in the hospital context, it was thought that the issue was of utmost importance.

The main objectives of this work are the characterization and evaluation of musculoskeletal complaints in nurses who provide home-based care in northern Portugal and also development of statistical predictive assessment models. It was chosen this region because it is one of the most densely populated in Portugal representing about 35% of the total (Instituto Nacional de Estatística 2010).

METHODOLOGY

The methodology for this work was a questionnaire in electronic format. The questionnaire was developed based on the "Standardized Nordic Questionnaire for the analysis of musculoskeletal symptoms" (Kuorinka et al. 1987). There have been some adjustments in order to better adapt to nursing activities carried out during the home care. Several questions were added in order to collect more information to enable the application of statistical techniques to identify the largest possible number of WRMSDs risk factors and evaluate its impact on the diagnosis of such disorders (Braga et al. 2006; Daraiseh et al. 2003).

The contents of the questionnaire were validated by several nurses from Health Centers and it is available on a website to be filled in by nurses belonging to Health Centers from the North Region of Portugal.

The responses are anonymous. Only the Health Center that belongs to the nurse will be known. The system generates a code for each respondent to allow them to pause and resume filling whenever they wish. When a questionnaire is submitted all the information contained in it goes to a database properly organized to allow the processing of data is simpler and faster. The questionnaire is divided into 4 parts: A, B, C and D. Parts A and B are an adaptation of the Standardized Nordic Questionnaire (Kuorinka et al. 1987) while parts C and D are unique and include only issues related to the work carried out in patients' homes.

Part A covers demographic aspects and aspects relating to the profession, such as sex, age, weight, height, handedness, seniority in the profession, among others. The nurse is also questioned about their habits sports and leisure and also about their musculoskeletal health. It also incorporates an issue that distinguishes between nurses who provide care only in the Health Center and those who provide home care. These, unlike those who only work in health centers must respond to the entire questionnaire.

Part B includes the identification and characterization of complaints and musculoskeletal symptoms self-reported by nurses. The complaints refer to different body segments (neck, shoulders, elbows, wrist/hand, back, lower back, thighs, knees, ankles/feet) and report to the last twelve months. At the end of this part is a group of questions aimed at identifying the most common symptoms and also their intensity (ranging on a scale with four levels) for each of body segments described above and for the last twelve months.

Part C, which can only be filled by nurses who provide home care, begins by asking how many hours per week on average, are dedicated to home care. The following is a list of nursing activities, which asked the nurse to select the activity performed most often during the provision of home care. In view of this activity, the nurses are asked to answer a series of questions that are actually an adaptation of the technique REBA for musculoskeletal risk assessment (Hignett and McAtamney 2000).

The last part of the questionnaire, Part D contains questions relating to various aspects still unexplored in the previous parts, as some physical factors and psychosocial factors. Some authors have related these factors with musculoskeletal complaints (Botha et al. 2006; Cheung et al. 2006; Ono et al. 1995; Sherehiy et al. 2004; Simon et al. 2008; Smith et al. 2006). Examples of physical factors are the height of the bed, the site characteristics (organization of the workspace, hygiene, availability of aids for moving patients). Examples of psychosocial factors have aspects related to the imposition of work (degree of dependence of patients and whether they are cooperating), aspects related to the stress caused by work, aspects of the personality of the nurse (if they're anxious or irritable), organizational aspects (whether they do a 5 min breaks during the work shift, if they think they have enough time for the proper performance of tasks, if they work alone or not).

The questionnaire was released through an e-mail message sent to all Health Centers in the northern region of Portugal during the second half of 2009 and also through mail during the first half of 2010.

RESULTS

By the end of August 2010 we received 133 complete responses in a universe of about 2500 nurses (response rate of 5.3%). The questionnaires received have been treated statistically by Statistical Package for Social Sciences (SPSS or PAWS Statistics 18.0®). The first results were as follows.

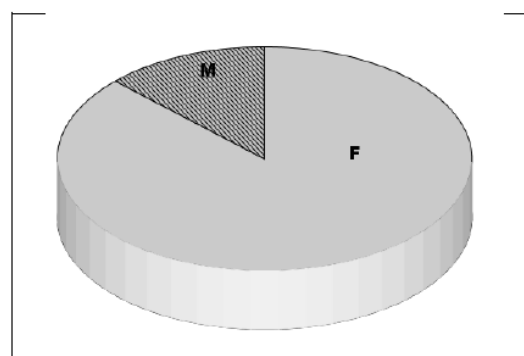It was found that about 87% of nurses are female and about 13% are male.

Figure 1: Distribution of respondents by sex

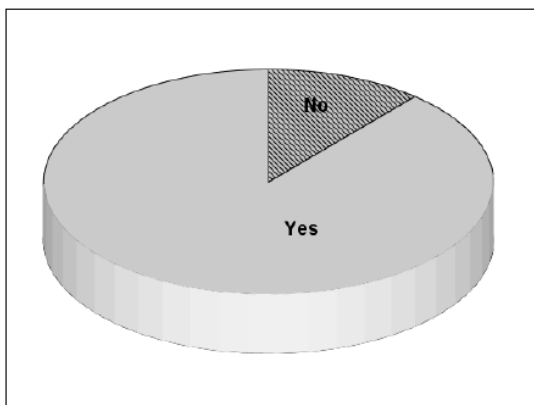About 88.7% of respondents refer that provide home health care.

Figure 2: Distribution of respondents in the provision of home care

The distribution of musculoskeletal complaints among different body zones, referring to all the respondents is as follows:
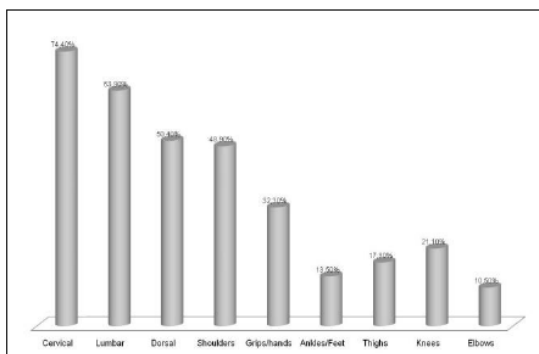

Figure 3: Distribution of related complaints referring to all the respondents

The area with most complaints is the vertebral column: the cervical with about 74.4% of complaints followed the lumbar region with 63.9% and the dorsal region with 50.4%. After the spine, the region with most complaints is the shoulders with 48.9%.

The overall prevalence of musculoskeletal complaints for the past 12 months for the nurses who provide home care is 90.7% with 95% confidence interval between 83.6% and 95.0%.

The following chart is identical to the previous one, but now the complaints are divided into two groups: the group of nurses who provide home care and the group of nurses who don't. Based on this sample of respondents, no differences were found between the two groups at the level of complaints in various body

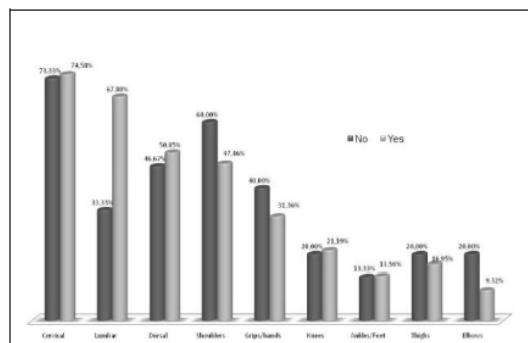zones, except in the lumbar region, as can be seen on Figure 4.

Figure 4: Distribution of related complaints referring to two nurses' groups: those who provide and those who do not provide home care

All results presented below relate to the group of nurses who provide home care.

It appears that, on average, these nurses make about 8 hours per week working at patients' home. The median of 6 hours per week means that 50% of the respondent nurses works less than 6 hours per week in home care. The difference between median and mean value is due of presence of several nurses that refers that works more than 20 h/week in home care. So, the variability is large, and the number of hours devoted to this activity varies from 1 hour to 35 hours per week.

Table 1: Weekly number of hours worked at patients' home

Mean	8,19
Median	6.00
Variance	47.50
Std. Deviation	6.89
Minimum	1
Maximum	35
Range	34
Interquartile Range	6

It was found that in general, the home care nurses works alone. In the present study, about 33.9% of them say they never have help from colleagues and 39.8% said they rarely have help. The remaining 26.3% says that have some help from colleagues with frequency, often and always.
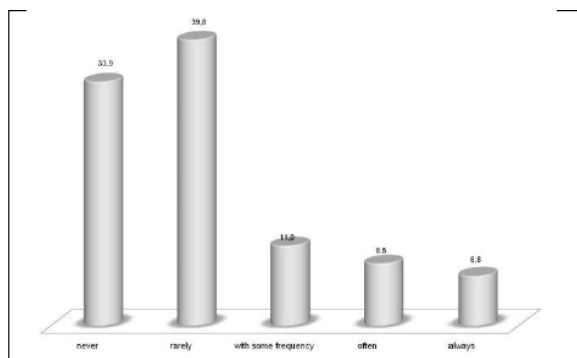
Figure 5: Distribution of responses regarding the frequency with which they have help from colleagues

This is one of the differences between working in institutional settings and work in home care settings. The former, in addition to having a controlled and well-equipped environment, have also nurses and other staff who can help the nurse in tasks where necessary, especially those involving the movement of the patient.

The activities carried out more frequently in the home care settings are the treatment of pressure ulcers (44.9%) and the implementation of dressings (40.7%).
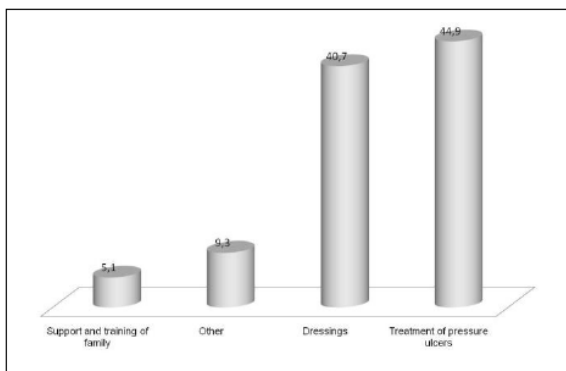

Figure 6: Task performed more frequently in home care environment

One of the questions were asked the nurse to comment on the height of the bed (or any other surface), where the treatment of patients was performed. Eighty-two point two percent consider it low, 16.9% consider it appropriate and 0.8% considers it high.
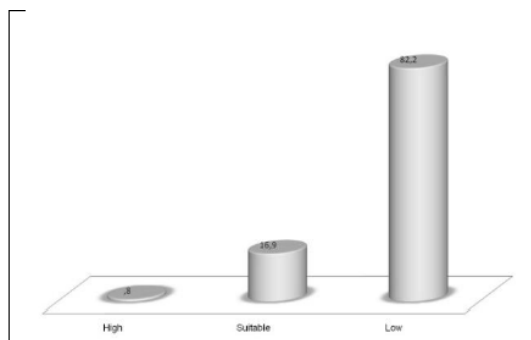

Figure 7: Distribution of responses regarding the bed's height

Ninety-two point four percent of nurses who provide home care reported that usually they need to move the patient to treat him and 97.5% of nurses reported that in general there are no patients lifting/transferring devices, and hence need to do it manually. These results are illustrated below.
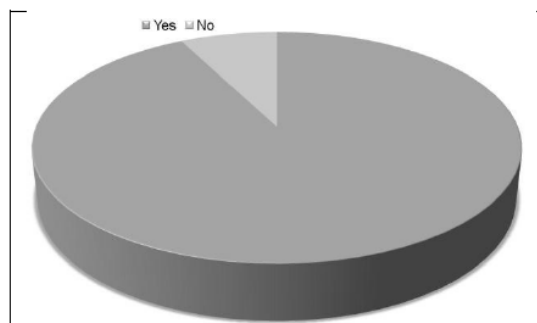

Figure 8: Distribution of responses regarding the need for patient's transfer
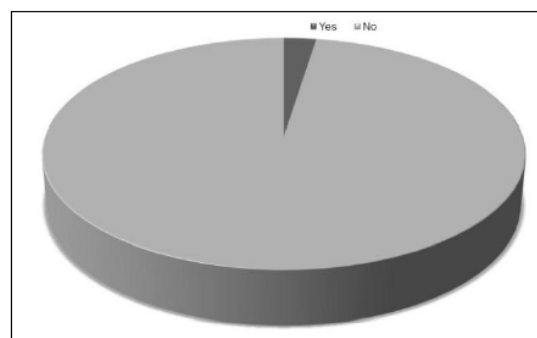
Figure 9: Distribution of responses regarding the availability of lifting/transferring devices

To measure the association between the factors "provide home care" and "the different related complaints" (dependent variables) we carried out models of binary logistic regression to evaluate the odds ratio and respective confidence intervals. We did not detect any statistically significant association at 0.05 level (p>0.05), except in relation to the lumbar

region (OR=4.21 (p<0.05), 95% Confidence Interval [1.4; 13.2]).

Table 2: Odds ratio and 95% CI for related complaints

Complaints	Odds ratio	95% CI
Cervical	1.07	(0.32, 3.60)
Dorsal	1.18	(0.40, 3.47)
Lumbar	**4.21**	**(1.35, 13.18)**
Thighs	0.82	(0.21, 3.16)
Knees	1.08	(0.28, 4.11)
Ankles/feet	1.02	(0.21, 4.95)
Shoulders	0.60	(0.20, 1.80)
Grips/hands	0.69	(0.23, 2.07)
Elbows	0.41	(0.10, 1.68)

Nurses who provide home care have about a fourfold chance of having musculoskeletal complaints in the lumbar region when compared with the nurses who don't provide home care.

CONCLUSIONS AND FURTHER RESEARCH

The sample size does not allow an inference about the population. However we can characterize it according to several important aspects, namely:

- The sample shows a higher number of female nurses (87% against 13% of male nurses);

- About 88.7% of nurses who work at Health Centers from Northern Portugal provides home care;

- The body regions with the greater number of complaints are the spine (cervical region – 74.4%, lumbar region – 63.9%, dorsal region – 50.4%) and the shoulders (48.9%). These values are somewhat consistent with studies of other authors carried out both at hospital context and at home care settings (Cheung et al. 2006; Knibbe and Friele 1996; Lagerstrom et al. 1995).

- On average, nurses work circa 8 hours a week in home setting and there, the most often performed task is the treatment of pressure ulcers (44.9%);

- About 82.2% of home care nurses consider the height of the bed (or any other surface where's the patient) low; 16.9% consider it suitable and 0.8% considers it high. This aspect is important because previous studies already revealed as a factor in the emergence of awkward postures and consequently of musculoskeletal complaints. In this research

developed focusing the attention on a nurse's figure and the occupation in home care nursing Capiello and colleagues confirmed that a problem of insufficiency, with regards to physical space, existed. For example, reduced and uncomfortable space, scarce ventilation, inadequate beds and lack of hygiene (Cappiello et al. 2005). Note, also the results of a study carried out by de Looze and colleagues: "especially the reduction of exposure to a high level of force on the L5-S1 motion segment without a concomitant rise in peak forces, speak in favour of the use of height-adjustable beds in nursing" (de Looze et al. 1994).

- Ninety-two point four percent of home care nurses reported that usually they need to move the patient to treat him and 97.5% of nurses reported that in general there are no lifting/transferring devices at patients home. Several authors reported to be used, whenever possible, lifting aids in tasks that involve the handling of patients. The non-use can lead to a greater likelihood of musculoskeletal complaints (Botha et al. 2006; Elford et al. 2000; Smedley et al. 1997).

- We did not find any statistically significant association (p>0.05) between "musculoskeletal complaints in any part of the body" and "provide home care", except in relation to the lumbar region (OR=4.21 (p<0.05), 95% Confidence Interval [1.4; 13.2]). Nurses who provide home care have about a fourfold chance of having musculoskeletal complaints in the lumbar region when compared with the nurses who don't provide home care. Several authors have found that the risk of musculoskeletal diseases was higher for the home care workers than for other occupations and also was higher than for other health care sectors (Knibbe and Friele 1996; Myers et al. 2002; Ono et al. 1995).

As future work, we will follow some nurses, during their visits to patients to collect local data and video footage of their activity. Risk assessment will be based on the video footage and information recorded for different activities and through application of the REBA procedure (Hignett and McAtamney 2000). This will allow a more realistic characterization of the risk of WRMSDs.

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