



Musculoskeletal discomfort, work ability and fatigue in nursing professionals working in a hospital environment

Desconforto musculoesquelético, capacidade de trabalho e fadiga em profissionais da enfermagem que atuam em ambiente hospitalar

Incomodidad musculoesquelética, capacidad laboral y fatiga en profesionales de la enfermería que actúan en ambiente hospitalario

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ABSTRACT

Objective: To evaluate the musculoskeletal discomfort, work ability and residual fatigue in nursing professionals working in the hospital setting. **Method:** Cross-sectional study with professionals from a medium-sized public hospital. The Nordic symptom questionnaire, the work ability index, and the need for recovery scale (fatigue) were used. Data were analyzed descriptively and inferential tests were applied in order to verify the association of fatigue and work ability, and compare the fatigue among sectors analyzed. **Results:** Participation of 110 professionals in the study. A total of 86.24% of workers reported musculoskeletal discomfort, with a higher prevalence in the cervical, thoracic and lumbar spine. Approximately 43% of professionals presented residual fatigue. There was a significant association between fatigue and reduction of work ability ($p < 0.003$), as well as association between younger age and greater fatigue ($p < 0.03$). **Conclusion:** Results demonstrated a high prevalence of musculoskeletal discomfort in the previous year and a considerable number of professionals with residual fatigue. There was a substantial portion of workers with moderate work ability and requiring attention in the medium term.

DESCRIPTORS

Nursing; Team; Occupational Health; Risk Factors; Working Conditions.

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INTRODUCTION

Infectious-contagious diseases and work-related musculoskeletal disorders (WMSD) are among the most frequent occupational diseases in nursing professionals. There is also physical, psychic and organizational burden that may be associated with standing work, weight lifting, inadequate postures and psychophysical aspects⁽¹⁾. WMSDs can cause dysfunction and disability and impose high costs with payed sick leave. They are recognized as one of the major responsible for high absenteeism and reduction of productivity. Workers with WMSDs are affected by intense psychic suffering, stress and dissatisfaction, which interfere directly in their work ability and quality of life⁽²⁾.

Work ability can be understood as professionals' physical and mental capacity to face physical and mental demands arising from their activity, both in the present time and the future⁽³⁾. Worker's health and occupational demands must be balanced for the preservation of this ability, which becomes possible by offering good conditions⁽⁴⁾. If this aspect is not contemplated, there may be an exposure to stressors and consequently, a state of fatigue.

Work-induced fatigue has an important role in the etiology of psychophysical overloads⁽⁵⁾. Recently, studies have adopted measures of fatigue in the nursing context^(3,6-7). This variable has demonstrated a high prevalence and an association with deleterious working conditions^(6,8-9). Fatigue is a process of physical and psychological exhaustion that changes the states of alertness and surveillance, affects skills and compromises the development of occupational activities⁽¹⁰⁾. Initially, fatigue is a result of physiological processes. In cases of prolonged exposure, it may evolve to a state of chronic fatigue and, later, to pathological fatigue⁽⁴⁾. Thus, residual fatigue can be defined as an accumulation of psychophysical symptoms resultant from constant exposure to stressors without periods of rest and due recovery⁽¹¹⁾. It is characterized by the presence of insomnia, difficulty in rest, irritability, discouragement and difficulty to perform activities both in the occupational and home environments⁽³⁻⁴⁾. The greater the workers' exposure to these factors, the greater their susceptibility to occupational diseases, a situation experienced by nursing professionals given their frequent exposure to poor working conditions.

Occupational risk factors associated to nursing professionals' activity may be related specifically to the complexity of care, double shifts, physical and mental work overloads and overtime⁽¹²⁾. Multidimensional measures such as fatigue are key in the context of nursing activity, because they can help to detect situations inducing cumulative loads and avoid long-term effects⁽⁷⁾. In addition, the traditionally used analysis of work ability and musculoskeletal discomfort is a useful tool to evaluate health status and plan preventive actions. Based on the above, emerges the issue of the association between work-induced fatigue, work ability and musculoskeletal discomfort with the view of a broader understanding of risk factors arising from the activity of nursing

professionals working in hospital settings. Thus, the aim of the present study is to assess the musculoskeletal discomfort, work ability and residual fatigue in nursing professionals working in a hospital environment. The specific objectives of this study are to estimate the risk of exposure to residual fatigue and the presence of musculoskeletal discomfort and to compare the level of fatigue among different sectors of a medium-sized hospital.

METHOD

TYPE OF STUDY

This is a cross-sectional study. It was conducted in a medium-sized public hospital in Distrito Federal (Federal District). The hospital has a total of 20 sectors.

PARTICIPANTS

One-hundred and ten nursing professionals participated in this study (27 nurses and 83 nursing technicians/assistants). The inclusion criteria were all professionals approved in the selective process of the State Department of Health of the Distrito Federal (Portuguese acronym: SES-DF), and who were actively working at the hospital during the study period. Workers on temporary contract services and those on leave (health leave, vacation, among others) during the study period were excluded.

ETHICAL ASPECTS

The study was approved by the Research Ethics Committee of the Health Science Teaching and Research Foundation/SES (FEPECS/SES under number 799.619, 09/22/2014). All were invited to participate by signing the Informed Consent form in accordance with resolution 466/2012 of the National Health Council.

EVALUATION PROCEDURES

The complaints of musculoskeletal discomfort were evaluated through application of the Brazilian translated and validated version of the Nordic Questionnaire of Musculoskeletal Symptoms⁽¹³⁾ in interview format. The analysis was based on the quantification of frequency of complaints for each body region in relation to the prevalence of symptoms in the 12 prior months, in addition to any work leave related to the reported discomfort.

The *Escala de Necessidade de Descanso* (Portuguese acronym: ENEDE) is the Brazilian version of the Need for Recovery Scale, translated into Portuguese and adapted for the Brazilian culture⁽¹¹⁾. The purpose of the instrument is to measure the need for recovery after a day of work by evaluating the work-induced fatigue and the quality of recovery time. The ENEDE also evaluates short-term effects of fatigue: lack of attention, irritability, social isolation, reduced performance and reduced quality of recovery time after work. The scale contains 11 questions with four alternative answers and equivalent scores for each (always: 3, often: 2, sometimes: 1, and never: 0). The sum of scores of the questions can vary from 0 to 33. Based on scores, is applied a direct rule

of three, in which the maximum value is equal to 100 hence transforming it into a 0-100 points scale. For the analysis of residual fatigue, ENEDE values were grouped into two categories, namely: less than or equal to 45 (fewer symptoms and less need for rest), and greater than 45 (greater number of symptoms and greater need for recovery). The higher the score the greater the amount of emotional, cognitive and behavioral fatigue symptoms, and the greater the workers' need for recovery.

The Work Ability Index (WAI) is a Finnish instrument composed of 11 questions concerning the physical and mental demands of work, the health status and resources of workers. The questions are divided into seven main groups, namely: current work ability compared to the lifetime best; work ability in relation to demands of the job; number of diagnosable diseases; estimated work impairment due to diseases; absences from work; own prognosis of work ability; and mental resources. At the end, is calculated a score ranging from 7 to 49, in which: a 7-27 score corresponds to a low work ability; 28-36 score is moderate; 37-43 is good; and 44-49 is excellent work ability. Thus, it provides an assessment of the current and future risk for inability for work. From the score, it is also possible to identify the objective of support measures that must be taken⁽¹⁴⁾.

DATA ANALYSIS

Discomfort complaints were analyzed descriptively and presented according to their frequency of occurrence in the different regions of the body. The Shapiro-Wilk test was applied to verify the normality of data. As the assumptions were not met, non-parametric tests were adopted. The Chi-square test was used to evaluate the association between fatigue scores (ENEDE), presence of discomfort in the previous year and work ability (WAI). In addition, was calculated the odds ratio (OR; confidence interval – CI 95%) to estimate the risk of exposure to residual fatigue (individuals with fatigue and without fatigue) and the presence of musculoskeletal discomfort.

The Mann-Whitney test was used to evaluate differences between groups arising from ENEDE (scores ≤ 45 or > 45), in the following dependent variables: time in the institution and age (both in years).

For the comparison of the residual fatigue (ENEDE) between hospital sectors, a combination of sectors was made by using as criteria the affinity and profile of the work process between professionals' areas of expertise. Thus, three independent groups were generated: Group 1 (Obstetric Center and Maternity); Group 2 (Surgical Clinic, Medical Clinic and Orthopedics); and Group 3 (Adult and Pediatric Emergency Services). For this comparison, was used the Kruskal-Wallis test with the Mann-Whitney post hoc test (total of six multiple comparisons with adjusted significance of 0.8% – $p < 0.008$ so as not to propagate the error of 5%). For data storage and analysis, were used the Epi info 7 and Excel programs. Statistical analysis was performed in the SPSS program (Statistical Package for the Social Sciences, version 20.0), and the significance was set at 5% ($p < 0.05$).

RESULTS

Descriptive data and sociodemographic characterization of participants are presented in Table 1. Participants were 110 professionals in a predominantly female sample (90%), and mean age of 39.47 ± 9.17 years. Most were married with children. The mean workload at the hospital was 38.9 ± 8.6 hours per week, with a mean working time in the institution of 12 ± 9.4 years.

Table 1 – Sociodemographic characterization of study participants – Brasília, DF, Brazil, 2017.

Characteristic	Category	n	%
Sex	Female	99	90
	Male	11	10
Age range (years)	20-30	17	16.18
	31-40	39	37.14
	41-50	36	34.28
	51-60	11	10.47
	61-70	2	1.90
Marital status	Single	25	22.73
	Married	68	61.82
	Lives with partner	4	3.64
	Separated	11	10
Children	Widowed	2	1.82
	Yes	78	73.58
	No	28	26.42
Sector	Ambulatory Ward 1	2	1.82
	Ambulatory Ward 2	2	1.82
	Milk Bank	5	4.55
	Center of Sterilized Material	17	15.45
	Obstetric Center	5	4.55
	Surgical Clinic	9	8.18
	Medical Clinic	6	5.45
	Maternity	14	12.73
	Orthopedics	12	10.91
	Pediatric Hospitalization	7	6.36
	Pediatric Emergency	6	5.45
	Emergency Room	7	6.36
	Adult ICU	5	4.55
Neonatal ICU	13	11.82	
Working time in institution (years)	1-10	45	47.37
	11-20	29	30.53
	21-30	19	20.03
	31-40	2	2.11
Arm or neck discomfort (at any moment)	Yes	81	74.31
	No	28	25.69
Musculoskeletal discomfort (in previous 12 months)	Yes	94	86.24
	No	15	13.76
Body regions affected by discomfort (in previous 12 months)	Head	-	15.96
	Shoulder	-	24.47
	Arm and wrist	-	21.28
	Hands	-	17.02
	Hips	-	10.64
	Legs	-	14.89
	Ankle and foot	-	26.59
	Cervical spine	-	56.38
Thoracic and lumbar spine	-	51.06	
Absence due to discomfort	Yes	28	37.33
	No	47	62.67
ENEDE	With fatigue (score > 45)	47	42.73
	Without fatigue (score ≤ 45)	63	57.27
WAI	Excellent	23	20.91
	Good	45	40.91
	Moderate	37	33.64
	Low	5	4.54

ICU: Intensive Care Unit; ENEDE: Need for Recovery Scale; WAI: Work Ability Index.

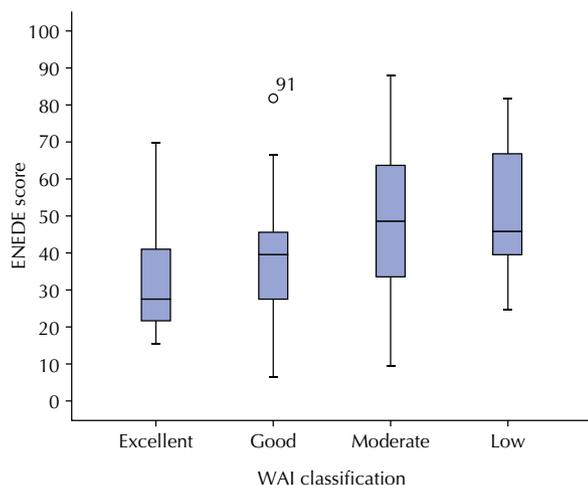
Study participants performed activities in several places, namely: Ambulatory Ward 1 and Ambulatory Ward 2, Milk Bank, Center of Sterilized Material, Obstetric Center, Medical Clinic, Surgical Clinic, Maternity, Orthopedics, Pediatrics (hospitalization and emergency room), Emergency Room, Adult and Neonatal Intensive Care Unit (total of 14 sectors).

Of the 110 professionals who answered the item on prevalence of discomfort in arms or neck, 81 (74%) reported having felt discomfort in the arms or neck at some time. Of these, 28 (37.33%) had occasions of sick leave because of this discomfort. However, six participants did not respond to this item. Of the 28 occurrences of sick leave, 57.14% were greater than 15 days. In relation to the prevalence of discomfort in the previous year, 86.24% of respondents presented discomfort in some region of the body. The most prevalent regions were lumbar and thoracic regions (56.38%), followed by cervical region with 51.06%, and ankle and foot with 26.59% (Table 1).

The WAI score demonstrated that most nursing professionals presented good (40.91%) and excellent (20.91%) work ability. However, of the 45 professionals with good work ability, 38 experienced musculoskeletal discomfort in the previous year. All those with low work ability had musculoskeletal discomfort in the previous year. However, there was no significant association between the presence of musculoskeletal discomfort and the Work Ability Index ($\chi^2 = 0.23$; $p = 0.97$).

The findings related to ENEDE showed that 42.73% of professionals presented fatigue symptoms and hence, a greater need for recovery. However, the association between fatigue and the presence of discomfort was not significant ($\chi^2 = 1.008$ - $p = 0.315$; OR: 1.77 - 95% CI [0.57; 5.51]). Among professionals with established fatigue, 95.74% felt musculoskeletal discomfort in the previous year. Among professionals in the group with a score ≤ 45 (57.27% of the total), 77.78% presented discomfort in the previous year.

There was a significant association between residual fatigue and work ability (WAI). Workers with established residual fatigue had a worse WAI classification ($\chi^2 = 17.7$; $p = 0.003$), as shown in Figure 1.

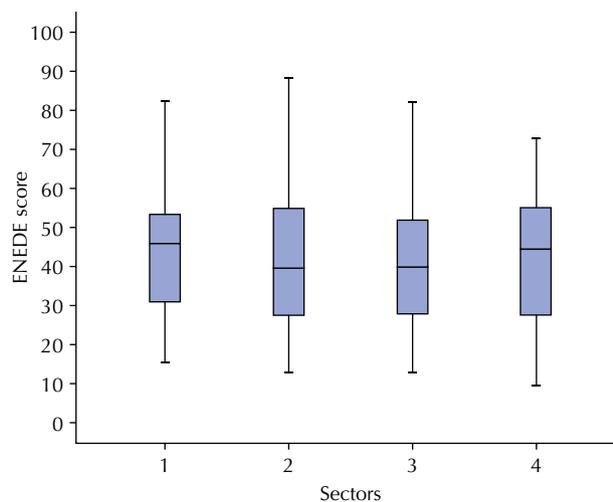


Note: Values are presented in median and quartile (25%; 75%).

Figure 1 – Data regarding the association between the different classifications of the Work Ability Index (WAI) and the Need for Recovery Scale score (ENEDE) – Brasília, DF, 2017.

Based on the division of groups by the ENEDE (with fatigue and without fatigue), there was a significant difference in workers' age by indicating that workers with residual fatigue were younger compared to workers without fatigue ($p = 0.03$). Regarding working time in the institution, there was no significant difference between individuals with and without residual fatigue ($p > 0.05$).

Figure 2 shows the findings related to the comparison of ENEDE scores between clustered sectors. There were no significant differences between sectors ($p = 0.9$).



Note: Values are presented in median and quartile (25%; 75%).

Figure 2 – Comparison of the ENEDE score between clustered sectors: (1) Obstetric Center and Maternity, (2) Surgical Clinic, Medical Clinic and Orthopedics, (3) Adult and Pediatric Emergency Room and (4) Adult and Neonatal ICU – Brasília, DF, 2017.

DISCUSSION

Our findings demonstrate the analyzed population consisted mostly of women, which corroborates previous studies⁽¹⁵⁻¹⁸⁾. A considerable number of participants has felt discomfort in the arms and neck at some point in their lives. Our findings confirm recent data⁽¹⁹⁾, which indicate shoulder, neck, and lumbar spine as the regions with higher prevalence of pain in nursing professionals in the percentages of 62.3%, 68% and 71.5%, respectively. These data highlight the fragility of this working class given their exposure to stressors such as dealing with events related to illness and death on a daily basis, shortage of human resources and work instruments, complexity of care, deviation of function, and double shifts. Furthermore, there is influence of ergonomic risk factors such as inadequate work environment, repetitive work and physical effort⁽²⁰⁾.

Previous studies have shown that the main causes of work absence of nursing team members are diseases of the musculoskeletal system^(15,18,21). In our study, only 37.33% of professionals who felt discomfort in the arms or neck had a period of absence. However, when considering data from other study, such findings deserve attention⁽¹⁸⁾. As nurses

play an important role in the supervision of the nursing team, and in some cases, are smaller in number compared to other members of the team, they are on leave less often or take longer to seek care⁽¹⁸⁾. Another reason of concern was that nurses choose to work in spite of their illnesses (presenteeism), so as not to cause harm to the team⁽¹⁸⁾. This may explain our findings regarding the high prevalence of discomfort, low number of absences, and high number of absences longer than 15 days.

The prevalence of discomfort in the previous year was high (86.43%), with emphasis on the cervical region (56.38%), lumbar and thoracic spine (51.06%), ankle and foot (26.59%), which corroborated other studies^(3,22). The onset of musculoskeletal discomfort can occur by performing activities requiring constant and intense physical exertion, often performed inadequately and under unfavorable conditions⁽²¹⁾. As an example, the prevalence of lumbar pain in nursing professionals was explained by the performance of activities such as transportation and handling of patients, bathing in the bed, handling stretchers, and procedures with asymmetric postures⁽²³⁾. The prevalence of discomfort in lower extremities can also be explained by remaining in the standing position for a prolonged period. Isometric muscle contractions also occur in static positions, which in turn produce metabolic waste that accumulates in the muscles due to reduced blood circulation and prolonged contraction. This can trigger painful processes or aggravate pain⁽²³⁾. Another factor possibly associated with the development of discomfort is the lack of physical training due to the sedentary lifestyle. These findings were highlighted in a previous study⁽¹⁾ in which was reported a high rate of workers not practicing any type of physical activity in their daily lives.

According to the present study results, most workers presented a good work ability. This information is in line with findings of another study⁽²²⁾ that evaluated 465 nursing professionals, and verified that 83.2% of them were classified as having good work ability. This finding deserves attention, since out of the 47 individuals evaluated in the present study as having good ability, only seven did not present discomfort in the previous year. There is a significant association between musculoskeletal diseases and reduction of work ability⁽²⁴⁻²⁶⁾. Hence, there must be special care with measures of support and risk control directed to these professionals with a view focused on the risk of inability in the near future.

Although most evaluated professionals presented higher scores than 36 in the WAI (borderline score between moderate and good ability), the number of workers with a score below this value (moderate and low ability) was substantial (38.18%). This point can be explained by the physical and mental demands in nursing activity. Inadequate physical loads such as lifting and carrying weight, repetitive work and inadequate postures, along with mental loads such as team and leadership conflicts, level of responsibility, long working hours, and lack of professional recognition can result in stressors that wear out and compromise the health of professionals and the work ability⁽²⁵⁾. There must

be attention to this factor, since it demonstrates the importance of support measures to restore and promote work ability⁽²⁷⁾. Multidisciplinary interventions involving actions in the work environment, such as the implementation of physical exercise, health education, behavioral changes and ergonomic measures are greatly important in this context⁽²⁸⁾. Furthermore, the integration of these interventions, such as in the Sherbrooke model⁽²⁹⁾ can determine the success of measures of support and restoration of work ability, and prevent musculoskeletal disorders.

The measurement of fatigue is very important in the scope of health professionals given its consequences in the reduction of commitment and performance of their activities, and the consequent higher risk of accidents⁽³⁰⁾. The findings of the present study showed 42.53% of professionals had a ENEDE score > 45 (with residual established fatigue). There may be factors as double work shifts, overtime work and the exchange of leisure for work that have resulted in a shortage of recovery periods. Hence the suggestion for future studies investigating these aspects of daily life (external to work) based on health social determinants in order to check any association between social and family factors and fatigue resulting from occupational activity.

An interesting finding of our study was the presence of greater residual fatigue in nursing professionals of lower age. Similar results were found in a previous study⁽³¹⁾, which showed that the greater the age the lower the physical and psychological exhaustion. The authors⁽³¹⁾ argued that younger workers tend to create higher expectations for their performance, are more perfectionists and committed to their work. Moreover, younger professionals take on many functions that do not fit them, and demand more from themselves in order to try to keep up with their expectations. There is also the aspect that experience and professional maturity provide coping strategies for dealing better with conflict situations and work demands⁽³¹⁾. Another factor that may also explain our findings regarding fatigue involves the current labor market condition that imposes great demands on young professionals. From the beginning of the career, there can be an intense search for professional qualification with possible concomitant moments of study and work, besides the financial need imposition leading to accumulation of jobs⁽³²⁾.

Another important finding was the significant association between the presence of residual fatigue and a lower work ability that corroborates with previous studies^(4,6,31). Our findings indicate that fatigue leads to deleterious influences on states of alertness and surveillance, and can be considered a risk factor for reducing the work ability in nursing professionals. Thus, the fundamental need for a rest period for professionals' recovery from the fatigue accumulated during a work day⁽³⁾. If this rest period is not enough, effects of residual fatigue can be "transferred" to the following day and, consequently, accumulation in the long term can lead professionals to falling ill. It is necessary to raise awareness about the deleterious effects of fatigue in nursing professionals, mainly because of shift work effects⁽⁹⁾.

Although in the present study was not found a significant difference of ENEDE scores among the different sectors, previous studies⁽³³⁻³⁴⁾ demonstrated that nursing professionals working in emergency sectors are at a higher risk of becoming ill. This was attributed to the profile of the sector that deals with severe or potentially serious patients, who need a faster care service, adequate physical structure and efficient communication among team members. However, nurses face the opposite of these requirements in many cases. In other words, precarious environment, overcrowding, and lack of materials and professionals, together with sector disorganization, prolong and make patient care more difficult, consequently causing greater exhaustion⁽³³⁻³⁴⁾.

Limitations of the present study are the restrictions inherent to the use of questionnaires, such as the memory bias of

information regarding the presence of discomfort in the prior 12 months. In addition, because of a logistical impossibility of the authors, there was a restriction in the evaluation of a larger number of nursing professionals working in the night shift.

CONCLUSION

Our findings demonstrated a high prevalence of musculoskeletal discomfort in the previous year among nursing professionals working in the hospital setting. A considerable number of professionals presented greater fatigue and need for recovery, conditions with direct impact on the work ability. An important finding was the presence of fatigue in younger workers. From a practical point of view, the monitoring of fatigue levels is recommended particularly in young nursing professionals for preventing deleterious effects in the long term.

RESUMO

Objetivo: Avaliar o desconforto musculoesquelético, a capacidade para o trabalho e a fadiga residual em profissionais de enfermagem que atuam em Hospital. **Método:** Estudo transversal com profissionais de um hospital público de médio porte. Foram utilizados o questionário nórdico de sintomas, o índice de capacidade para o trabalho e a escala de necessidade de descanso (fadiga). Os dados foram analisados descritivamente e aplicaram-se testes inferenciais com o intuito de verificar a associação da fadiga e a capacidade para o trabalho e comparar a fadiga entre os setores analisados. **Resultados:** Participaram da pesquisa 110 profissionais. Um total de 86,24% dos trabalhadores relatou desconforto osteomuscular, com maior prevalência na coluna cervical, torácica e lombar. Aproximadamente 43% dos profissionais apresentaram fadiga residual. Verificou-se associação significativa entre fadiga e redução da capacidade para o trabalho ($p < 0,003$), assim como associação entre menor idade e maior fadiga ($p < 0,03$). **Conclusão:** Os resultados mostraram uma alta prevalência de desconforto osteomuscular no último ano e uma quantidade considerável de profissionais que apresentaram fadiga residual instalada. Destaca-se também uma importante parcela dos trabalhadores com moderada capacidade de trabalho, que requer atenção em médio prazo.

DESCRITORES

Equipe de Enfermagem; Saúde do Trabalhador; Fatores de Risco; Condições de Trabalho.

RESUMEN

Objetivo: Evaluar la incomodidad musculoesquelética, la capacidad laboral y la fatiga residual en profesionales de la enfermería que actúan en Hospital. **Método:** Estudio transversal con profesionales de un hospital público de mediano porte. Fueron utilizados el cuestionario nórdico de síntomas, el índice de capacidad laboral y la escala de necesidad de descanso. Los datos fueron analizados descriptivamente y se aplicaron pruebas inferenciales con el fin de verificar la asociación de la fatiga y la capacidad laboral y comparar la fatiga entre los sectores analizados. **Resultados:** Participaron en la investigación 110 profesionales. Un total del 86,24% de los trabajadores relató incomodidad osteomuscular, con mayor prevalencia en la columna cervical, torácica y lumbar. Un 43% de los profesionales presentaron fatiga residual. Se verificó asociación significativa entre fatiga y reducción de la capacidad laboral ($p < 0,003$), así como asociación entre menor edad y mayor fatiga ($p < 0,03$). **Conclusión:** Los resultados mostraron una alta prevalencia de incomodidad osteomuscular en el último año y una cantidad considerable de profesionales que presentaron fatiga residual instalada. Se destaca también una importante parte de los trabajadores con moderada capacidad laboral, que requiere de atención a mediano plazo.

DESCRIPTORES

Grupo de Enfermería; Salud Laboral; Factores de Riesgo; Condiciones de Trabajo.

REFERENCES

- Vidor CR, Mahmud MAI, Farias LS, Silva CA, Ferrari JN, Comel JC, et al. Prevalence of musculoskeletal pain among nursing surgery teams. *Acta Fisiátr.* 2014;21(1):6-10.
- Moraes PWT, Bastos AVB. The RSI/WMSD and the psychosocial factors. *Arq Bras Psicol [Internet].* 2013 [cited 2017 Mar 30];65(1):2-20. Available from: <http://pepsic.bvsalud.org/pdf/arb/v65n1/v65n1a02.pdf>.
- Nery D, Toledo AM, Oliveira Júnior SO, Taciro C, Carregaro R. Analysis of functional parameters related to occupational risk factors of ICU nursing activity. *Fisioter Pesqui [Internet].* 2013 [cited 2016 Dec 7]; 20(1):76-82. Available from: http://www.scielo.br/pdf/fp/v20n1/en_13.pdf
- Masson VA, Monteiro MI, Vedovato TG. Workers of CEASA: factors associated with fatigue and work ability. *Rev Bras Enferm [Internet].* 2015 [cited 2017 Jan 20];68(3):460-6. Available from: http://www.scielo.br/pdf/reben/v68n3/en_0034-7167-reben-68-03-0460.pdf.
- Sluiter JK, de Croon EM, Meijman TF, Frings-Dresen MH. Need for recovery from work related fatigue and its role in the development and prediction of subjective health complaints *Occup Environ Med [Internet].* 2003 [cited 2017 Aug 18];60 Suppl 1:i62-70. Available from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1765724/>
- Vasconcelos SP, Fischer FM, Reis AOA, Moreno CRC. Factors associated with work ability and perception of fatigue among nursing personnel from Amazonia. *Rev Bras Epidemiol [Internet].* 2011 [cited 2016 Nov 12];14(4):688-97. Available from: http://www.scielo.br/pdf/rbepid/v14n4/en_15.pdf

7. Moriguchi CS, Trevizani T, Moreira RFC, Januário LB, Oliveira AB, Coury HJCG. Need for recovery assessment among nursing professionals and call center operators. *Work* [Internet]. 2012 [cited 2017 Aug 18]; 41 Suppl 1:4838-42. Available from: <https://content.iospress.com/articles/work/wor0773>
8. Mininel VA, Baptista PCP, Felli VEA. Psychic workloads and strain processes in nursing workers of brazilian university hospitals. *Rev Latino Am Enfermagem*. 2011;19(2):340-7.
9. Chen J, Davis KG, Daraiseh NM, Pan W, Davis LS. Fatigue and recovery in 12-hour dayshift hospital nurses. *J Nurs Manag*. 2014;22(5):593-603.
10. Yamazaki S, Fukuhara S, Suzukamo Y, Morita S, Okamura T, Tanaka T, et al. Lifestyle and work predictors of fatigue in japanese manufacturing workers. *Occup Med*. 2007;57(4):262-9.
11. Moriguchi CS, Alem MER, Coury HJCG. Evaluation of workload among industrial workers with the Need for Recovery Scale. *Rev Bras Fisioter*. 2011;16(2):154-9.
12. Beza CME, Gouveia MTO, Robazzi MLDC, Torres CRD, Azevedo GAVD. Riscos ocupacionais e problemas de saúde percebidos por trabalhadores de enfermagem em unidade hospitalar. *Cienc Enferm* [Internet]. 2013 [citado 2016 nov. 14];19(3):63-71. Disponível em: http://www.scielo.cl/pdf/cienf/v19n3/art_08.pdf
13. Barros ENC, Alexandre NMC. Cross-cultural adaptation of the Nordic musculoskeletal questionnaire. *Int Nurs Rev*. 2003;50(2):101-8.
14. Silva Júnior SHA, Vasconcelos AGG, Griep RH, Rotenberg L. Validade e confiabilidade do índice de capacidade para o trabalho (ICT) em trabalhadores de enfermagem. *Cad Saúde Pública* [Internet]. 2011 [citado 2017 maio 5];27(6):1077-87. Disponível em: <http://www.scielo.br/pdf/csp/v27n6/05.pdf>
15. Marques DO, Pereira MS, Souza ACS, Vila VSC, Almeida CCOF, Oliveira EC. O absenteísmo - doença da equipe de enfermagem de um hospital universitário. *Rev Bras Enferm* [Internet]. 2015 [citado 2016 nov. 13];68(5):876-82. Disponível em: <http://www.scielo.br/pdf/reben/v68n5/0034-7167-reben-68-05-0876.pdf>
16. Bargas EB, Monteiro MI. Factors related to absenteeism due to sickness in nursing workers. *Acta Paul Enferm* [Internet]. 2014 [cited 2016 Nov 10];27(6):533-8. Available from: http://www.scielo.br/pdf/ape/v27n6/en_1982-0194-ape-027-006-0533.pdf
17. Leão ALM, Barbosa-Branco A, Rassi Neto E, Ribeiro CAN, Turchi MD. Sickness absence in a municipal public service of Goiânia, Brazil. *Rev Bras Epidemiol* [Internet]. 2015 [cited 2017 May 1]; 18(1):262-77. Available from: http://www.scielo.br/pdf/rbepid/v18n1/en_1415-790X-rbepid-18-01-00262.pdf
18. Santana LL, Miranda FMD, Karino ME, Baptista PCP, Felli VEA, Sarquis LMM. Description of workloads and fatigue experienced among health workers in a teaching hospital. *Rev Gaúcha Enferm* [Internet]. 2013 [cited 2017 May 02];34(1):64-70. Available from: http://www.scielo.br/pdf/rge/v34n1/en_08.pdf
19. Lelis MC, Battaus MRB, Freitas FCT, Rocha FLR, Marziale MHP, Robazzi MLCC. Work-related musculoskeletal disorders in nursing professionals: an integrative literature review. *Acta Paul Enferm* [Internet]. 2012 [cited 2017 Apr 11];25(3):477-82. Available from: http://www.scielo.br/pdf/ape/v25n3/en_v25n3a25.pdf.
20. Santana LL, Sarquis LMM, Miranda FMD, Kalinke LP, Felli VEA, Mininel VA. Health indicators of workers of the hospital area. *Rev Bras Enferm* [Internet]. 2016 [cited 2017 May 7];69(1):30-9. Available from: http://www.scielo.br/pdf/reben/v69n1/en_0034-7167-reben-69-01-0030.pdf
21. Mininel VA, Felli VEA, Silva EJ, Torri Z, Abreu A, Branco MTA. Workloads, strain processes and sickness absenteeism in nursing. *Rev Latino Am Enfermagem*. 2013;21(6):1290-7.
22. Raffone AM, Hennington EA. Avaliação da capacidade funcional dos trabalhadores de enfermagem. *Rev Saúde Pública*. 2005;39(4):669-76.
23. Souza DBO, Martins LV, Marcolino AM, Barbosa RI, Tamanini G, Fonseca RCR. Work capability and musculoskeletal symptoms in workers at a public hospital. *Fisioter Pesqui* [Internet]. 2015 [cited 2017 May 7];22(2):182-90. Available from: http://www.scielo.br/pdf/fp/v22n2/en_2316-9117-fp-22-02-00182.pdf
24. Marassaki ACY, Melo WA, Matsuda LM. Influência das características sociodemográficas e ocupacionais em trabalhadores da equipe de enfermagem com um emprego e multiemprego. *Cienc Enferm* [Internet]. 2013 [citado 2016 dez. 7];19(2):89-98. Disponível em: http://www.scielo.cl/pdf/cienf/v19n2/art_09.pdf
25. Martinez MC, Latorre MRDO, Fischer FM. Capacidade para o trabalho: revisão de literatura. *Ciênc Saúde Coletiva* [Internet]. 2010 [citado 2016 nov. 3];15(1):1553-61. Disponível em: <http://www.scielo.br/pdf/csc/v15s1/067.pdf>
26. Duran ECM, Cocco MIM. Capacidade para o trabalho entre alho entre trabalhadores de enfermagem do Pronto-Socorro de um Hospital Universitário. *Rev Latino Am Enfermagem* [Internet]. 2004 [citado 2016 dez. 5];12(1):43-9. Disponível em: <http://www.scielo.br/pdf/rlae/v12n1/v12n1a07.pdf>
27. Negeliskii C, Lautert L. Occupational Stress and Work Capacity of Nurses of a Hospital Group. *Rev Latino-Am Enfermagem* [Internet]. 2011 [cited 2016 Nov 10];19(3):606-13. Available from: <http://www.scielo.br/pdf/rlae/v19n3/21.pdf>
28. Staal JB, Hlobil H, van Tulder MW, Köke AJ, Smid T, van Mechelen W. Return-to-work interventions for low back pain: a descriptive review of contents and concepts of working mechanisms. *Sports Med*. 2002;32(4):251-67.
29. Fassier JB, Durand MJ, Caillard JF, Roquelaure Y, Loisel P. Results of a feasibility study: barriers and facilitators in implementing the Sherbrooke model in France. *Scand J Work Environ Health*. 2015;14(3):223-33.
30. Goveia VV, Oliveira GF, Mendes LAC, Souza LEC, Cavalcanti TM, Melo RLP. Escala de avaliação da fadiga: adaptação para profissionais da saúde. *Rev Psicol Organ Trab* [Internet]. 2015 [citado 2017 mar. 1];15(3):246-56. Disponível em: <http://pepsic.bvsalud.org/pdf/rpot/v15n3/v15n3a03.pdf>
31. Maissiat GS, Lautert L, Pai DD, Tavares JP. Work context, job satisfaction and suff ering in primary health care. *Rev Gaúcha Enferm*. 2015;36(2):42-9.

32. Fontana RT, Brigo L. Estudar e trabalhar: percepções de técnicos de enfermagem sobre esta escolha. Esc Anna Nery [Internet]. 2012 [citado 2016 dez. 10];16(1):128-33. Disponível em: <http://www.scielo.br/pdf/ean/v16n1/v16n1a17.pdf>
33. Rosado IVM, Russo GHA, Maia EMC. Produzir saúde suscita adoecimento? As contradições do trabalho em hospitais públicos de urgência e emergência. Ciênc Saúde Coletiva [Internet]. 2015 [citado 2016 nov. 13];20(10):3021-32. Disponível em: <http://www.scielo.br/pdf/csc/v20n10/1413-8123-csc-20-10-3021.pdf>
34. Pereira DS, Araújo TSSL, Gois CFL, Gois Júnior JP, Rodriguez EOL, Santos V. Occupational stressors among nurses working in urgent and emergency care units. Rev Gaúcha Enferm. 2013;34(4):55-61.

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