









## Workloads in nursing activities performed in university hospitals

Cargas de trabalho nas atividades de enfermagem em hospitais universitários\*  
Cargas de trabajo en las actividades de enfermería en hospitales universitarios

### How to cite this article:

Carvalho DP, Rocha LP, Brum AN, Juliano LF, Tomaszewski-Barlem JG, Barlem ELD. Workloads in nursing activities performed in university hospitals. Rev Esc Enferm USP. 2021;55:e20210023. doi: <https://doi.org/10.1590/1980-220X-REEUSP-2021-0023>

-  Deciane Pintanela de Carvalho<sup>1</sup>
-  Laureize Pereira Rocha<sup>1</sup>
-  Aline Neutzling Brum<sup>1</sup>
-  Laís Farias Juliano<sup>1</sup>
-  Jamila Geri Tomaszewski-Barlem<sup>1</sup>
-  Edison Luiz Devos Barlem<sup>1</sup>

\* Extracted from dissertation: "Elaboração e validação do instrumento "Escala de Cargas de Trabalho nas Atividades de Enfermagem" e a relação com o presenteísmo no contexto socioambiental de hospitais universitário", Universidade Federal do Rio Grande, Programa de Pós-Graduação em Enfermagem, 2020.

<sup>1</sup> Universidade Federal do Rio Grande, Rio Grande, RS, Brazil.

### ABSTRACT

**Objective:** Analyze the exposure of nursing workers to workloads present in university hospitals located in southern Brazil. **Method:** Cross-sectional quantitative study performed with 361 nursing workers from two University Hospitals between November 2019 and February 2020. An instrument addressing sociodemographic and occupational variables was used together with the previously validated Workloads in Nursing Activities Scale. The distribution of frequencies, measures of location, and variability were identified, and analysis of variance and the Tukey test were performed. **Results:** The construct that obtained the highest mean was F3 – Biological Loads (3.00), revealing that nursing workers are very intensively exposed to biological loads. Workloads were significantly different between the work units – physiological ( $p = 0.001$ ), biological ( $p = 0.007$ ), psychological ( $p = 0.042$ ), mechanical ( $p = 0.014$ ), chemical ( $p = 0.001$ ), and physical ( $p = 0.001$ ). **Conclusion:** The workers identified that exposure to workloads varies in intensity, showing aspects of the work performed in health institutions that either aggravate or mitigate workloads through the activities performed by nursing workers.

### DESCRIPTORS

Workload; Nursing; Occupational Health; Hospitals, University; Nursing, Team.

### Corresponding author:

Deciane Pintanela de Carvalho  
Rua General Osório, s/n  
96200-190 – Rio Grande, RS, Brazil  
[deciane.carvalho@gmail.com](mailto:deciane.carvalho@gmail.com)

Received: 01/20/2021  
Approved: 05/21/2021

## INTRODUCTION

Nursing workers perform tasks in different settings, including outpatient clinics, industries, and hospitals<sup>(1)</sup>. Among hospital facilities, university hospitals (UHs), which are health care institutions linked to a public or private Higher Education Institution, stand out. In addition to the care provided in university hospitals, these are considered training centers, where practical coursework in the health field is developed to innovate care practices and obtain technological advancement. The objectives are focused on ensuring improved quality of care, teaching, research, and management<sup>(2)</sup>.

There are aspects within the work context of UHs related to the actions developed by nursing workers, who plan, organize, perform, and assess activities to ensure the quality of care. The work process involves working with care teams and multidisciplinary teams by establishing relationships and communication. Other aspects concern working conditions, such as inadequate physical facilities that do not favor the performance of tasks<sup>(3)</sup>. Additionally, UHs host research and the development of health technologies, promote actions intended to improve health care quality, patient and occupational safety through care delivery, management, extension, research, and teaching undergraduate and graduate courses<sup>(4)</sup>.

Nursing professionals working in UHs play an essential role in providing care and establishing relationships with multidisciplinary teams. However, how social labor relations are established and the work process is implemented influences the health-disease continuum, potentially triggering physical and mental fatigue among workers<sup>(5)</sup>. The promotion of socio-environmental elements involves the workplace and workers, based on an understanding of how work processes and the health/disease continuum are associated<sup>(6)</sup>. Hence, this study adopted a socio-environmental approach of university hospital settings, nursing workers, and the workloads to which these workers are exposed.

Considering that workloads in the socio-environmental context of university hospitals constitute the object of study, it is necessary to identify how workloads are classified and differentiated. Nursing workloads are identified as psychological, physiological, chemical, physical, mechanical, and biological loads, and these loads are significantly associated with work-related strain<sup>(7)</sup>. Biological loads include exposure to viruses, bacteria, fungi, blood, secretions, excretions, handling patients with infectious contagious diseases, and handling contaminated material. Chemical loads include medications, chemotherapy agents, anesthetic gases, dust, antiseptics, sodium hypochlorite, glutaraldehyde, and latex gloves. Physical loads include noise, temperature differences, humidity, non-ionizing radiation, and mechanical loads include accidents involving sharp objects, sprains, bruises, fractures, torsions, perforations, cuts, and physical violence<sup>(7)</sup>.

Psychological loads include lack of autonomy, conflicts, difficulties in reconciling administrative and care activities, multiple tasks, difficulties with teamwork, and lack of support from the headship<sup>(8)</sup>. Physiological loads refer to

lifting heavy loads, uncomfortable and inappropriate physical postures, working night shifts, shift work, physical strain, standing for long periods, and walking long distances within the facility<sup>(7)</sup>.

UHs present a socio-environmental context that differs from that found in other hospital facilities because workers in university hospitals provide care to patients, manage health services, and work with research and teaching activities together with professors and students from different fields of health. These are factors that submit workers to additional workloads inherent to the work linked to the training of future health workers. The different socio-environmental contexts presented by these institutions motivated this study. Hence, the objective was to analyze the exposure of nursing workers to workloads presented in university hospitals located in southern Brazil.

## METHOD

### STUDY DESIGN

This quantitative and cross-sectional study adopted the "Workloads in Nursing Activities Scale" (*ECTAE*), previously developed and validated with nursing professionals working in two UHs located in two cities in the south of Brazil, identified here as H1 and H2. Both hospitals are linked to the Brazilian Hospital Services Company (*EBSERH*). H1 is a public university hospital with 231 beds, a reference in the treatment of high-risk pregnancies and highly complex orthopedic surgeries and H2 is also a public university hospital, with 175 beds and provides outpatient care, medium- and high-complex care, and home care.

### POPULATION AND SAMPLE

A population of 752 nursing workers was considered: 366 from H1 and 376 from H2, to calculate the sample with a 95% confidence interval, and a minimum sample of 255 participants was obtained. A convenience, non-probabilistic sample was adopted to reach the largest number of participants; 361 participants were recruited.

The inclusion criterion was working in one of the following units: Medical Clinic, Surgical Clinic, Emergency Care Service, Urgency and Emergency Network, Obstetrical Clinic, Maternity, Pediatric Clinic, Surgical Center, or (general or neonatal) ICU. These units were chosen because similar work processes were implemented in both UHs. The exclusion criterion was being on vacation or any type of leave at the time of data collection.

### DATA COLLECTION

A previously trained team collected data between November 2019 and February 2020 using a self-report form printed on letter-sized sheets and placed in individual manila envelopes. The envelopes were distributed to the nursing workers in their respective units in the morning, afternoon, and night shifts. The participants were invited to participate after receiving clarification regarding the study's objectives, the hosting institution, participating health institutions, and potential participants. A total of 400 envelopes were

distributed, and 372 returned, with 28 losses. Two questionnaires were excluded due to incomplete responses; eight were blank, and one professional refused to participate.

*ECTAE* was developed with nursing workers using an eight-stage guide<sup>(9)</sup> to assess the intensity and frequency with which workers are exposed to workloads during nursing tasks. *ECTAE* is composed of 22 statements rated on a five-point Likert scale regarding intensity (not intense at all = 0; somewhat intense = 1; intense = 2; very intense = 3; extremely intense = 4), and frequency (not frequent at all = 0; somewhat frequent = 1; frequent = 2; very frequent = 3; extremely frequent = 4). This scale was validated with a Cronbach's alpha equal to 0.87, with sample adequacy measure (KMO) equal to 0.87, while the Bartlett's sphericity test (BTS) identified statistical significance equal to 0.001.

*ECTAE* presents six constructs that represent workloads of internal materiality and workloads of external materiality. Construct F1 – Psychological Loads is composed of seven items related to administrative tasks, care delivery, teaching, research, and extension activities; lack of communication or miscommunication; advisory and supervision; difficulties with teamwork; state of constant alertness; psychological and/or moral abuse; and tension in the development of work. Construct F2 – Physiological Loads contains four items related to lifting heavy loads, transporting patients, and physical strain.

Construct F3 – Biological Loads comprises four items that describe the presence of microorganisms, contact with secretions, body fluids, and invasive and non-invasive procedures. Construct F4 – Mechanical loads comprises three items addressing physical violence, falls, and occupational accidents. Construct F5 – Physical loads comprises two items related to inappropriate infrastructures such as lighting, physical space, material, waste disposal, and electrical shock. Construct F6 – Chemical loads contains two items that refer to the preparation and administration of medications, handling cleaning products, and material disinfection.

The instrument also addressed sociodemographic and occupational variables, with two open-ended questions (age and work unit) and close-ended questions concerning sex (female or male), hospital facility (H1 or H2), job position (nurse, nursing technician, or nursing aid), and work shift (morning, afternoon, night, or morning and afternoon).

## DATA ANALYSIS AND TREATMENT

Data were typed and organized in *Microsoft Office Excel 2020* and later entered in *Statistical Package for Social Sciences*, version 24 for processing and analysis. Data were analyzed using descriptive statistics, distribution of absolute and relative frequencies, measures of location such as minimum and maximum, and mean and variability measures such as standard deviation. Inferential analysis, through the Kolmogorov Smirnov test ( $p = 0.000$ ), confirmed data were normally distributed. Analysis of Variance (ANOVA) and Tukey test were used to compare the workloads means according to the job position and work unit variables.

## ETHICAL ASPECTS

This study was conducted after approval was provided by the Institutional Review Board regulating studies addressing human subjects (Opinion Report No. 79/2019), and the participating institutions authorized its development. Ethical guidelines provided by Resolution 466/2012, National Council of Health, were complied with, and all the nursing workers who met the inclusion criteria and were invited to participate signed free and informed consent forms.

## RESULTS

A total of 361 nursing workers aged 38.9 years ( $SD \pm 8.6$  years) participated in the study; 295 (81.7%) were women, 189 (52.4%) worked in H1, and according to their job positions, 97 (26.9%) were nurses, 233 (64.5%) nursing technicians, and 31 (8.6%) were nursing aids. The work unit with the largest number of participants was the Medical Clinic, with 57 participants (15.8%) (Table 1).

Table 2 presents the mean of the constructs and the mean of the instrument's items, revealing the intensity to which nursing workers are exposed to workloads. The construct presenting the highest mean was F3 – Biological Loads (3.00), showing that nursing workers are very intensively exposed to biological loads. Constructs F2 – Physiological Loads and F6 – Chemical Loads followed with means equal to 2.53 and 2.36, respectively, revealing that these workers experience intense exposure to physiological and chemical loads.

Constructs F1 – Psychological Loads and F5 – Physical Loads follow in the sequence with means equal to 1.83 and 1.39, respectively, revealing that nursing workers are less

**Table 1** – Characterization of nursing workers according to sociodemographic and occupational variables. Rio Grande, RS, Brazil, 2020.

Variables	n	%	
Hospital	H1	189	52.4
	H2	172	47.6
Sex	Female	295	81.7
	Male	66	18.3
Job position	Nurse	97	26.9
	Nursing technician	233	64.5
	Nursing aid	31	8.6
Work unit	Obstetrical center	20	5.5
	Maternity	49	13.4
	Pediatric clinic	28	7.8
	Emergency care service	33	9.1
	Medical clinic unit	57	15.8
	Surgical clinic unit	31	8.6
	Surgical center	20	5.5
	General ICU	25	6.9
	Neonatal ICU	46	12.7
Urgency and emergency network	52	14.4	

**Table 2** – Mean and standard deviation (SD) of the constructs that identify exposure to workloads among nursing workers. Rio Grande, RS, Brazil, 2020.

Constructs	n	$\bar{X}$	DP
<b>Construct 1 – Psychological loads</b>	361	1.83	0.90
Q22. Excess work resulting from administrative tasks, care delivery, and teaching, research, and extension activities.	360	1.69	1.34
Q17. Lack of communication or miscommunication due to many people asking for information and difficulties communicating with the staff, students, and professors.	361	1.87	1.27
Q19. Guide and supervise the preparation of medications during the training of co-workers newly admitted to the unit, undergraduate students, or residents.	358	1.78	1.29
Q16. Perceiving and/or experiencing difficulties with teamwork, conflicts among workers, and many people in the unit (multidisciplinary teams, residents, students, and professors).	361	1.81	1.28
Q18. Living in a state of constant alertness when monitoring students performing invasive and non-invasive procedures and advising and developing research.	359	1.45	1.25
Q21. Witnessing and/or experiencing threats and psychological and/or moral violence on the part of patients, family members, or remaining health workers.	359	1.71	1.41
Q20. Experiencing tension when developing work due to inadequate staffing and intense and exhausting routines,	360	2.52	1.26
<b>Construct 2 – Physiological loads</b>	361	2.53	1.12
Q14. Handling excessive weight of patients, devices, and equipment.	359	2.34	1.29
Q15. Transporting patients from stretcher to bed or wheelchair, transporting patients and equipment.	360	2.60	1.30
Q12. Performing physical effort when moving patients.	356	2.71	1.24
Q13. Performing physical effort due to understaffing.	348	2.47	1.28
<b>Construct 3 – Biological loads</b>	361	3.00	0.95
Q11. Providing care to patients affected by microorganisms (e.g., viruses, bacteria, fungi) and patients on contact, aerosol, or droplet precautions.	361	3.17	1.14
Q10. Contact with secretions when changing dressings, tending drains or performing oral, nasal, or tracheal aspiration.	360	2.65	1.31
Q09. Performing procedures involving contact with body fluids such as feces, urine, or amniotic fluid.	361	3.08	1.18
Q05. Wearing latex gloves to perform invasive and non-invasive procedures in patients and to handle products.	361	3.13	1.20
<b>Construct 4 – Mechanical loads</b>	361	0.92	0.94
Q06. Experiencing physical violence on the part of companions or patients.	354	0.79	1.15
Q07. Falling due to wet floors, imperfection, or obstacles in the circulation area.	358	0.65	1.02
Q08. Experiencing accidents such as torsions, bruises, and sprains due to overload of patients and/or equipment during handling and transportation.	361	1.35	1.23
<b>Construct 5 – Physical loads</b>	361	1.39	1.06
Q01. Working with poor lighting, no natural light, or in the presence of burnt-out lamps.	357	1.30	1.19
Q02. Working in poor conditions, such as limited physical space, scrapped material, inadequate waste disposal, or exposure to electric shock.	359	1.49	1.30
<b>Construct 6 – Chemical loads</b>	361	2.36	1.10
Q04. Preparing and administering medications such as antibiotics, chemotherapy, anesthetic gases, and antiviral agents.	361	2.00	1.40
Q03. Handling products to clean and disinfect equipment and material such as formaldehyde, sodium hypochlorite, soaps, peracetic acid, and alcohol.	357	2.72	1.25

$\bar{X}$ : mean; SD: standard deviation

intensively exposed to psychological and physical loads. The construct F4 – Mechanical Loads (0.92) obtained the lowest mean, showing that exposure of nursing workers to mechanical loads is not intense at all.

ANOVA was used to verify the difference between occupational variables and the workloads identified with *ECTAE*. A significant difference was found between job positions and the following workloads: psychological loads ( $p = 0.001$ ), physiological loads ( $p = 0.022$ ), biological loads ( $p = 0.002$ ), and chemical loads ( $p = 0.001$ ) (Table 3).

The comparison of multiple means using the Tukey test indicated statistically significant differences for the

psychological loads between nurses and nursing technicians ( $p = 0.000$ ) and between nurses and nursing aids ( $p = 0.000$ ). Physiological loads presented statistically significant differences only between nurses and nursing technicians ( $p = 0.016$ ). Significant differences were found regarding biological loads between nurses and nursing technicians ( $p = 0.024$ ), and between nursing technicians and nursing aids ( $p = 0.010$ ), and statistical differences ( $p = 0.000$ ) were also found between nurses and nursing technicians and between nursing technicians and nursing aids ( $p = 0.006$ ) regarding chemical loads.

Statistical differences were found between work units and psychological loads ( $p = 0.042$ ), work units and physiological



**Table 3** – Statistical differences between occupational characteristics and workloads identified with the *ECTAE*, Rio Grande, RS, Brazil, 2020.

Variables	Psychological loads		Physiological loads		Biological loads		Mechanical loads		Chemical loads		Physical loads	
	$\bar{X}$	p	$\bar{X}$	p	$\bar{X}$	p	$\bar{X}$	p	$\bar{X}$	p	$\bar{X}$	p
Job position		0.001*		0.022*		0.002*		0.149		0.001*		0.407
Nurse	2.27		2.27		2.83		1.03		1.69		1.52	
Technician	1.69		2.64		3.13		0.85		2.64		1.35	
Aid	1.48		2.47		2.60		1.11		2.35		1.33	
Work unit		0.042*		0.001*		0.007*		0.014*		0.001*		0.001*
OB	2.06		3.16		3.07		1.35		3.12		1.25	
MAT	1.82		2.63		2.88		0.62		2.34		1.14	
PC	1.78		1.74		2.46		0.94		2.01		1.51	
ECS	1.48		2.28		3.00		0.83		1.95		0.78	
MCU	2.04		2.92		3.25		0.99		2.37		1.35	
SCU	1.56		2.81		2.99		0.79		2.11		1.04	
SC	1.55		2.33		2.48		0.98		1.90		1.75	
G ICU	1.70		2.96		3.14		1.44		2.16		1.72	
Neo ICU	1.89		1.22		3.13		0.72		2.80		1.46	
UEN	2.03		3.19		3.15		1.02		2.54		1.90	

\*:  $p < 0.05$ ;  $\bar{X}$ : mean; p: p-value obtained with ANOVA; Technician: nursing technician; Aid: nursing aid; OB: Obstetrical clinic; MAT: maternity; PC: pediatric clinic; ECS: emergency care service; MCU: medical clinic unit; SCU: surgical clinic unit; SC: surgical center; G ICU: General intensive care unit; Neo ICU: neonatal intensive care unit; UEN: Urgency and Emergency Network.

loads ( $p = 0.001$ ), work units and biological loads ( $p = 0.007$ ), work units and mechanical loads ( $p = 0.014$ ), work unit and chemical loads ( $p = 0.001$ ), and between work units and physical loads ( $p = 0.001$ ) (Table 3).

The Tukey test was performed between each type of load and significant differences were found regarding physiological loads between the obstetrical and pediatric clinic ( $p = 0.000$ ); between obstetrical clinic and ECS ( $p = 0.035$ ); obstetrical clinic and neonatal ICU ( $p = 0.000$ ); maternity and pediatric clinic ( $p = 0.003$ ); maternity and neonatal ICU ( $p = 0.000$ ); pediatric clinic and medical clinic ( $p = 0.000$ ); pediatric clinic and surgical clinic ( $p = 0.001$ ); pediatric clinic and general ICU ( $p = 0.000$ ); pediatric clinic and UEN ( $p = 0.000$ ); ECS and neonatal ICU ( $p = 0.000$ ); ECS and UEN ( $p = 0.001$ ); neonatal ICU and medical clinic ( $p = 0.000$ ); neonatal unit and surgical center ( $p = 0.0001$ ); surgical center and UEN ( $p = 0.021$ ); general ICU and neonatal ICU ( $p = 0.000$ ); UEN and neonatal ICU ( $p = 0.000$ ).

As for chemical loads, statistically significant differences were found between the obstetrical and pediatric clinics ( $p = 0.016$ ); obstetrical clinic and ECS ( $p = 0.005$ ); obstetrical and surgical clinics ( $p = 0.034$ ); obstetrical clinic and surgical center ( $p = 0.012$ ); and between ECS and Neonatal ICU ( $p = 0.019$ ). Significant differences were found regarding physical loads between the maternity units and UEN ( $p = 0.009$ ); ECS and surgical centers ( $p = 0.036$ ); ECS and general ICU ( $p = 0.025$ ); ECS and UEN ( $p = 0.000$ ); surgical clinic and UEN ( $p = 0.011$ ), regarding biological loads between pediatric and medical clinics ( $p = 0.010$ ), and regarding mechanical loads between the maternity units and

general ICU ( $p = 0.015$ ). The p-value for psychological loads was higher than 0.05 in all comparisons, indicating that the work unit did not influence exposure to psychological loads.

## DISCUSSION

Biological loads obtained the highest intensity mean in the validated instrument, showing that exposure to microorganisms, contact with secretions and body fluids, and performing invasive and non-invasive procedures is very intense among nursing workers. Many invasive procedures are performed in university hospitals, which favors occupational accidents with biological material<sup>(10)</sup>.

Another example of nursing activities that expose workers to biological loads is assisting child delivery in obstetrical centers and maternities. This assistance includes invasive procedures such as puncturing patients to administer medications and procedures that involve exposure to body fluids due to the proximity between workers and women during labor and childbirth<sup>(11)</sup>.

Nursing workers reported that exposure to physiological and chemical loads is intense. Physiological loads are identified by handling excessive weight, transporting patients, and physical strain accruing from both handling patients and dealing with understaffed units. Chemical loads are related to the preparation and administration of medications and the manipulation of cleaning products and material disinfection.

Physiological loads are related to physical tasks, and one example of such workload among nursing workers is physical strain. Physiological loads are significantly associated with pain in the upper limbs and the cervical

region<sup>(7)</sup>. Musculoskeletal disorders are the leading causes of absenteeism due to sick leave, linked to workload and physical and mental fatigue<sup>(12)</sup>. Absenteeism affects the quality of care, as it decreases the number of workers, generating an unhealthy environment for the remaining workers<sup>(13)</sup>, confirming this study's findings.

Likewise, chemical loads are frequent in nursing practice. The presence of chemical loads was identified with the use of chemical products used in the cleaning of material and equipment. Contact with these products causes nausea, dizziness, and allergic reactions<sup>(14)</sup>.

Nursing workers administer many different medications in their practice; thus, exposure to chemical loads is considered intense. Nursing technicians administer medications orally, intravenously, intramuscularly, via tubes, topically, and inhaled medications, and handle serums and solutions such as analgesics, medications for gastrointestinal disorders, hyperemia, and antibiotics<sup>(15)</sup>.

Nursing workers considered psychological and physical loads to be somewhat intense. Psychological loads refer to administrative tasks, care delivery, teaching, research, and extension activities; lack of communication or miscommunication; advisory and supervision; difficulties with teamwork; state of constant alertness; psychological and/or moral violence; tension during work. Physical loads comprise inappropriate infrastructures such as lighting, physical space, material, waste disposal, and electrical shock.

The low intensity related to these loads may be due to the UHs' management. In order for these facilities to perform teaching, research, and extension activities and provide care, UHs integrate the National Program for Restructuring of Federal University Hospitals (*Programa Rebuf*), which enables proper material and institutional conditions, with adequate physical structure, management, restructuring of human resources and technological innovation<sup>(16)</sup>. One study identified that the inclusion of university hospitals improved work conditions due to investments and technological advancements through the acquisition of material and equipment to promote the quality of care and administrative activities<sup>(17)</sup>.

Additionally, factors such as social support, labor relations, strengthened and valued interpersonal and professional relationships promote a healthy work environment that protects nursing workers against diseases and promotes the quality of life and wellbeing of workers inside and outside their jobs, resulting in job satisfaction<sup>(18)</sup>. This study's results concerning psychological and physical loads reveal a favorable socio-environmental context for developing nursing activities.

Finally, mechanical loads obtained the lowest mean among the nursing workers; that is, exposure to physical violence, falls, or occupational accidents was not intense at all. This finding shows that nursing workers do not foresee the occurrence of accidents with the potential to compromise their physical integrity. Note that some actions enable decreasing the intensity of exposure to mechanical loads, such as nursing workers adhering to precautionary measures,

including adequately disposing of sharp objects and not recapping needles<sup>(19)</sup>.

However, nursing workers frequently deal with physical and mental violence in their workplaces<sup>(19)</sup>. One study addressing 151 nurses in a university hospital located in Turkey verified that 68.5% of the participants had experienced at least once an occupational accident, highlighting accidents caused by sharp objects, violence, and falls<sup>(20)</sup>.

Significant differences were found between job positions and psychological, physiological, biological, and chemical loads. This finding is explained by the characteristics of the activities performed by nurses, nursing technicians, and nursing aids, and the entire staff's working conditions. Nurses perform activities related to work organization, supervising and providing care in situations in which the presence of a nurse is necessary. Nurses are responsible for the division of work, shift changes, visiting patients, and recording patients' history, prescriptions, and progression. Nursing technicians are responsible for preparing and administering medications, verifying the patients' vital signs, and providing hygiene and comfort care. Regarding working conditions, the workers deal with understaffed units, overtime work, and the presence of conflicts, and work rhythm<sup>(3)</sup>.

Significant differences were also found between job positions and psychological, physiological, biological, mechanical, chemical, and physical loads. This finding is related to the particularities of each work unit in the university hospitals participating in the study, which confirm the presence of workloads according to the work process developed in each hospital unit.

For example, in inpatient surgical units, the nurses' practice involves providing care to patients in the pre- and postoperative, which demands knowledge to deal with complications and ensure patient safety. Nursing care involves physical effort and inappropriate body positions, harming workers' health depending on the tasks performed<sup>(21)</sup>. Other examples of workloads are found in neonatal ICUs in which the nursing workers identified the presence of inappropriate infrastructure, lack of material, nighttime work, awkward body postures, contact with viruses, fungi, secretions and bacteria, noise, different temperatures, ionizing radiation, and accidents caused by sharp objects<sup>(14)</sup>.

This study's results contribute to the scientific literature addressing workloads in nursing practice by identifying activities in the socio-environmental context of university hospitals that may lead to physical and psychological fatigue among health workers. The activities addressed here highlight social relationships experienced by the workers, such as psychological loads, and relationships established with multidisciplinary teams, professors, and students. Conditions related to the workplace were also found, such as physical structure and human and material resources, which can favor reduced workloads.

Identifying the activities developed at work and appropriate workplaces strengthens the quality of care provided to

patients and decreases workloads among nursing workers, promoting the satisfaction of both workers and patients<sup>(22)</sup>.

This study's limitations include its cross-sectional design, which prevents establishing a cause and effect relationship. Assessing exposure to workloads in other hospitals providing professional training using this validated instrument is suggested to obtain information to compare with the reported results.

## CONCLUSION

This study analyzed the exposure of nursing workers using the *ECTAE* in the socio-environmental context of university hospitals. The workers reported exposure to workloads with intensities that ranged from very intense to not intense at all. Exposure to biological loads was considered

very intense, followed by intense exposure to physiological and chemical loads, while psychological and physical loads were considered only somewhat intense, and mechanical loads were not intense at all. Additionally, a significant difference was found between job positions and workloads and between work units and workloads.

These results reveal aspects of the work performed in health facilities that either aggravate or mitigate workloads through the activities developed by nursing workers. The aspects of the work performed in health facilities that mitigate workloads include improved physical infrastructure, ergonomic equipment and furniture, availability of personal protective equipment, providing training on precautionary measures and strategies to reduce occupational accidents, adequate staffing, and support to the management of services.

## RESUMO

**Objetivo:** Analisar a exposição dos trabalhadores de enfermagem às cargas de trabalho presentes em hospitais universitários no sul do Brasil. **Método:** Estudo quantitativo transversal, com 361 trabalhadores de enfermagem de dois Hospitais Universitários, entre os meses de novembro de 2019 e fevereiro de 2020. Foi utilizado um instrumento com variáveis sociodemográficas e laborais e a Escala de Cargas de Trabalho nas Atividades de Enfermagem, previamente validada. Realizou-se distribuição de frequências, medidas de posição e variabilidade e análise de variância e teste de Tukey. **Resultados:** O construto que apresentou a maior média do instrumento foi F3-Cargas Biológicas (3,00), evidenciando que a exposição às cargas biológicas é muito intensa entre os trabalhadores de enfermagem. As cargas de trabalho possuíram diferença significativa com as unidades de trabalho – fisiológicas ( $p = 0,001$ ), biológicas ( $p = 0,007$ ), psíquicas ( $p = 0,042$ ), mecânicas ( $p = 0,014$ ), químicas ( $p = 0,001$ ) e físicas ( $p = 0,001$ ). **Conclusão:** Os trabalhadores identificam a exposição às cargas de trabalho com diferentes intensidades, evidenciando aspectos do trabalho nas instituições de saúde que aumentam ou atenuam as cargas de trabalho, por meio das atividades desenvolvidas pelos trabalhadores de enfermagem.

## DESCRITORES

Carga de Trabalho; Enfermagem; Saúde do Trabalhador; Hospitais Universitários; Equipe de Enfermagem.

## RESUMEN

**Objetivo:** analizar la exposición de los trabajadores de enfermería a las cargas de trabajo presentes en hospitales universitarios, en el sur de Brasil. **Método:** estudio cuantitativo transversal, en 361 trabajadores de enfermería de dos Hospitales Universitarios, entre los meses de noviembre de 2019 y febrero de 2020. Fue utilizado un instrumento con variables sociodemográficas y laborales y la Escala de Cargas de Trabajo en las Actividades de Enfermería, previamente validada. Se realizó distribución de frecuencias, medidas de posición y variabilidad y análisis de variancia y test de Tukey. **Resultados:** el construto que presentó la mayor media del instrumento fue F3-Cargas Biológicas (3,00), evidenciando que la exposición a las cargas biológicas es muy intensa entre los trabajadores de enfermería. Las cargas de trabajo tenían una diferencia significativa con las unidades de trabajo – fisiológicas ( $p = 0,001$ ), biológicas ( $p = 0,007$ ), psíquicas ( $p = 0,042$ ), mecánicas ( $p = 0,014$ ), químicas ( $p = 0,001$ ) y físicas ( $p = 0,001$ ). **Conclusión:** los trabajadores identificaron la exposición a las cargas de trabajo con diferentes intensidades, evidenciando aspectos do trabalho en las instituciones de salud que aumentan o atenúan las cargas de trabajo, por medio de las actividades desarrolladas por los trabajadores de enfermería.

## DESCRIPTORES

Carga de Trabajo; Enfermería; Salud Laboral; Hospitales Universitarios; Grupo de Enfermería.

## REFERENCES

1. Leal JAL, Melo CMM. The nurses' work process in different countries: an integrative review. *Rev Bras Enferm.* 2018;71(2):413-23. DOI: <https://doi.org/10.1590/0034-7167-2016-0468>.
2. Brasil. Ministério da Saúde. Portaria Interministerial n. 285, de 24 de março de 2015. Redefine o Programa de Certificação de Hospitais de Ensino (HE) [Internet]. Brasília; 2015 [cited 2021 Aug 03]. Available from: [https://bvsms.saude.gov.br/bvs/saudelegis/gm/2015/prt0285\\_24\\_03\\_2015.html](https://bvsms.saude.gov.br/bvs/saudelegis/gm/2015/prt0285_24_03_2015.html).
3. Oro J, Gelbecke FL, Sousa VAF, Scherer MDA. From prescribed work to the real work of nursing in in-patient care units of federal university hospitals. *Texto Contexto Enferm.* 2019;28:e20170508. DOI: <http://dx.doi.org/10.1590/1980-265X-TCE-2017-0508>.
4. Santos JLG, Lanzoni GMM, Costa MFBNA, Debetio JO, Sousa LP, Santos LS, et al. How are university hospitals coping with the COVID-19 pandemic in Brazil?. *Acta Paul Enferm.* 2020;33:eAPE20200175. DOI: <http://dx.doi.org/10.37689/actape/2020AO01755>.
5. Guimarães ALO, Felli VEA. Notification of health problems among nursing workers in university hospitals. *Rev Bras Enferm.* 2016;69(3):475-83. DOI: <https://doi.org/10.1590/0034-7167.2016690313i>.
6. Cezar-Vaz MR, Bonow CA, Almeida MCV, Sant'Anna CF, Cardoso LS. Workload and associated factors: a study in maritime port in Brazil. *Rev. Latino-Am. Enferm.* 2016;24:e2837. DOI: <http://dx.doi.org/10.1590/1518-8345.1347.2837>.

7. Carvalho DP, Rocha LP, Pinho EC, Tomaszewski-Barlem JG, Barlem ELD, Goulart LS. Workloads and burnout of nursing workers. *Rev Bras Enferm.* 2019;72(6):1435-41. DOI: <http://dx.doi.org/10.1590/0034-7167-2017-0659>.
8. Biondi HS, Pinho EC, Kirchof ALC, Rocha LP, Barlem ELD, Kerber NPC. Psychic workload in the process of work of maternity and obstetric centers nurses. *Rev Gaúcha Enferm.* 2018;39:e64573. DOI: <https://doi.org/10.1590/1983-1447.2018.64573>.
9. Devellis RF. Scale development: theory and applications. Newbury Park: Sage; 2016.
10. Vieira KMR, Vieira FU Jr, Bittencourt ZZLC. Occupational accidents with biological material in a school hospital. *Rev Bras Enferm.* 2019;72(3):737-43. DOI: <http://dx.doi.org/10.1590/0034-7167-2018-0630>.
11. Biondi HS, Pinho EC, Kirchof ALC, Rocha LP, Kerber NPC. Workloads and interrelationships with the program for the humanization of prenatal and childbirth care. *Cogitare Enferm.* 2018;3(23):e52801. DOI: <http://dx.doi.org/10.5380/ce.v23i3.52801>.
12. Dias BVB, Pagano AP, Gomes BGM, Souza DA, Marcondes MCS, Zacari MG, et al. The Main Causes of Absenteeism Disease Among Nursing Professionals – An Integrative Literature Review. *Biomed J Sci Tech Res.* 2019;4(16):1-5. DOI: <http://dx.doi.org/10.26717/BJSTR.2019.16.002888>
13. Mbombi MO, Mothiba TM, Malema RN, Malatji M. The effects of absenteeism on nurses remaining on duty at a tertiary hospital of Limpopo province. *Curationis.* 2018;41(1):1-5. DOI: <http://dx.doi.org/10.4102/curationis.v41i1.1924>.
14. Michaello RS, Tomaszewski-Barlem JG, Carvalho DP, Rocha LP, Bordignon SS, Neutzling BRS. Perception of nursing workers about the workloads in a neonatal intensive care unit. *J Res Fundam Care Online.* 2020;12:54-61. DOI: <http://dx.doi.org/10.9789/2175-5361.rpcf.v12.6983>.
15. Kreling A, Magalhães AMM. Medication administration – nursing workload in clinical inpatient units. *Cogitare Enferm.* 2018;1(23):e50974. DOI: <http://dx.doi.org/10.5380/ce.v23i1.50974>.
16. Brasil. Ministério da Saúde. Programa Nacional de Reestruturação dos Hospitais Universitários Federais (REHUF) [Internet]. Brasília; 2019 [cited 2021 Aug 03]. Available from: <http://www.saude.gov.br/atencao-especializada-e-hospitalar/assistencia-hospitalar/programa-nacional-de-reestruturacao-dos-hospitais-universitarios-federais-rehuf>.
17. Fabriz LA, Bernardino E, Chaves MMN, Peres AM, Utzumi FC, Aued GK. The work of the nurse in the context of transformation: from general hospital to teaching. *Rev enferm UFPE on line.* 2017;11(1):188-95. DOI: <http://dx.doi.org/10.5205/reuol.9978-88449-6-1101201723>.
18. Fonseca EC, Zeitoune RCG, Sousa KHJF, Portela LF, Soares MRC. Damage to the health of vaccination room nursing workers. *Acta Paul Enferm.* 2020;33:eAPE20190147. DOI: <http://doi.org/10.37689/acta-ape/2020AO0147>.
19. Llor-Esteban B, Sánchez-Muñoz M, Ruiz-Hernández JA, Jiménez-Barbero JA. User violence towards nursing professionals in mental health services and emergency units. *The European journal of psychology applied to legal context.* 2017;9(1):33-40. DOI: <https://doi.org/10.1016/j.ejpal.2016.06.002>.
20. Çelikkalp Ü, Dilek F. Factors affecting the occupational accident rates among nurses. *Rev Esc Enferm USP.* 2019;53:e03524. DOI: <http://dx.doi.org/10.1590/S1980-220X2018049703524>.
21. Silva RM, Zeitoune RCG, Beck CLC, De Martino MMF, Prestes FC. The effects of work on the health of nurses who work in clinical surgery departments at university hospitals. *Rev Latino-Am Enferm.* 2016;24:e2743. DOI: <http://dx.doi.org/10.1590/1518-8345.0763.2743>.
22. Mendes M, Trindade LL, Pires DEP, Biff D, Martins MMFPS, Vendruscolo C. Workloads in the Family Health Strategy: interfaces with the exhaustion of nursing professionals. *Rev Esc Enferm USP.* 2020;54:e03622. DOI: <https://doi.org/10.1590/S1980-220X2019005003622>.

