

Musculoskeletal disorders in nurses who provide home care

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ABSTRACT

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

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

Main goal of this work is the characterisation and evaluation of the risk of WRMSDs on the home care nursing.

The first results reveal that a great percentage of the respondents provide home care. The most frequent complaints are in spine and shoulders. There are no significant association between the related disorders and the home care ($p < 0.05$).

Keywords

WRMSDs; Nurses; Home Care; Risk Assessment

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 [8] [10]. In the EU-27, 25% of workers complain of back pain and 23% of muscle pain [10]. 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 2008¹.

For professionals in the health sector, various professional groups come to be strongly affected by WRMSDs, including the nurses that this type of injury is identified

¹ These results are published in "Jornal de Notícias", 15 October 2009 (http://jn.sapo.pt/PaginaInicial/Sociedade/Interior.aspx?content_id=1390915 available on 12/01/2010)

as the main problem of occupational health [1] [2] [23].

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 [21]. 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 [6]. 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 [11].

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. It was chosen this region because it is one of the most densely populated in Portugal representing about 35% of the total [13].

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" [15]. 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 lesions [4] [7].

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 [15] 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 [12].

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 [3] [6] [19] [20] [21] [23]. 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).

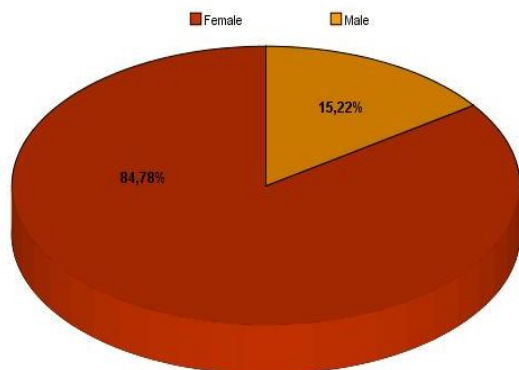
The questionnaire was released through an e-mail message sent to all Health Centers in the northern region of Portugal during the second half of 2009.

RESULTS

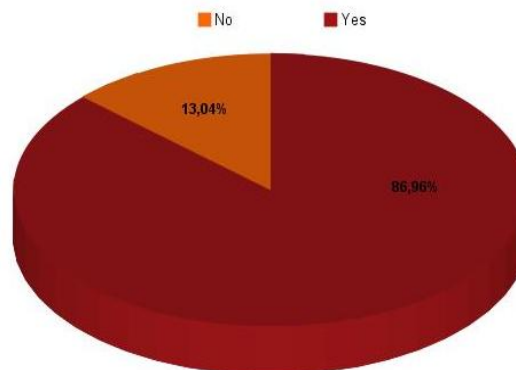
By the end of 2009 we received 46 complete responses in a universe of about 2200 nurses (response rate of 2.5%). However, the questionnaires received have been treated statistically by Statistical Package for Social Sciences (SPSS or PAWS Statistics 18.0®). The first results were as follows.

It was found that about 85% of nurses are female and about 15% are male. Eighty-seven percent of respondents refer that provide home health care.

Distribution of respondents by sex

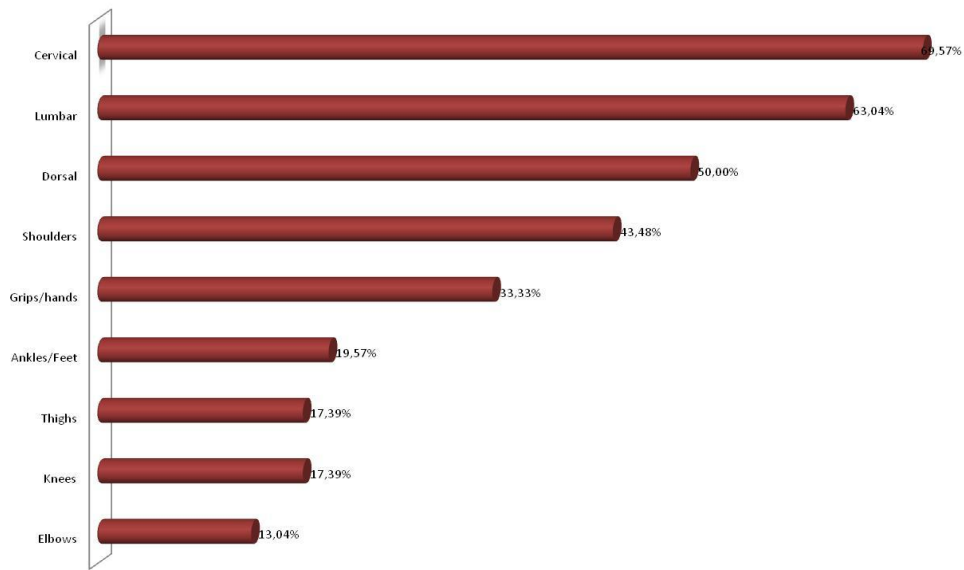


Distribution of respondents in the provision of home care



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

Distribution of related complaints referring to all the respondents

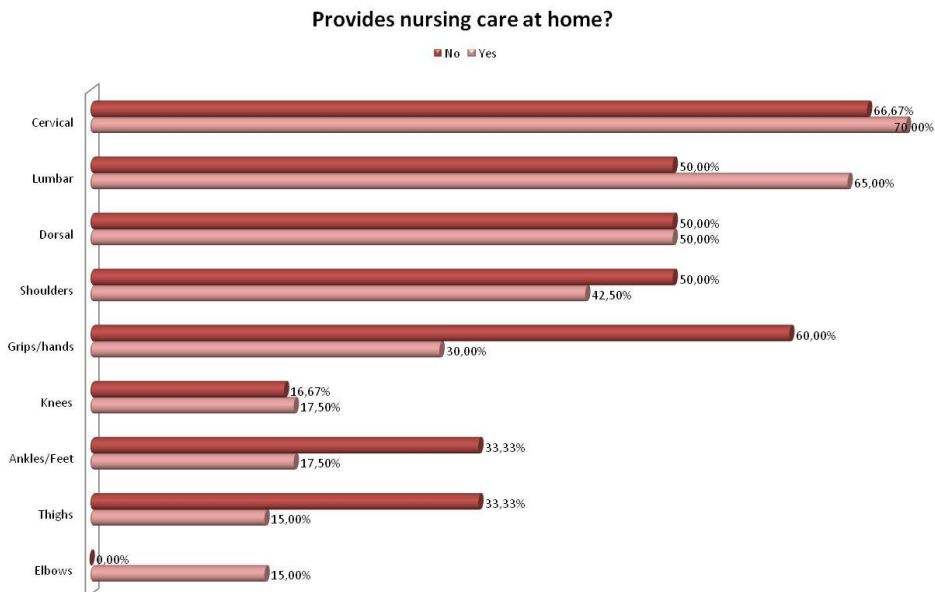


The area with most complaints is the vertebral column: the cervical with about 70% of complaints followed the lumbar region with 63% and the dorsal region with 50%. After the spine, the region with most complaints is the shoulders with 43.5%.

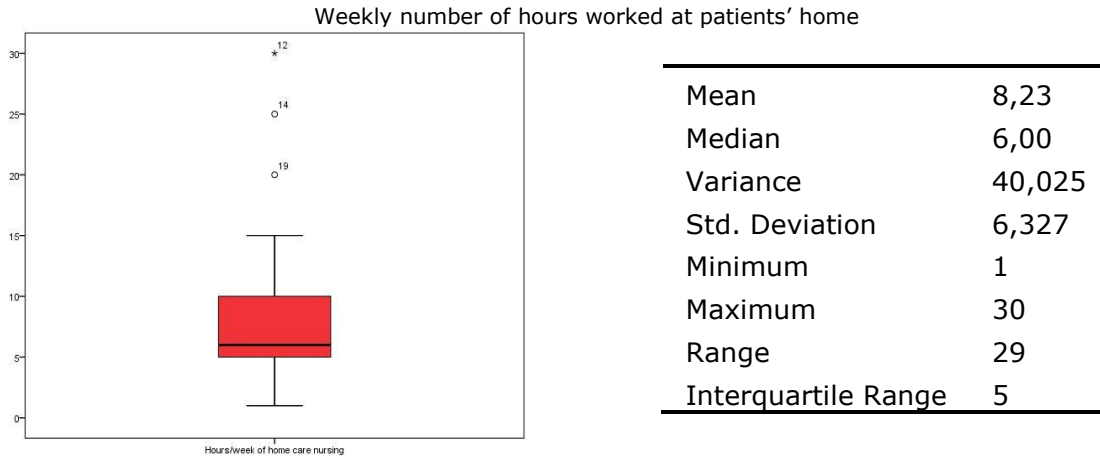
The overall prevalence of musculoskeletal complaints for the past 12 months for the nurses who provide home care is 92.5% with 95% confidence interval between 78.5% and 98.0%.

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.

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

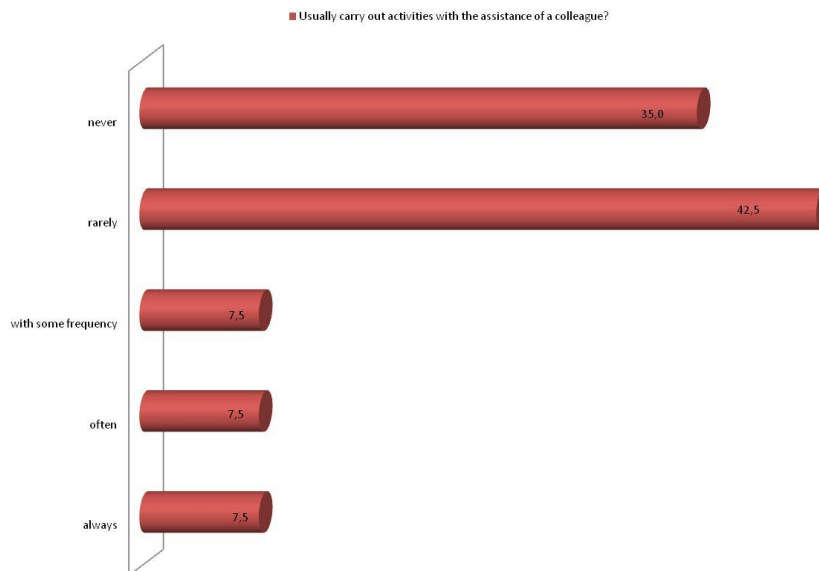


All results presented below relate to the group of nurses who provide home care. It appears that, on average, these nurses make about 8 hours per week working at patients' home. The median of 6 hours per week means that 50% of the respondent nurses works less than 6 hours per week in home care. The difference between median and mean value is due of presence of 3 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 30 hours per week.



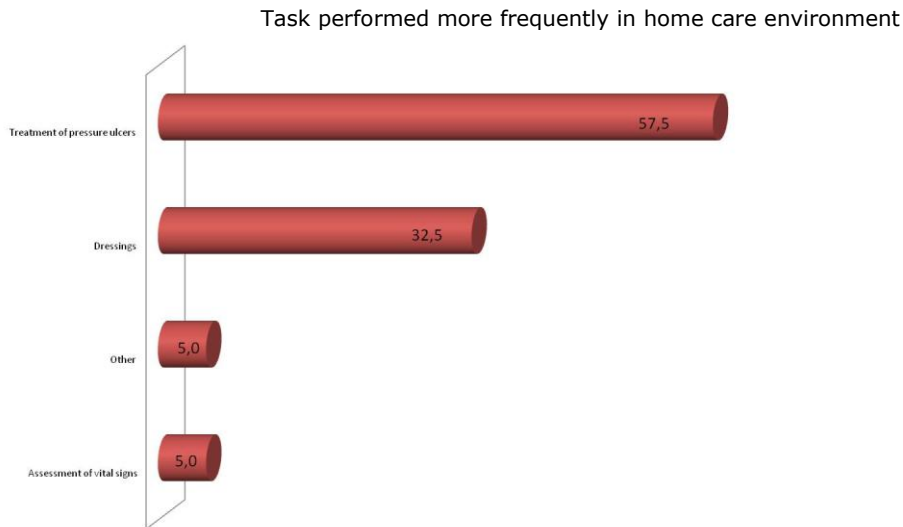
It was found that in general, the home care nurses works alone. In the present study, about 35% of them say they never have help from colleagues and 42.5% said they rarely have help. The remaining 22.5% says that have some help from colleagues with frequency, often and always.

Distribution of responses regarding the frequency with which they have help from colleagues

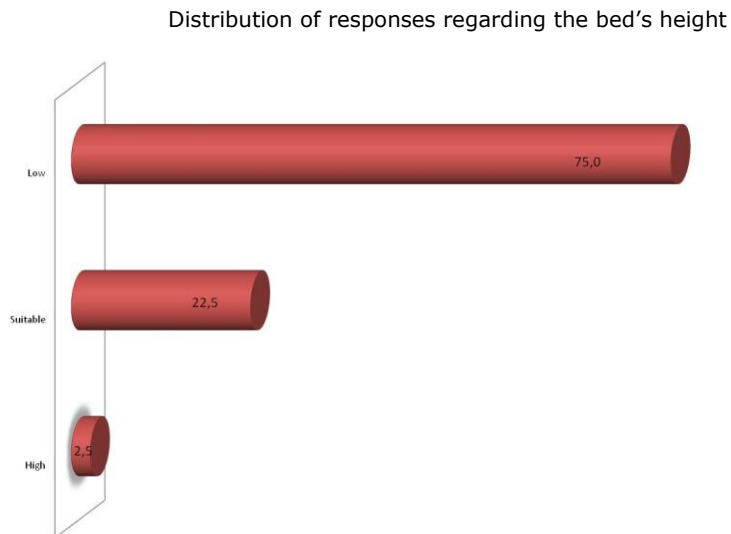


This is one of the differences between working in institutional settings and work in home care settings. The former, in addition to having a controlled and well-equipped environment, have also several nurses and other staff who can help the nurse in tasks where necessary, especially those involving the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

The activities carried out more frequently in the home care settings are the treatment of pressure ulcers (57.5%) and the implementation of dressings (32.5%).

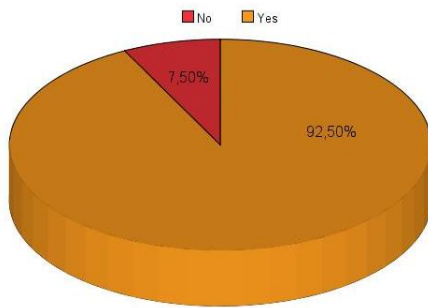


One of the questions were asked the nurse to comment on the height of the bed (or any other surface), where the treatment of patients was performed. Seventy-five percent consider it low, 22.5% consider it appropriate and 2.5% consider it high.

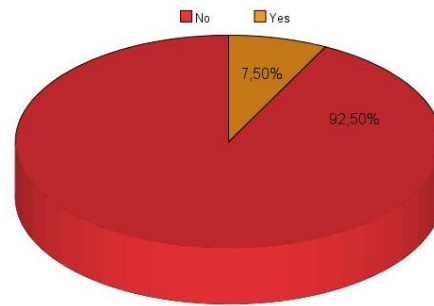


Ninety-two and a half percent of nurses reported that usually they need to move the patient to treat him. Also 92.5% of nurses who provide home care reported that in general there are no patients lifting/transferring devices, and hence need to do it manually. These results are illustrated in graphs below.

Distribution of responses regarding the need for patients transfer



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 ($p < 0.05$).

Odds ratio and 95% CI for related complaints

Complaints	Odds ratio	95% CI
Cervical	1.17	(0.19, 7.25)
Dorsal	1.00	(0.18, 5.56)
Lumbar	1.86	(0.33, 10.45)
Thighs	0.35	(0.05, 2.38)
Knees	1.06	(0.11, 10.54)
Ankles/feet	0.42	(0.07, 2.79)
Shoulders	0.74	(0.13, 4.12)
Grips/hands	0.29	(0.04, 1.94)
Elbows	-	-

DISCUSSION AND CONCLUSIONS

Given that the number of responses received so far does not allow an inference about the population, however we can characterize this sample according to some important aspects, namely:

- The sample shows a higher number of female nurses (85% against 15% of male nurses);
- About 87% of nurses who work at Health Centers from Northern Portugal provides home care;
- The body zones with the greater number of complaints are the spine (cervical - 70%, lumbar - 63%, dorsal - 50%) and shoulder (43.5%). These values are somewhat consistent with studies of other authors carried out both at hospital context and at home care settings [6] [14] [16].

- On average, nurses work circa 8 hours a week in home setting. The most often performed task is the treatment of pressure ulcers (57.5%);
- About 75% of home care nurses consider the height of the bed (or any other surface where's the patient) low; 22.5% consider it suitable and 2.5% consider it high. This 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 [5]. 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" [17].
- Ninety-two and a half percent of home care nurses reported that usually they need to move the patient to treat him. Also 92.5% 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 [3] [9] [22].
- We did not find any statistically significant association ($p < 0.05$) between "musculoskeletal complaints in any part of the body" and "provide home care". However the estimate of the odds ratio at the lumbar reveals a greater risk for nurses who provide home care when compared with those who not. 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 [14] [18] [19].

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 [12]. This will allow a more realistic characterization of the risk of WRMSDs.

REFERENCES

1. Barroso, M.; Carneiro, P.; Braga, A.C. (2007). Characterization of Ergonomic Issues and Musculoskeletal complaints in a Portuguese District Hospital. Proceedings of the International Symposium "Risks for Health Care Workers: prevention challenges", Athens.
2. Bos, E.H.; Krol, B.; Van Der Star, A.; Groothoff, J.W. (2006). The effects of occupational interventions on reduction of musculoskeletal symptoms in the nursing profession. *Ergonomics*, Vol.49, 7, 706-723.
3. Botha, W. E.; Bridger, R. S. (1998). Anthropometric variability, equipment usability and musculoskeletal pain in a group of nurses in the Western Cape. *Applied Ergonomics*, 29:6, 481-490.
4. Braga, A. C.; Macedo, P.; Ferreira, A. P. (2006). Modelo de regressão logística em ortodontia. Actas do XIV^o Congresso da Sociedade Portuguesa de Estatística, Covilhã.
5. Cappiello, E.; Righini, R.; Trevisani, F.; Tovoli, D. (2005). A Survey on the Ergonomic Quality of the Home to Home Nursing Aid Services of the Local Health Unit of Bologna, in *Healthcare Systems Ergonomics and Patient Safety – Proceedings of the International Conference HEPS 2005*, Florence, Italy, 30 March- 2 April 2005. ISBN: 0 415 37556 8.
6. Cheung, K.; Gillen, M.; Faucett, J.; Krause, N. (2006). The Prevalence of and Risk Factors for Back Pain Among Home Care Nursing Personnel in Hong Kong. *American Journal of Industrial Medicine*, 49:1, 14-22.
7. Daraiseh, N.; Genaidy, A.M.; Karwowski, W.; Davis, L.S.; Stambough, J.; Huston, R.L. (2003). Musculoskeletal outcomes in multiple body regions and work effects among nurses: the effects of stressful and simulating working conditions. *Ergonomics*, 46:12, 1178-1199.
8. Denis, D.; St-Vincent, M.; Imbeau, D.; Jetté, C.; Nastasia, I. (2008). Intervention practices in musculoskeletal disorder prevention: A critical literature review. *Applied Ergonomics*, 39, 1-14.
9. Elford, W.; Straker, L.; Strauss, G. (2000). Patient Handling with and without slings: an analysis of the risk of injury to lumbar spine. *Applied Ergonomics*, 31, 185-200.
10. Gauthy, R. (2007). Musculoskeletal disorders – An ill-understood "pandemic". European Trade Union Institute for Research, Education, Health and Safety: Brussels.
11. Giannakouris, K. (2008). Population and social conditions. Eurostat. *Statistics in Focus*, 72/2008. <http://www.apapr.ro/images/BIBLIOTECA/demografie/eurostat%20focus%202008.pdf> - available on 02/02/2010.
12. Hignett, S.; McAtamney, L. (2000). Rapid Entire Body Assessment (REBA). *Applied Ergonomics*, 31:2, 201-205.
13. Instituto Nacional de Estatística (2010). *The People 2008*. ISBN: 978-989-25-0074-4.
14. Knibbe, J.J.; Friele, R.D. (1996). Prevalence of back pain and characteristics of the physical workload of community nurses. *Ergonomics*, 39:2, 186-198.
15. Kuorinka, I.; Jonsson, B.; Kilborn A. (1987). Standardized Nordic Questionnaires for Analysis of Musculoskeletal Symptoms. *Applied Ergonomics*, 18:3, 233-237.
16. Lagerstrom, M.; Wenemark, M; Hagberg, M; Hjelm, E. (1995). Occupational and individual factors related to musculoskeletal symptoms in five regions among Swedish nursing personnel. *International Archives of Occupational and Environmental Health*, 68, 27-35.
17. de Looze, M.P.; Zinzen, E.; Caboor, D.; Heyblom, P.; van Bree, E.; van Roy, P.;

- Toussaint, H.; Clarijs, J. (1994). Effect of individually chosen bed-height adjustments on the low-back stress of nurses. *Scandinavian Journal of Work, Environment & Health*, 20, 427-434.
18. Myers, D.; Silverstein, B.; Nelson, N. (2002). Predictors of Shoulder and Back Injuries in Nursing Home Workers: A Prospective Study. *American Journal of Industrial Medicine*, 41, 466-476.
 19. Ono, Y.; Lagerstrom, M.; Hagberg, M.; Lindén, A.; Malke, B. (1995). Reports of work related musculoskeletal injury among home care service workers compared with nursery school workers and the general population of employed women in Sweden. *Occupational and Environmental Medicine*, 52, 686-693.
 20. Sherehiy, B.; Karwowski, W.; Marek, T. (2004). Relationship between risk factors and musculoskeletal disorders in the nursing profession: A systematic review. *Occupational Ergonomics*, 4, 241-279.
 21. Simon, M.; Tackenberg, P.; Nienhaus, A.; Estryng-Behar, M.; Conway, P.M.; Hasselhorn, H.-M. (2008). Back or neck-pain-related disability of nursing staff in hospitals, nursing homes and home care in seven countries – results from the European NEXT-Study. *International Journal of Nursing Studies*, 45, 24-34.
 22. Smedley, J.; Egger, P.; Cooper, C; Coggon, D. (1997). Prospective cohort study of predictors of incident low back pain in nurses. *British Medical Journal*, 314, 1125-1128.
 23. Smith, D.R.; Mihashi, M.; Adachi, Y.; Koga, H.; Ishitake, T. (2006). A detailed analysis of musculoskeletal disorder risk factors among Japanese nurses. *Journal of Safety Research*, 37, 195-200.