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Exposure of nursing workers to workloads and their consequences*

Exposição dos trabalhadores de enfermagem às cargas de trabalho e suas consequências
Exposición de los trabajadores de enfermería a las cargas de trabajo y sus consecuencias

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ABSTRACT

Objective: Measure the exposure of nursing workers to workloads and strain processes and their consequences, by means of indicators. **Method:** Epidemiological, descriptive, cross-sectional quantitative study, conducted in 12 units of three teaching hospitals in the city of Sao Paulo. The study population consisted of 452 nursing workers and the data was collected from hospital medical records using the software System for Monitoring the Health of Nursing Workers (SIMOSTE). The data was analyzed on the basis of indicators that provided information about organizational dynamics, occupational health problems and their consequences. **Results:** The health problem indicators revealed 879 exposures to worloads and 1,355 strain processes. The consequences indicators showed 2,709 lost days per year. **Conclusions:** Exposure to different workloads subjects workers to numerous strain processes, which should be monitored in order to implement preventive measures.

DESCRIPTORS

Hospital Nursing Staff; Workload; Occupational disease; Occupational Health; Indicators.

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INTRODUCTION

Monitoring the exposure of nursing workers to workloads and the resulting strain processes and their consequences extends beyond the promotion and protection of the health of nursing workers. Monitoring this exposure bolsters interventions related to the quantitative and qualitative availability of people for patient care, not only in the hospital environment, but also in all health institutions.

Studies from the perspective of social determination have identified the exposure of nursing workers to biological, chemical, physical, mechanical, physiological and psychological workloads as elements that interact with each other and the worker's body, generating processes of adaptation that result in stress and strain. Stress-strain processes, or more specifically, the loss of potential or effective capability of the worker's body or mind, lead to diminished work capacity and illness, with consequent decreased work productivity, many missed work days due to leaves, and overload for workers who remain on the job[1-4].

The exposure of nursing workers to occupational hazards and workloads were systematically described in 1996, based on a study from 1989[5,6].

Biological workload occurs by direct contact with patient fluids and secretions, and handling material contaminated during the disposal, transport and cleaning of materials and objects used in patient care, such as needles, catheters, and dressing materials (scissors, tweezers, scalpels, basins, vats, etc.)[7].

Chemical workload results from the handling of chemical substances. It should be noted that improper management of chemical waste can cause serious occupational health, general public health and environmental problems[4].

Physical workload occurs through ionizing and non-ionizing radiation, noise, temperature changes, humidity, electricity and other physical agents[6].

Mechanical workload is related to solution of continuity of tissues, due to trauma, falls, cuts and lacerations.

Physiological workload is generated by the use of the body as a work instrument; in this exposure, different strain processes may occur, such as musculoskeletal disorders, fatigue, pain in general and changes in circadian rhythms due to working at night[8].

Psychic workload includes exposure to an accelerated work pace; asymmetric interpersonal relationships; fragmented, repetitive and monotonous work; constant attention on the part of the worker; strict supervision; communication problems; unraveling of collective defenses; women's work; and stress, tension and professional dissatisfaction. All of these are factors that generate psychic damage and lead to a variety of strains[3].

Exposure to these workloads generates numerous health problems, and a morbidity profile can to be identified for this category of workers[1] that shows a higher frequency of musculoskeletal disorders, infectious and parasitic diseases, and mental and behavioral disorders. A recent study[9] found that cancer and suicide also appear in the mortality profile of these workers.

Although it is known that nursing workers are exposed to workloads and the resultant strain processes, changes in work processes to improve labor conditions are far from being a reality, signaling the need to monitor the health of these workers. Indicators are important tools for such monitoring.

In this study, the authors propose an analysis of indicators to assist in decision-making related to the health of nursing workers.

The objective of this study was to measure the exposure of nursing workers to workloads and strain processes, and their consequences, through using occupational health indicators.

METHOD

This is an epidemiological, descriptive, cross-sectional study, developed in a quantitative approach.

The research was performed in three hospitals (two teaching hospitals and one university hospital) in the city of Sao Paulo, referred to as H1, H2 and H3. Internal medicine and surgical units were chosen; according to their managers, these units would provide greater data consistency and representativeness. Thus, in H1, one internal medicine unit and one surgical unit were examined; in H2, two internal medicine units and two surgical units; and in H3, four internal medicine units and two surgical units.

The study population consisted of 452 health workers: 118 from H1, 103 from H2 and 231 from H3. The data collection instrument was the software entitled System for Monitoring the Health of Nursing Workers (SIMOSTE)[10]. It contains three modules that enable the inclusion of data related to the characterization of the institutions and workers, in addition to exposure to workloads and ensuing health problems, as well as their consequences. To facilitate data collection, the researchers used a form containing this information. The data was gathered from managerial reports (notifications), work shift records, electronic medical records and occupational accident notifications by workers.

The data was collected from August 2012 to July 2013. The data was input and consolidated in an electronic database, and then subjected to statistical analysis by units and scenarios.

After the data treatment, some indicators validated by the project entitled Implementation and Evaluation of the System for Monitoring the Health of Nursing Workers (SIMOSTE)[11] were examined. These indicators were related to the following dimensions.

1. Organizational dynamics: number of nursing workers per bed (I1), percentage of nursing workers in relation to total workers (I2), percentage of workers per professional category in relation to total number of nursing workers (I3).
2. Health problems: number of reports (notifications) according to type of workload, divided by total number of nurses exposed (I4), number of strains according to type of workload, divided by total number of reports (I5), number of sick leaves, according to the International Classifica-

tion of Diseases (ICD), divided by total number of reports (I6)

3. Consequences: number of lost work days and reason (I7), number of lost work days divided by total number of reports (I8) and number of lost work days per report (I9).

The results are presented in tables according to measures of absolute and relative frequency.

The project was approved by the Ethics Committee of the School of Nursing of USP, under No. 1110/2011/CEP – EEUSP and SISNEP CAAE: 0132.0,196,198-11, and received authorization from the participating hospitals.

RESULTS

The presentation of the data is based on the indicators examined for nine units involving three scenarios, taking into account organizational dynamics, health problems and consequences.

The indicators related to organizational dynamics (I_1 - I_3) are presented in Table 1.

In relation to the number of nursing workers per bed, the worst ratio was in H2 (0.91) and the best in H3 (1.46). The highest occupancy rate was in H1 (91%), followed by H2, with around 80%.

Regarding the percentage of nursing workers in relation to the total number of workers in the units, the best annual mean was found in H1 (68.7%), followed by H2 (51%), with the lowest ratio being in H3 (49%).

For the percentage of nursing team workers, the ratio between nurses and other categories was better in H3 (36.4%), with the lowest ratio being in H2 (14.4%). In relation to nursing technicians and assistants, the best percentage was found in H3 (63.6%) and the worst in H2 (85.6%).

The indicators related to health problems refer to the number of reports (I_4), number of stresses-strains according to type of hazard (I_5), and number of absences according to the ICD (I_6). Table 2 shows the risk coefficient of exposure to different types of occupational hazards (I_4).

In the three hospitals, 852 reports were registered, with the largest number in H3 (411), followed by H2 (322) and H1 (119). However, the real number of reports of workloads/year was 879, since some reported simultaneous exposure to two or three types of workloads.

In relation to the risk coefficient, among the different workloads, biological workloads ranked first, with H3 recording the highest frequency (489.74 reports/100 nursing workers) and H1 the lowest (113.46 reports/100 nursing workers). Exposure to physiological workloads was the second most frequent, with 393.33 reports/100 nursing workers in H3 and 343.59 reports/100 nursing workers in H2. The third most frequent reports were in relation to psychic workloads where 187.18 reports/100 nursing workers were made in H3 and 187.18 reports/100 nursing workers in H2. It was also noted that in H3 an average of 1.43 reports of biological workloads per worker were made.

Physical workloads were not reported in the scenarios and chemical workloads had the lowest frequency.

Another indicator involved the number of strains generated through exposure to workloads (I_5). The overall data revealed a total of 1,355 strains reported in the year and a ratio of 1.5 strains per exposure to workloads, i.e., each exposure to a workloads generated 1.5 health problems.

Table 3 shows data on generated stresses and strains as classified by the ICD (I_6),.

It can be seen in that the highest frequency of reports in the three hospitals was for musculoskeletal system diseases, with the highest percentage in H2 (34.47%), followed by H1 with 3.93%. The second leading cause of sick leave was diseases of the circulatory system, where the highest frequencies were reported in H1 (21%) and H3 (19.46%). The third most frequent health problem was infectious and parasitic diseases, with approximately 12% registered in H3 and 11.8% in H1.

Another group of indicators refers to the consequences of the health problems registered. These indicators deal with the number of lost work days according to the reason (I_7), number of lost work days by total number of reports (I_8), and number of lost work days per report (I_9).

Table 1 - Frequencies related to Indicators of Organizational dynamics in the scenarios examined - São Paulo, São Paulo, Brazil, 2012-2013.

Scenario/Indicator	Nº beds	Occup. rate$_{(\%)}$	Total Nº. workers	Nº. nursing workers			I_1	$I_{2\,(\%)}$	$I_{3\,(\%)}$	
				Nurses	Tec/Ass.	Total			Nurs.	Tec/Ass.
H1	84	91	150	24	79	103	1.23	68.7:	23.3:	77.0:
H2	130	80.30	232	17	101	118	0.91	51.0	14.4	85.6
H3	158	74.70	472	84	147	231	1.46	49.0	36.4	63.6

I_1: annual mean number of nursing workers per bed; I_2: total number of hospital workers; I_3: nursing worker categories.

Table 2 - Risk coefficients* of exposure to different types of workload, according to scenarios studied - Sao Paulo, Sao Paulo, Brazil, 2012-2013.

Hospital/Workloads	Biological	Physical	Physiolog.	Mech.	Psychic.	Chemical	Total
H1	113.46	0.00	84.62	7.69	30.77	0.00	119
H2	416.67	0.00	393.33	120	186.67	13.33	322
H3	489.74	0.00	343.59	38.46	187.18	10.26	411
Total	375	0.00	296	55	145	8	-

*Refers to the ratio between number of workers exposed to different types of hazards and total number of workers exposed to the incident.

Table 3 - Frequency of strains processes reported, according to the ICD and the scenario - Sao Paulo, Sao Paulo, Brazil, 2012-2013.

ICD Group 2/hospitals	H1		H2		H3		Total	
	No.	%	No.	%	No.	%	No.	%
Consequences of. external causes (traumas)	4	3.36	21	6.52	21	5.11	46	5.40
External contamination and communicable diseases. (biological accidents)	0	0.00	3	0.93	0	0.00	3	0.35
D. skin & subcutaneous tissue	6	5.04	5	1.55	2	0.49	13	1.53
D. circulatory system	4	3.36	13	4.04	7	1.70	24	2.82
D. digestive system	5	4.20	16	4.97	18	4.38	39	4.58
D. genitourinary system	1	0.84	4	1.24	14	3.41	19	2.23
D. respiratory system	25	21.01	58	18.01	80	19.46	163	19.13
D. eyes and annexes	5	4.20	14	4.35	37	9.00	56	6.57
D. ear and mastoid process	5	4.20	6	1.86	6	1.46	17	2.00
D. nervous system	6	5.04	25	7.76	39	9.49	70	8.22
D. musculoskeletal system	38	31.93	111	34.47	119	28.95	268	31.46
D. infectious and parasitic	14	11.76	26	8.07	49	11.92	89	10.45
Mental & behavioral disorders	6	5.04	20	6.21	19	4.62	45	5.28
Overall total	119	100	322	100	411	100	852	100

Table 4 shows that 852 reports were responsible for 2,709 lost work days. The highest frequencies were for sick leaves, which totaled 1,023 days (87.7%) in H3, followed by H1 with 308 days (85.8%). As for absence from work by occupational accident, the highest frequencies were in H2 with 459 days (38.8%) and H3 with 143 days (12.3%). Eight absences were also recorded for health problems, only in H1.

In examining the mean number of lost days per report, the highest frequency was due to absence from work by occupational accident, where HI had 21.5% and H3 20.4%. It was also found that the mean number of lost days for workers in H2 was 9.9 days, in H3, 5 days and in H1, 3.5 days.

DISCUSSION

The use of indicators to provide information about the health of nursing workers is necessary to enable monitoring, i.e., occupational health surveillance. As explained earlier, the proposed indicators for this study were validated in the study entitled "Implementation and Evaluation of the System for Monitoring the Health of Nursing Workers (SIMOSTE)[11]." The study was approved by the Research Support Foundation of the State of São Paulo. This study was conducted from the perspective of social determination, and validated indicators designed to identify the generation of health problems within the organizational dynamics of hospitals, since workers are exposed to workloads and strain processes, as well as identify the consequences resulting from this exposure. However, measurement of the indicators seeks to monitor their performance and help propose preventive measures to promote the health of these workers.

Therefore, discussion of the results considers the proposed indicators on the three levels. The organizational dynamics indicators refer to the number of nursing workers per bed and reveal quite different results for the three scenarios studied, even with different occupancy rates. It can be seen that, regardless of the occupancy rate, the number of workers does not vary, which leads to an accelerated work pace due to patient demand. H3 had the best worker/bed ratio and the lowest occupancy rate.

This indicator shows that there are few workers to provide nursing care over a 24-hour period. Other factors that

Table 4 - Frequency of lost work days according to type and mean days by report in the different scenarios - Sao Paulo, Sao Paulo, Brazil, 2012-2013.

Scenario	Type of missed work day	Mean days/report	No. reports	%
H1	Absence from work by occupational accident	21.5	43	12.0
	Sick leave	2.8	308	85.8
	Absence	1	8	2.2
	Total		**359**	**100**
H2	Absence from work by occupational accident	17.0	459	38.8
	Sick leave	2.5	725	61.2
	Absence	0	0	0
	Total		**1,184**	**100.0**
H3	Absence from work by occupational accident	20.4	143	12.3
	Sick leave	2.5	1023	87.7
	Absence	0	0	0
	Total		**1,166**	**100.0**
Total	Absence from work by occupational accident	17.9	645	23.8
	Sick leave	2.6	2,056	75.9
	Absence	1	8	0.3
	Total		**2,709**	**100.0**

have an impact on the number of beds per worker are: vacations and authorized leaves of over 15 consecutive days; and absences, such as justified absences, sick leaves, donating blood, voter or military enrollment, judicial summons and suspensions resulting from disciplinary measures[12].

It is important to note that, according to the Pan American Health Organization (PAHO)[13], the mean number of nurses/bed in Brazilian public hospitals is 22.2 nurses/100 beds, with 31.7 nurses/100 beds in the southeast region of the country. Compared to the data from the Pan American Health Organization[13], in the scenarios studied it was found that H3 had the best situation, with 53.16 nurses/100 beds, unlike H1 with 28.57 nurses/100 beds. The situation was even worse in H2, with 13.07 nurses for every 100 beds. The data showed that the work pace of nursing workers will surely be intensified.

In terms of the proportion of the nursing workforce in relation to the rest of the professionals, the proportion in the hospitals studied is higher than at the national level. This may be because medical teams do not solely belong to the staff of the hospital organizations, as is the case with nursing teams. Data from SIMOSTE[11] indicates that this ratio does not reach 40% at the national scenario, and in data from the Ministry of Health, nurses account for 14.8% in comparison to 57.6% for physicians[14].

It is also worth noting that the composition of the health team is affected by worker' employment contracts, daily and weekly working hours and work regime. Therefore, when observing the percentage of workers on the nursing teams, there was also large variance in the data among the three hospitals, with the best ratio found in H3 (36.4%).

The data from H2 showed that nurses represented 14.4% of the nursing team, differing significantly from the national composition of nursing teams, where nurses represent 20.5% of nursing teams[15]. Since nurses, who have a university education and are supposedly better prepared, represent an opportunity to enhance quality of care, the indicator shows that this care can be compromised when most of the team is composed of nursing technicians and assistants. Due to the small number of nurses, direct care is generally the responsibility of nursing technicians and assistants, who are thus more exposed to the hazards inherent in this kind of work. Overall, studies have shown that the risk of disease among nursing technicians and assistants is much greater than that of nurses, especially in terms of musculoskeletal disorders. Furthermore, the risk of occupational injuries among less qualified nursing professionals is reported to be four times higher than in the nurse category[11-16].

A study conducted in a public hospital found that the hiring of nursing technicians and assistants was higher than for nurses, who were hired at rates below those recommended by COFEN[17].

The health problem indicators examined exposure to workloads and the consequent strains processes. Of the 852 health problems reported, H3 accounted for nearly 48%, followed by H2 with 37.8%. The hospital with the best ratio of nurses on the teams was the one with the highest percentage of reports. This could indicate greater exposure of workers to workloads or suggest that these nurses encouraged filing reports.

Biological workloads were reported the most in the scenarios, with the largest number of reports occurring in H3.

Reports of physiological workloads were more frequent in H2, which also had the highest risk coefficient of exposure to mechanical and chemical workloads. This hospital had the worst ratio of workers per bed, indicating higher risk of occupational injuries.

In terms of psychic workloads, the highest risk exposure coefficient was in H3, which was characterized by oncology care, followed by H2.

Mininel et al. investigated the relationship between psychic workloads and a low ratio of hospital workers per number of beds, which intensifies the work pace. That study corroborates the findings of the present study, where psychic workloads were the third most reported[3].

Chemical and physical workloads are generally not much reported or recognized as workloads. Chemical workloads are present during the care process, whether while handling drugs or in the cleaning and organization of the work environment during disinfection or sterilization processes for materials and instruments. As for the consequences of this exposure, problems include contact dermatitis or hypersensitivity, resulting in poisoning or even the formation of tumors[4].

Mechanical workloads are more obviously damaging to workers' bodies, making them easier to identify. These workloads include work accidents that cause injuries, such as contusions, fractures, perforations, cuts and bruises[1].

This exposure was responsible for a ratio of 1.6 strains per workloads, where 852 reports generated 1,355 strains, demonstrating the effects of exposure.

In observing the strains caused by exposure to workloads, the highest frequency was musculoskeletal system diseases generated by the impact of physiological and psychic workloads, resulting from excess physical exertion due to an insufficient numbers of workers.

Studies have indicated the magnitude of musculoskeletal diseases in nursing workers, where the postures assumed for long periods during patient care are primarily responsible for this morbidity profile[18-19].

The second and third leading causes of sick absenteeism were respiratory system diseases and infectious and parasitic diseases. These result from exposure to biological workloads that were prevalent in the three scenarios, a finding corroborated by data from another study[20]. However, our data differed from studies involving the national situation[11] where the main health problems were musculoskeletal diseases, followed by those stemming from external causes and mental and behavioral disorders.

With respect to respiratory problems, health workers are at risk for flu, colds and other infectious processes. A study on the H1N1 epidemic showed its prevalence among nursing workers[21].

Furthermore, according to Silva and Marziale[22], workers and their supervisors assign little importance to respiratory system diseases, treating them as temporary and resulting in few lost work days, and do not attribute them to work overload and precarious working conditions.

A recent study found a close relationship between chemical workloads and respiratory system illnesses, resulting from the handling, inhalation and inoculation of substances such as drugs, sterilizers and disinfectants[4].

In fact, biological workloads are found in various ICD groups, which would heighten the exposure of workers to these workloads.

Nowadays, contact with patients carrying pathogenic microorganisms has become a relevant issue, as seen in the Ebola epidemic that occurred in African countries[23].

In relation to the consequences indicators, it was noted that there were three types of lost work days: sick leaves, occupational injuries and absences.

It was noted that most absenteeism is due to sick leave (75.9%), followed by occupational accident leave (23.8%) and absences (0.3%). This data indicates that the work-related health problems lead to sick leave, when they should be identified as occupational injuries, in accordance with legislation. Legally, occupational injuries are defined as "those that occur through performing work for the company or carrying out special category work, causing bodily injuries or functional disturbances, whether permanent or temporary, leading to death or lost or reduction in work capacity"[24]. Occupational injuries include occupational and work-related illness, as well as commuting work accidents.

Workers' health problems are often not viewed as being related to work, and injury data is not always reported and, therefore, does not appear in official statistics. Even normal absences should not be attributed to health problems when they are work-related. It's normal for workers to feel worn out and unable to work and decide not to show up. This entry is difficult to find and was only reported in H1, corresponding to 2.2% of lost work days.

According to one study[25], the under-reporting of occupational injuries ranges from 75% to 85% of cases, confirming the findings of the present study.

The lost work day indicator demonstrates the strong relationship between absenteeism and the cost it represents, apart from the seriousness of health problems. The present study identified 2,709 missed work days in one year, which equals 7.4 years. Most of the lost days were due to sick leaves (75%). However, the fact that the mean number of lost days reported was higher for occupational injuries is indicative of the seriousness of these injuries.

Another health problem accounting for a large number of lost work days was mental and behavioral disorders, as seen in H2 (10.1 days) and H3 (10.7 days). By comparison, musculoskeletal diseases, which are more frequent, resulted in workers missing, on average, 4.4 days in H2, 3.7 days in H1 and 2.7 days in H3. This is in agreement with Sancinetti et al. [26], who found that musculoskeletal diseases and mental and behavioral disorders were the groups of ICD diseases that generated the most lost work days.

The predominance of lost work days due to sick leave, indicating the occurrence of work-related illnesses that are not registered as occupational injuries, can be reported as such according to criteria established in the new Social Security Epidemiological Technical Nexus, which recognizes such diseases even when occupational accident report[27] are not submitted.

In light of the results of the present study, it is extremely important to adopt effective measures to promote and protect the health of nursing workers, as well as systematically monitor indicators to assess their health. It is also essential to monitor managerial indicators associated with care indicators, in addition to measuring the costs entailed by health-related absenteeism for institutions.

CONCLUSION

This study enabled the identification of indicators related to organizational dynamics, health problems and their consequences. The data analysis found that worker overload caused by the low worker-bed ratio, the small number of nurses on nursing teams and shortage of workers is a determining factor for exposure to different workloads and strain processes, manifested in musculoskeletal diseases, respiratory system diseases and infectious and parasitic diseases.

On the other hand, the study helped show the magnitude of unreported work-generated diseases, since workers miss work, for the most part, based on sick leaves, without establishing the relationship to work and registering them as injuries. Lost work days indicate the seriousness of health problems, corresponding to more than seven years lost over the space of one year. The extremely high cost this represents is incalculable and could be reversed by investments in workers' health and, consequently, in the quality of nursing care.

In this regard, this study helped shed light on the issue of workers' health, as well as its monitoring through indicators, which represents an objective and fundamental measure for decision-making in terms of complying with the right of citizens to health care, as governed by our Constitution.

RESUMO

Objetivo: Mensurar a exposição dos trabalhadores às cargas de trabalho, aos processos de desgaste e as suas consequências, por meio de indicadores. **Método:** Estudo epidemiológico descritivo, transversal e quantitativo, realizado em doze unidades de três hospitais de ensino do município de São Paulo. A população foi de 452 trabalhadores de enfermagem e a coleta de dados foi realizada por meio do software Sistema de Monitoramento da Saúde do Trabalhador de Enfermagem (SIMOSTE) nos prontuários dos trabalhadores de enfermagem. Os dados foram analisados segundo indicadores que permitiram apreender a dinâmica organizacional (DO), os problemas de saúde dos trabalhadores (PS) e suas consequências (CO). **Resultados:** Os indicadores PS evidenciam 879 exposições às cargas de trabalho e 1.355 processos de desgaste. Os indicadores de CO mostram 2.709 dias perdidos em um ano. **Conclusões:** A exposição às diferentes cargas de trabalho submete os trabalhadores a inúmeros processos de desgaste, os quais devem ser monitorados para que sejam implementadas medidas preventivas.

DESCRITORES
Recursos Humanos de Enfermagem no Hospital; Carga de Trabalho; Doença ocupacional; Saúde do Trabalhador; Indicadores.

RESUMEN
Objetivo: mensurar la exposición de los trabajadores a las cargas de trabajo, los procesos de desgaste y sus consecuencias a través de indicadores. **Método:** estudio epidemiológico descriptivo, transversal y cuantitativo realizado en 12 unidades de tres hospitales de enseñanza de São Paulo. La población era 452 trabajadores de enfermería y la recolección de datos se realizó mediante el software Sistema de Monitoreo de los Trabajadores de Enfermería (SIMOSTE) en los ficheros de los trabajadores de enfermería. Los datos fueron analizados a través de indicadores que permitieron aprehender la dinámica organizacional (DO), los problemas de salud de los trabajadores (PS) y sus consecuencias (CO). **Resultados:** los indicadores de PS evidenciaron 879 exposiciones a las cargas de trabajo y 1.355 procesos de desgaste. Los indicadores de CO muestran 2709 días perdidos en un año. **Conclusiones:** La exposición a distintas cargas de trabajo somete los trabajadores a numerosos procesos, que deben ser monitoreados para que se apliquen medidas preventivas.

DESCRIPTORES
Personal de Enfermería en Hospital; Carga de Trabajo; Enfermidades Professionales; Salud Laboral; Indicadores.

REFERENCES

1. Felli VEA, Tronchin DMR. A qualidade de vida no trabalho e a saúde do trabalhador de enfermagem. In: Kurcgant P, coordenadora. Gerenciamento em enfermagem. Rio de Janeiro: Guanabara Koogan; 2010. p. 89-107.
2. Silva FJ. A fadiga e a capacidade para o trabalho de enfermagem em unidades de internação médica e cirúrgica [dissertação]. São Paulo: Escola de Enfermagem, Universidade de São Paulo; 2011.
3. Mininel VA, Baptista PCP, Felli VEA. Psychic occupational hazards and strain processes in nursing workers of Brazilian university hospitals. Rev Latino Am. Nursing. 2011;19(2):340-7.
4. Costa TF, Felli VEA, Baptista PCP. Nursing workers' perceptions regarding the handling of hazardous chemical waste. Rev Esc Enferm USP. 2012;46(6):1453-61.
5. Laurell AC, Noriega M. Processo de produção e saúde: trabalho e desgaste operário. São Paulo: Hucitec; 1989.
6. Silva VEF. O desgaste do trabalhador de enfermagem: relação trabalho de enfermagem e saúde do trabalhador [tese doutorado]. São Paulo: Escola de Enfermagem, Universidade de São Paulo; 1996.
7. Bernardes CL. A vivência dos trabalhadores de enfermagem que sofreram acidente com fluido biológico: um olhar fenomenológico [dissertação]. São Paulo: Escola de Enfermagem, Universidade de São Paulo; 2014.
8. Felli VEA, Baptista PCP, Mininel VA, Sarquis LMM. Indicators to surveillance the health of nursing staff. In: Anais da 23rd Conference on Epidemiology in Occupational Health; 2013 June 18-25; Utrecht, Holanda.
9. Karino ME. As causas de morte dos enfermeiros: uma revisão sistemática [tese doutorado]. São Paulo: Escola de Enfermagem, Universidade de São Paulo; 2012.
10. Baptista PCP, Felli VEA, Mininel VA, Karino ME, Silva SM, Tito RS, et al. Using technological innovation as a tool to monitor nursing workers' health. Rev Esc Enferm USP. 2011;45(n.spe):1621-6.
11. Felli VEA. Implantação e avaliação do sistema de monitoramento da saúde do trabalhador de enfermagem (SIMOSTE) [Relatório final de pesquisa]. São Paulo: EEUSP; 2010.
12. Núcleo de Apoio à Gestão Hospitalar (NAGEH). Programa de Compromisso com a Qualidade Hospitalar. Manual de indicadores de enfermagem. São Paulo: APM/CREMESP; 2012.
13. Organização Pan-Americana da Saúde; Rede Interagência de Informação para a Saúde (RIPSA). Indicadores básicos para a saúde no Brasil: conceitos e aplicações. 2ªed. Brasília: OPAS; 2008.
14. Instituto Brasileiro de Geografia e Estatística (IBGE). Estatísticas da Saúde: assistência médico sanitária. Rio de Janeiro; 2010.
15. Conselho Federal de Enfermagem (COFEN). Análise de dados das inscrições dos profissionais de Enfermagem existentes nos Conselhos Regionais no ano de 2011. Brasília; 2013.
16. Érrico DA, Punnett L, Cifuentes M, Boyer J, Tessler J, Gore R, et al. Hospital injury rates in relation to socieconomic status and working conditions. Occup Environ Med. 2007;64(5):325-33.
17. Rossetti AC, Gaidzinski RR. Estimativa do quadro de pessoal de enfermagem em um novo hospital. Rev Latino Am Enfermagem. 2011;19(4)1011-7.
18. Magnago TSBS, Lisboa MTL, Griep RH, Kirchhof ALC, Camponogara S, Nonnenmacher CQ, et al. Condições de trabalho, características sociodemograficas e distúrbios musculoesqueléticas em trabalhadores de enfermagem. Acta Paul Enferm. 2010;23(2):187-93.
19. Alexandre NMC. Aspectos ergonômicos e posturais e o trabalhador da área de saúde. Semina. Ciênc Biol Saúde. 2007;28(2):109-18.
20. Santana LL. Propostas de Intervenção à saúde dos trabalhadores apoiadas em indicadores [dissertação]. Curitiba: Universidade Federal do Paraná; 2013.

21. Felli, VAA, Sarquis, LMM, Carvalho MB. Respiratory diseases among nursing workers in Brazil: a report of pandemic (A1488). In: Anais do 30th International Congress on Occupational Health; 2012 Mar 18-23; Cancun, México.

22. Silva DMPP, Marziale MHP. Problemas de saúde responsáveis pelo absenteísmo de trabalhadores de enfermagem de um hospital universitário. Acta Sci Health Sci. 2003; 25(2)191-7.

23. Miranda FMD, Stein Júnior AV, Petreli S, Pires MR, Soares LG, Ribeiral BN, et al. A contribution to occupational health: a guide on the exposure to biological fluids. Rev Esc Enferm USP. 2011;45(4):1018-22.

24. Brasil. Lei n. 8.213, de 24 de julho de 1991. Dispõe sobre os Planos de Benefícios da Previdência Social e dá outras providências [Internet]. Brasília; 2009 [cited 2014 Oct. 15]. Available from: http://www.planalto.gov.br/ccivil_03/leis/l8213cons.htm

25. Hintikka N, Saarela KL. Accidents at work related to violence: analysis of Finnish national accidents. Saf Sci. 2010;48(4):517-25.

26. Sancinetti TR, Gaidzinski RR, Felli VEA, Fugulin FMT, Baptista PCP, Ciampone MGT, et al. Absenteeism - disease in the nursing staff relationship with the occupation tax. Rev Esc Enferm USP. 2009;43(2):1277-83.

27. Brasil. Ministério da Saúde. Diretrizes de implantação da Vigilância em Saúde do Trabalhador no SUS. Brasília; 2012.