



Work-related musculoskeletal disorders in nursing professionals: an integrative literature review*

Distúrbios osteomusculares relacionados ao trabalho em profissionais de enfermagem: revisão integrativa da literatura

Disturbios osteomusculares relacionados al trabajo en profesionales de enfermería: revisión integrativa de la literatura

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ABSTRACT

Objective: To evaluate evidence of the susceptibility of the nursing staff for Work-Related Musculoskeletal Disorders (WRMD). **Methods:** An integrative review of the literature using the databases: Virtual Health Library (VHL), VHL Nursing, Scopus and Theses Database of the University of São Paulo (USP), obtained 17 studies. **Results:** It was evident that WRMD affect nursing professionals and relate to the inadequate conditions of the workplace, and to the organization and structure of work. **Conclusion:** It is necessary to invest in preventive programs, improving capabilities, health education, intervention strategies and the organization of existing services.

Descriptors: Cumulative trauma disorders; Musculoskeletal diseases; Nursing; Occupational health; Nursing, team

RESUMO

Objetivo: Avaliar as evidências sobre o adoecimento de trabalhadores de enfermagem pelos Distúrbios Osteomusculares Relacionados ao Trabalho (DORT). **Métodos:** Revisão integrativa da literatura utilizando as bases: Biblioteca Virtual em Saúde (BVS), BVS Enfermagem, Scopus e Banco de Teses da Universidade de São Paulo (USP) obtendo-se 17 estudos. **Resultados:** Evidenciou-se que os DORT acometem os profissionais de enfermagem e relacionam-se às condições inadequadas dos ambientes de trabalho, à organização e estrutura do trabalho. **Conclusão:** É necessário investir em programas preventivos, capacitações, educação em saúde, estratégias de intervenção e organização dos serviços existentes.

Descritores: Transtornos traumáticos cumulativos; Doenças musculoesqueléticas; Saúde do trabalhador; Equipe de enfermagem

RESUMEN

Objetivo: Evaluar las evidencias sobre el padecimiento de trabajadores de enfermería por los Disturbios Osteomusculares Relacionados al Trabajo (DORT). **Métodos:** Revisión integrativa de la literatura utilizando las bases: Biblioteca Virtual en Salud (BVS), BVS Enfermagem, Scopus y Banco de Tesis de la Universidad de Sao Paulo (USP) obteniéndose 17 estudios. **Resultados:** Se evidenció que los DORT atacan a los profesionales de enfermería y se relacionan a las condiciones inadecuadas de los ambientes de trabajo, a la organización y estructura del trabajo. **Conclusión:** es necesario invertir en programas preventivos, capacitaciones, educación en salud, estrategias de intervención y organización de los servicios existentes.

Descriptor: Trastornos de traumas acumulados; Enfermedades musculoesqueléticas; Salud laboral; Grupo de enfermería

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INTRODUCTION

Work-related musculoskeletal disorders (WMSDs) are isolated or combined problems in the muscles, tendons, synovial membranes (joint tissue) nerves, fascia (connective tissue) and ligaments, with or without tissue degeneration, caused by work. They are characterized by the occurrence of symptoms, concomitantly or not, like: pain, numbness, feeling of heaviness and fatigue. These treacherous injuries generally affect the superior limbs, scapular region around the shoulder and cervical region, but can also affect inferior limbs and are frequent causes of temporary or permanent occupational disabilities⁽¹⁻²⁾.

Damage caused by WMSDs result from the excessive use of the musculoskeletal system and its inadequate recovery and comprise clinical conditions workers are victims of when they are submitted to inadequate work conditions⁽³⁾. The origins of these musculoskeletal disorders are multifactorial and complex; they result from a disequilibrium between the requirements the tasks performed at work impose and individual functional abilities to respond to these requirements; and are modulated by the characteristics of work organization⁽⁴⁾.

WMSDs produce different levels of functional disability; they result in decreased productivity, increased absenteeism rates, jeopardizing companies' production capacity, and lead to considerable expenses to treat victims and social responsibility indemnity lawsuits^(5,6). Besides physical, biomechanical and ergonomic stressors, their etiology includes psychosocial and organizational risk factors, such as high occupational stress, inadequate social support, monotonous activities, anxiety and depression, among others⁽⁷⁾.

Nursing workers develop their activities in different places, including hospital institutions, and continuously, demanding constant attention, physical effort, inadequate positions, repetitive movements and weight lifting, which predisposes them to the risk of work-related disease⁽⁸⁾; hence, the work routine exposes them to different occupational risk factors. Nursing professionals' work is stressful due to the heavy psycho-emotional burden deriving from the nurse-patient relation, physical requirements, shortage of workers, extended shifts, inadequate work conditions and limited decision making power⁽⁸⁾.

Besides unhealthy, work is hard and repetitive and can provoke irreversible physical injuries⁽⁹⁾; professionals are victims of musculoskeletal disorders⁽¹⁰⁾ that can result in exhaustion, related to their exposure to physiological burdens, accompanied by painful symptoms in the legs, feet, hands, shoulders, joints, back pain, disk herniation, knee problems, arm/shoulder tendinitis and fatigue⁽¹¹⁾.

Knowing the determinant aspects of WMSDs in nursing becomes fundamental to understand the causal links of

these problems, permitting the implementation of prevention strategies in the workplace and victim treatment and rehabilitation forms⁽¹⁰⁾. Thus, this study was developed to assess scientific evidence about the illness of nursing workers with WMSDs.

METHODS

As an integrative literature review, this study involved the following steps: establishment of the review hypothesis and objectives; text inclusion and exclusion criteria (sample selection); definition of information to be extracted from the selected texts; result analysis and discussion and presentation of results^(12,13). The following research questions were formulated: are nursing team workers victims of WMSDs? How and in what conditions do WMSDs emerge in these workers?

The inclusion criteria were defined as follows: studies published between 1990 and 2010; in Portuguese, English and Spanish; with abstract available in the selected databases, to answer the research questions.

The Health Science Descriptors (DeCS): *DORT, transtornos traumáticos cumulativos, enfermagem, trabalhadores* were used, as well as their respective translations in English and Spanish. The search was accomplished in July 2010 through online access and the following databases were consulted to select the studies: Virtual Health Library (VHL), Virtual Health Library in Nursing (VHL Nursing), SCOPUS and the University of São Paulo (USP) Dissertation and Thesis Database.

Initially, 29 studies were identified in VHL, 43 in VHL Nursing, 10 dissertations in the USP Dissertation Database and 25 texts in *Scopus*. All were analyzed by reading the abstracts and selected based on the aim of this review. Forty-five texts were selected from this group (107 texts), 18 of which from VHL, 16 from VHL Nursing, two from the USP Dissertation Database and nine from SCOPUS. Repeated texts, unavailable full versions and texts that did not attend to the aim of this research were excluded. Thus, 17 of the texts and dissertations that complied with the inclusion criteria were analyzed.

To collect information from these studies, a Brazilian validated instrument was used, which aims to guide data collection for integrative and systematic reviews and meta-analyses, based on scientific papers⁽¹²⁾, and addresses the following items: identification of original study and its methodological characteristics, assessment of methodological rigor⁽¹⁴⁾, interventions measured and results found. Summary tables were elaborated for the analysis and further synthesis of the included texts.⁽¹³⁾

As the study did not address research involving human beings, no Research Ethics Committee approval was sought.

RESULTS

In this integrative review, 17 studies were analyzed that complied with the inclusion criteria and will be presented next.

Concerning the primary author, 12 were nurses, three physiotherapists, one physician and one did not permit the identification of the author's professional category; 11 were published in nursing journals, three in multidisciplinary journals and one in a physiotherapy journal. Two

studies were selected from the dissertation database; six were published in 2010, two in 2009, three in 2008, the same number in 2007, one in 2005 and two in 2004. As for the research design, 11 quantitative studies were found (seven descriptive and cross-sectional, three descriptive and exploratory and one descriptive-retrospective study), four integrative reviews and two qualitative studies. All studies displayed evidence level 6⁽¹⁴⁾, demonstrating weak scientific evidence. Figures 1, 2 and 3 display the synthesis of the papers included in this integrative review.

Figure 1. Synthesis of studies about WMSDs in nursing workers

Title	Authors	Journal (vol, No., pg, year)	Synthesis of Conclusions/Recommendations
Fatores de risco dos distúrbios osteomusculares relacionados ao trabalho de enfermagem	Moreira, AMR; Mendes, R	Rev Enferm UERJ 2005; 13:19-26.	Work conditions at the hospital are inadequate, enhancing manifestations of WMSDs in the workers.
The experience of a woman working in nursing suffering from de Quervain's disease	Leite, PC; Merighi, MAB; Silva, A	Rev Latino-am Enfermagem 2007 March-April; 15 (2): 253-8	WMSDs cause pain and limitations, but coping with the new reality leads to workers' discovery of their role as caregivers for themselves, re-elaborating their functions and attributing true meaning to their existence.
A mulher trabalhadora de enfermagem e os distúrbios osteomusculares relacionados ao trabalho	Leite, PC; Silva, A; Merighi, MAB	Rev Esc Enferm USP 2007; 41(2):287-91	Intervention strategies in the illness process of female workers should be reconsidered, as they represent the group in which this disease is most frequent.
Incidência de LER/DORT em trabalhadores de enfermagem	Rosa, AFG; Garcia, PA; Vedoato, T; Campos, RG; Lopes, MLS	Acta Sci. Health Sci. Maringá, v. 30, n. 1, p. 19-25, 2008	Further attention should be paid to workers' postures in the performance of their occupational activities, elaborating training programs, besides adequate furniture and ergonomically ideal instruments.
Doenças Osteomusculares relacionadas ao trabalho e sua associação com a enfermagem ocupacional.	Barboza, MCN, Milbrath, VM, Bielemann, VM, Siqueira, HCH	Rev Gaucha Enferm; 29(4): 633-638, 31 Dec. 2008.	Investments are due in health promotion and disease prevention programs, as well as better environmental and work conditions.
Distúrbios Osteomusculares relacionados ao trabalho em profissionais de enfermagem de um hospital universitário.	Freitas, JRS; Lunardi Filho, WD; Lunardi, VL; Freitas, KSS	Rev. Eletr. Enf. [Internet]. 2009;11(4):904-11	Research focused on the nursing team is needed, which can contribute to improve their work conditions and decrease their suffering.

Figure 2. Synthesis of studies about WMSDs in nursing workers

Title	Authors	Journal (vol, No., pg, year)	Synthesis of Conclusions/Recommendations
Estresse, Aspectos Psicossociais do Trabalho e Distúrbios Musculoesqueléticos em trabalhadores de enfermagem	Magnano, TSBS; Lisboa, MTL; Griep, RH	Rev. Enferm. UERJ, Rio de Janeiro, 2009 Jan/Mar; 17(1):118-23	It is important to consider women's role in society when reconsidering intervention strategies in the disease process caused by WMSD, as this group is the most frequent victim of the disease.
Distúrbios Osteomusculares e o trabalho dos que cuidam de idosos institucionalizados	Alencar, MCB, Schultze, VM, Souza, SD.	Fisioter. Mov., Curitiba, v. 23, n. 1, p. 63-72, Jan./Mar. 2010	The reorganization of task distribution is needed and, in the work process, improvements in work conditions and specific training.
Work-related musculoskeletal disorders among nurses in Ibadan, South-west Nigeria: a cross-sectional survey	Tinubu, BMS; Mbada, CE; Oyeyemi, AL; Fabunmi, AA	BMC Musculoskeletal Disorders 2010	WMSD education and prevention programs and coping strategies need to be put in practice to reduce the professional risk rate and enhance patient care efficiency.
Perfil das trabalhadoras de enfermagem com diagnóstico de LER/DORT em Salvador-Bahia 1998-2002	Varela, CDS; Ferreira, SL	Rev Bras Enferm, Brasília (DF) 2004 May/Jun;57(3):321-5	Work conditions associated with the greater hour load, multiple jobs, repetitiveness and anti-ergonomic positions contribute to the development of WMSDs.
O cotidiano de trabalhadoras de enfermagem acometidas por distúrbios osteomusculares relacionados ao trabalho sob a luz da fenomenologia heideggeriana	Leite, PC; Merighi, MAB; Silva, A	On line Brazilian Journal Of Nursing – volume 6, nº3 2007	Studies are needed that address not only statistical data, although these are fundamental to clarify the workers' morbidity and mortality profiles.

Figure 3. Synthesis of studies about WMSDs in nursing workers

Title	Authors	Journal (vol, No., pg, year)	Synthesis of Conclusions/Recommendations
Condições de trabalho, características sociodemográficas e distúrbios musculoesqueléticos em trabalhadores de enfermagem	Magnano, TSBS; Lisboa, MTL; Griep, RH; Kirchhof, ALC; Camponogaras, S; Nonnenmacher, CQ; Viera, LB	Acta Paul Enferm 2010;23(2):187-93.	Participatory proposals are needed to promote health and wellbeing in nursing work, involving hospital managers and workers.
Factors Related to Musculoskeletal Disorders in Nursing Workers	Fonseca, NR; Fernandes, RCP	Rev. Latino-Am. Enfermagem 2010 Nov-Dec;18(6):1076-83	Intervention strategies are important, incorporating the organizational aspects of work and adaptations in the physical environment and in task characteristics.
Continuous assessment of low back loads in long-term care nurses	Holmes, MWR, Hodder, JN; Keir, PJ	Ergonomics, 53: 9, 1108 — 1116 (2010)	Attention is due to patient care activities as a risk factor for heavy back loads. A method is needed to measure these data in the workplace.
Aspectos psicossociais do trabalho e distúrbio musculoesquelético em trabalhadores de enfermagem	Magnago, TSBS, Lisboa, MTL, Griep, RH, Kirchhof, ALC, Guido LA.	Rev. Latino-Am. Enferm 18(3):[08 telas] mai-jun 2010	Health promotion and WMSD prevention strategies need to be put in practice among nursing workers.
O adoecimento dos trabalhadores de enfermagem da Fundação Hospitalar do Estado de Minas Gerais: reflexo das mudanças no mundo do trabalho.	Murofusa, NT	Banco de Teses USP 2004	Administrators and managers need to assess the organization of existing services to define health care actions and workers' organization to preserve their own health.
Lesões Osteomusculares entre trabalhadores de um hospital mexicano e a ocorrência de absenteísmo	Montoya Diaz, MDC	Banco de Teses USP 2008	It is important to correct ergonomic aspects in the environment with a view to preventing workers' illnesses and losses for the hospital.

DISCUSSION

Nursing work is repetitive, demands physical effort, weight lifting and inadequate postures, associated with the mental stressors that represent risk factors for the occurrence of WMSDs^(8-9,15,16). These disorders gain importance in the nursing profession, which is characterized as a high-risk profession for stress and illness⁽⁸⁾, with long work periods and demanding high levels of worker responsibility^(17,18).

Professionals perform multivariate and fragmented activities, accompanied by an overload and accelerated work rhythm⁽¹⁹⁾; submitted to the high requirements in the work environment, their chances of developing musculoskeletal pain in some body regions are high⁽²⁰⁾. WMSDs are related with the organization and intensity of the work rhythm, enhancing workers' suffering and often leading to underreporting of data⁽¹⁹⁾. Disinformation exists about the problem, making people hide their symptoms, which ends up jeopardizing a correct diagnosis and treatment⁽¹⁶⁾. Work-related diseases are underreported⁽¹⁹⁾; recognizing, diagnosing and establishing the causal nexus between most diseases and work represents a challenge⁽¹⁵⁾. Nursing work can provoke often irreversible physical injuries, involving partial or permanent leaves of absence and disabilities⁽⁹⁾. Conse-

quently, WMSDs are diseases that are difficult to treat and are motives for sick leave⁽¹⁸⁾, representing a limiting factor for hospital work⁽²¹⁾.

Concerning the prevalence of pain or musculoskeletal discomfort, a study found that 96.3% of nursing workers referred pain in the previous 12 months and 73.1% in the last 7 days⁽²⁰⁾. One study involving elderly caregivers, including nursing auxiliaries, showed that, out of 43 subjects, 62.7% referred musculoskeletal pain in the previous month⁽²²⁾. Among the reasons for illness, 59.68% attribute the problem to musculoskeletal problems. Most leaves of absence in nursing were neck pain, effort-related back pain, tendinitis and tenosynovitis⁽²¹⁾. A study of Nigerian nurses showed a large proportion of WMSD, more frequent in the back region⁽²³⁾. Another study appointed that the lesions found in nursing workers include carpal tunnel syndrome and neck pain⁽²⁴⁾.

Among nursing technicians and auxiliaries, WMSDs are more frequent when compared with nurses, as the latter provide more direct care actions⁽¹⁶⁾. Musculoskeletal system diseases ranked second among nursing workers' disorders, who referred higher frequencies for back (71.5%), neck (68%), shoulder (62.3%) and leg pain (54.6%)⁽¹⁵⁾. The work load and having another job were not associated with musculoskeletal pain reports⁽¹⁰⁾; the back region (62.9%) concentrates most pain/dis-

comfort, followed by the back (25.9%) and shoulders (18.5%)⁽²²⁾. More frequent musculoskeletal symptoms among hospital workers were located in the back and neck regions, respectively, during the 12 months and seven days before the start of data collection⁽²¹⁾. The work nursing technicians and auxiliaries perform was related with the main complaints of superior limb problems⁽¹⁶⁾. Musculoskeletal disorders in the neck, shoulder or upper and lower back are associated with physical, psychosocial demands and precarious physical conditioning⁽²⁵⁾. Among nursing auxiliaries, patient care most strongly affected the cumulative burden, due to the time spent to perform these tasks⁽²⁶⁾.

The physical-pathological process of De Quervain's injury was described in a nursing workers and triggers life changes characterized by painful manifestations, and especially by physical limitations, arousing multiple feelings⁽²⁷⁾. WMSDs altered the health-disease process, entailing new experiences, not only related to pain deriving from these disorders, but also to alterations like sleep-and-wake pattern changes⁽²⁸⁾. Health promotion and prevention by companies is the best way to take care of workers' health, including actions that can create ergonomically adequate and healthy environments. Prevention measures represent lower costs if compared to the treatment of a sick worker⁽¹⁸⁾ and also prevent absenteeism.

Preventing these disorders involves the understanding of psychosocial and stress factors in the work environment and helps to develop disease prevention and health promotion strategies for workers, including the further use of technologies to develop activities that demand greater physical force, sporadic pauses during the work day, conflict management and improved or-

ganizational climate⁽²⁰⁾. In this perspective, ergonomic analysis and its application and correction aim to prevent workers' getting ill and losses for the hospital⁽²¹⁾.

Intervention strategies that combine organizational aspects of work, adaptations in the physical environment and task characteristics are important⁽²⁵⁾. The occupational health nursing service should help to prevent and reduce occupational accident and illness levels, particularly WMSDs. Occupational health nurses facilitate employee/employer interaction and can help to bring down absenteeism rates, improve workers' quality of life and minimize costs for the company⁽¹⁸⁾.

CONCLUSIONS

Concerning the questions asked for the sake of this research, it was evidenced that WMSDs represent a reality among nursing workers and that these conditions are responsible for illness and sick leaves, often leading to partial or permanent disability, contributing to the occurrence of losses and burdens for employers. Part of the problems is related to inadequate work conditions and work organization and structural factors.

Institutions are responsible for planning their workers' health promotion better, in partnership with trained health professionals, who work by identifying problems, proposing and applying changes and notifying cases, in order to guarantee healthy and productive workers. Investments are needed in prevention programs, training, health education, intervention strategies and organization of existing services. The preventive focus and education guarantee better health for workers, as well as increased productivity and also contribute to reduce the costs and burdens absenteeism causes.

REFERENCES

1. National Institute for Occupational Safety and Health. Musculoskeletal disorders and workplace factors: a critical review of epidemiologic evidence for work-related musculoskeletal disorders of the neck, upper extremity, and low back. Cincinnati (OH): 1997. (DHHS (NIOSH) Publication No. 97B141).
2. Instituto Nacional do Seguro Social. Instrução Normativa INSS/DC n. 98 de 5 de dezembro de 2003. Aprova norma técnica sobre Lesões por Esforços Repetitivos-LER ou Distúrbios Osteomusculares Relacionados ao Trabalho-DORT. Diário Oficial da República Federativa do Brasil, DF; 2003 Dez 5; Seção 1.
3. Brasil. Ministério da Saúde. Lesões por Esforços Repetitivos (LER). Distúrbios Osteomusculares Relacionados ao Trabalho (DORT). Dor relacionada ao trabalho. Protocolos de atenção integral à saúde do trabalhador de complexidade diferenciada. Brasília: Ministério da Saúde; 2006.
4. Assunção AA, Vilela LV. Lesões por esforços repetitivos: guia para profissionais de saúde. Piracicaba (SP): Centro de Referência em Saúde do Trabalhador – CEREST.2009.
5. Murofuse NT, Marziale MH. [Diseases of the osteomuscular system in nursing workers]. *Rev Latinoam Enferm*. 2005;13(3):364-73. Portuguese
6. Walsh IA, Corral S, Franco RN, Canetti EE, Alem ME, Coury HJ. [Work ability of subjects with chronic musculoskeletal disorders]. *Rev Saúde Pública*. 2004; 38(2):149-56. Portuguese
7. Carayon P, Smith MJ, Haims MC. Work organization, job stress, and work-related musculoskeletal disorders. *Hum Factors*. 1999; 41(4): 644–63.
8. Magnano TS, Lisboa MT, Griep RH. [Stress, psychosocial aspects of the work and musculoskeletal disorders in nursing workers]. *Rev Enferm UERJ*. 2009; 17(1):118-23. Portuguese
9. Rosa AF, Garcia PA, Vedoato T, Campos RG, Lopes ML. Incidência de LER/DORT em trabalhadores de enfermagem. *Acta Sci Health Sci Maringá*. 2008; 30(1):19-25.
10. Magnago TSBS, Lisboa MTL, Griep RH, Kirchhof ALC, Camponogara S, Nonnenmacher CQ, Vieira LB. Nursing workers: work conditions, social-demographic characteristics and skeletal muscle disturbances. *Acta Paul Enferm*. 2010; 23(2):187-93.

11. Sápia T, Felli VE, Ciampone MH. Health problems among outpatient nursing personnel with a high physiological workload. *Acta Paul Enferm.* 2009; 22(6):808-13.
12. Ursi ES, Galvão CM. [Perioperative prevention of skin injury: an integrative literature review]. *Rev Latinoam Enferm.* 2006; 14(1): 124-31. Portuguese
13. Ganong LH. Integrative reviews of nursing research. *Res. Nurs Health.* 1987; 10:1-11.
14. Stillwell SB, Fineout-Overholt E, Melnyk BM, Williamson KM. Evidence-based practice, step by step: searching for the evidence. *Am J Nurs.* 2010; 110(5): 41-7.
15. Murofuse NT. O adoecimento dos trabalhadores de enfermagem da Fundação Hospitalar do Estado de Minas Gerais: reflexo das mudanças no mundo do trabalho [tese]. Ribeirão Preto: Escola de Enfermagem de Ribeirão Preto, Universidade de São Paulo; 2004.
16. Freitas JR, Lunardi Filho WD, Lunardi VL, Freitas KS. [Work-related musculoskeletal disorders in professionals of nursing in an academical hospital] *Rev Eletrônica Enferm.* 2009;11(4): 904-11. Portuguese
17. Moreira AM, Mendes R. [Risk factors for cumulative trauma disorders related to the nursing work]. *Rev Enferm UERJ.* 2005;13(1):19-26. Portuguese
18. Barboza MC, Milbrath VM, Bielemann VM, de Siqueira HC. Doenças osteomusculares relacionadas ao trabalho (DORT) e sua associação com a enfermagem ocupacional. *Rev Gaúcha Enferm.* 2008;29(4):633-8.
19. Leite PC, Silva A, Merighi MA. [Female nurses and the osteomuscular disturbances related to their work]. *Rev Esc Enferm USP.* 2007;41(2):287-91. Portuguese
20. Magnago TS, Lisboa MT, Griep RH, Kirchhof AL, Guido, LA. Psychosocial aspects of work and musculoskeletal disorders in nursing workers. *Rev. Latinoam. Enferm.* 2010; 18(3): 429-35.
21. Montoya Díaz MC. Lesões osteoarticulares entre trabalhadores de um hospital mexicano e a ocorrência de absenteísmo [tese]. Ribeirão Preto: Escola de Enfermagem de Ribeirão Preto, Universidade de São Paulo; 2008.
22. de Alencar MC, Schultze VM, de Souza SD. [Musculoskeletal disorders and the care work of elderly in institutions]. *Fisioter Mov.* 2010; 23(1):63-72. Portuguese
23. Tinubu BM, Mbada CE, Oyeyemi AL., Fabunmi AA. Work-related musculoskeletal disorders among nurses in Ibadan, South-west Nigeria: a cross-sectional survey. *BMC Musculoskelet Disord.* 2010;11:12.
24. Varela CD, Ferreira SL. [Profile of nursing workers with RSI//WRMD diagnosis in Salvador-Bahia in 1998-2002]. *Rev Bras Enferm.* 2004; 57(3):321-5. Portuguese
25. Fonseca NR, Fernandes RC. Factors related to musculoskeletal disorders in nursing workers. *Rev Latinoam Enferm.* 2010; 18(6):1076-83.
26. Holmes MW, Hodder JN, Keir PJ. Continuous assessment of low back loads in long-term care nurses. *Ergonomics.* 2010; 53(9):1108–16.
27. Leite PC, Barbosa Merighi MA, Silva A. The experience of a woman working in nursing suffering from De Quervain's disease. *Rev Latinoam Enferm.* 2007; 15(2): 253-8.
28. Leite PC, Merighi MAB, Silva A. [The daily living experience of nursing woman-workers that display work related musculoskeletal disorders (WRMD) at optical heideggerian existential phenomenology]. *Online Braz J Nurs.* 2007; 6(3): 1-8. Portuguese