

<http://dx.doi.org/10.1590/0104-07072017001720016>

## NURSING WORKLOAD, STRESS/BURNOUT, SATISFACTION AND INCIDENTS IN A TRAUMA INTENSIVE CARE UNITS

Katia Grillo Padilha<sup>1</sup>, Ricardo Luis Barbosa<sup>2</sup>, Rafaela Andolhe<sup>3</sup>, Elaine Machado de Oliveira<sup>4</sup>, Adriana Janzantte Ducci<sup>5</sup>, Raquel Santa Bregalda<sup>6</sup>, Lígia Maria Dal Secco<sup>7</sup>

- <sup>1</sup> Ph.D. in Nursing. Professor, Department of Medical-Surgical Nursing, the Nursing School of the *Universidade de São Paulo* (USP). São Paulo, São Paulo, Brazil. E-mail: kgpadilh@usp.br
- <sup>2</sup> Ph.D. in Cartographic Sciences. Professor, Geography Institute. *Universidade Federal de Uberlândia*. Uberlândia, Minas Gerais, Brazil. E-mail: rluisbarbosa@uol.com.br
- <sup>3</sup> Ph.D. in Adult Health Nursing. Professor, Department of Nursing, *Universidade Federal de Santa Maria*. Santa Maria, Rio Grande do Sul, Brazil. E-mail: rafaela.andolhe@ufsm.br
- <sup>4</sup> Ph.D. Sciences. Postdoctoral student, USP Nursing School. São Paulo, São Paulo, Brazil. E-mail: elainemachado@usp.br
- <sup>5</sup> Ph.D. in Adult Health Nursing. USP Nursing School. São Paulo, São Paulo, Brazil. E-mail:
- <sup>6</sup> Nurse, USP Nursing School. São Paulo, São Paulo, Brazil. E-mail: aducci@ig.com.br
- <sup>7</sup> M. Sc. in Nursing. *Hospital das Clínicas*, USP Faculty of Medicine. São Paulo, São Paulo, Brazil. E-mail: ligia.secco@hc.fm.usp.br

### ABSTRACT

**Objective:** to analyze the influence of workload, stress, Burnout, work satisfaction, the nursing team's perception of the care environment, and the presence of adverse events in a Trauma Intensive Care Units.

**Method:** an observational study conducted at the Intensive Trauma Therapy Unit 195 patients were prospectively followed for the collection of incidents, and instruments were used to measure Nursing workload, stress, Burnout, job satisfaction and work environment assessment by the nursing team. Data were analyzed using appropriate statistics for the study.

**Results:** we observed 1,586 incidents, predominantly no harm incidents (78.44%). Among the nursing staff, 77.40% had average levels of stress; 17.00% presented Burnout; 56.6% were dissatisfied and considered the environmental characteristics to be inadequate. Nursing workload was high (73.24%). An association between incident and length of stay was found. No harm incidents were associated with nursing workload.

**Conclusion:** identifying associated factors can prevent the occurrence of incidents.

**DESCRIPTOR:** Patient safety. Intensive care units. Workload. Burnout, professional. Nursing.

## CARGA DE TRABALHO DE ENFERMAGEM, ESTRESSE/BURNOUT, SATISFAÇÃO E INCIDENTES EM UNIDADE DE TRATAMENTO INTENSIVO DE TRAUMA

### RESUMO

**Objetivo:** analisar a influência da carga trabalho, estresse, *Burnout*, satisfação e percepção do ambiente de cuidado, pela equipe de enfermagem com a presença de eventos adversos em Unidade de Terapia Intensiva de Trauma.

**Método:** estudo observacional realizado em Unidade de Terapia Intensiva de Trauma. Para a coleta de incidentes foram acompanhados 195 pacientes, prospectivamente, sendo utilizados instrumentos para medir a carga de trabalho de enfermagem, estresse, *Burnout*, satisfação no trabalho e trabalho de avaliação do ambiente laboral pela equipe de enfermagem. Os dados foram analisados por meio de análise estatística.

**Resultados:** ocorreram 1.586 incidentes, predominantemente incidentes sem dano (78,44%). Entre a equipe de enfermagem, 77,40% tinham níveis médios de estresse; 17,00% apresentaram *Burnout*; 56,6% estavam insatisfeitos e consideraram as características ambientais inadequadas. A carga de trabalho de enfermagem foi alta (73,24%). Houve associação entre incidentes e tempo de permanência. Os incidentes sem dano tiveram associação com a carga de trabalho de enfermagem.

**Conclusão:** a identificação de fatores associados pode prevenir a ocorrência de incidentes.

**DESCRIPTORES:** Segurança do paciente. Unidades de terapia intensiva. Carga de trabalho. Esgotamento profissional. Enfermagem.

# CARGA DE TRABAJO DE ENFERMERIA, ESTRES/BURNOUT, SATISFACCION E INCIDENTES EN UNA UNIDAD DE TERAPIA INTENSIVA DE TRAUMA

## RESUMEN

**Objetivo:** analizar la influencia de la carga de trabajo, estrés, Burnout, satisfacción y percepción del ambiente de cuidado, por el equipo de enfermería con la presencia de eventos adversos en Unidad de Terapia Intensiva de Trauma.

**Método:** estudio observacional en la Unidad de Cuidados Intensivos de Trauma. Para la recolección de los incidentes fueron seguidos prospectivamente 195 pacientes siendo utilizados instrumentos para medir la carga de trabajo de enfermería, el estrés, el Burnout, la satisfacción laboral y el trabajo de evaluación del entorno de trabajo por parte del personal de enfermería. Los datos se analizaron usando el estudio estadístico apropiado.

**Resultados:** ocurrieron 1.586 incidentes predominantemente incidentes sin daño (78,44%). Entre el personal de enfermería, 77.40% tenían niveles medios de estrés; 17,00% mostró Burnout; y el 56,6% estaban insatisfechos y consideraron inadecuadas las características ambientales. La carga de trabajo de enfermería fue alta (73,24%). Se observó una asociación entre la incidencia y la duración de la estancia. Incidentes sin lesiones se asociaron con la carga de trabajo de enfermería.

**Conclusión:** La identificación de factores asociados puede prevenir la aparición de incidentes.

**DESCRIPTORES:** Seguridad del paciente. Unidades de cuidados intensivos. Carga de trabajo. Agotamiento profesional. Enfermería.

## INTRODUCTION

Patient safety in health care has been a concern demonstrated by several professionals and researchers, mainly in Nursing, who have invested in safe practices from the beginning of the profession aimed at preventing risks related to the environment, procedures and work organization. In the Brazilian context, this concern is reiterated by studies on the subject.<sup>1-2</sup>

However, improving actions linked to safe practice has been a recent issue of increasing relevance, supported by studies conducted in 1999 by the *Institute of Medicine*<sup>3</sup> in the United States, demonstrating the magnitude of the problem in the country: 44,000 to 98,000 preventable deaths per year as a consequence of health care. According to these results, errors represent the eighth most important cause of death, surpassing automobile accidents, breast cancer and AIDS.

By definition, adverse events are events of unintentional harm, unrelated to the natural course of the underlying disease leading to injury, which can be measured in affected patients and prolong the length of hospitalization or cause death.<sup>4</sup> For this study, we adopted the most recently established classification, in which harmful incidents refer to adverse events, and incidents are those that do not produce harm to the patient.<sup>5</sup>

The intensive care unit (ICU) as the destination unit for critically ill patients is considered by many authors as the unit where most incidents occur, considering that many of the patients who need intensive care require a greater number of complex therapeutic interventions, and are more vulnerable to care errors or infections.<sup>6-7</sup> In addition, the unit

is known for demanding a high workload from its professionals, particularly the nursing team,<sup>6</sup> requiring adequate staffing so that the quality of care and patient safety are not compromised.<sup>7</sup>

A study analyzing variables that favored the presence of adverse events in the ICU for adults identified high or excessive nursing workload, and hospital infection as risk factors.<sup>1</sup> The authors observed that severe complications caused increased mortality, morbidity and length of hospital stay. In addition, literature shows evidence that high workload, stress, fatigue and professional dissatisfaction are associated with errors.<sup>7-9</sup> However, this is still poorly evidenced in studies in Brazil.

This study was elaborated considering ICUs as complex and exhausting environments, nurses' workload, the number of people on the staff and the levels of stress and dissatisfaction among professionals being associated with the presence of adverse events and incidents in these units. Thus, the purpose of this study was to analyze the influence of workload, stress, Burnout, work satisfaction, the nursing team's perception of the care environment, and the presence of adverse events in a Trauma ICU.

## METHOD

This is an observational study performed in two Trauma ICUs in the city of São Paulo, Brazil, a reference center for treatment of traumatic lesions. The research project was approved by the Ethics Committee of the institution, with protocol number 0196/11 and CAAE number 0167001500011. All ethical requirements were observed for the study according to resolution number 466/2012 involving studies with human beings in Brazil.

Patient data were collected by a trained team of researchers by reading the medical records of all hospitalizations that occurred during the months from September to November 2012, in order to identify and analyze the incidents.

Classification of the incidents was done in accordance with the provisions of the World Health Organization (WHO),<sup>10</sup> as follows: 1) clinical management; 2) processes/procedures; 3) clinical documentation; 4) infection; 5) medication/administration of intravenous fluids; 6) blood derivatives/products; 7) nutrition; 8) oxygen/gas; 9) medical equipment; 10) behavior; 11) patient accidents; 12) infrastructure; and 13) resources/organizational management.

A consultation guidance manual was created in order to standardize the classification of incidents by the group of collectors/analysts, in addition to intensive training. Face-to-face meetings were also held to minimize differences in interpretations of the findings, as well as to establish consensus on the different types of incidents.

The *Nursing Activities Score (NAS)*<sup>11</sup> was used to collect the daily nursing workload. A specific system was developed for data collection and implemented in the units, followed by three months of training of the nursing team.

The following instruments were used to collect data from the nursing team: Professional and work characterization form, Job Stress Survey short version (*Escala de Estresse no Trabalho, versão resumida - EET-R*),<sup>12</sup> Maslach Burnout Inventory - MBI (*Inventário Maslach Burnout - IMB*),<sup>13</sup> Nursing Work Index-Revised (NWI-R)<sup>14</sup> and Index of Work Satisfaction - IWS (*Índice de Satisfação no Trabalho - IST*).<sup>15</sup> All the instruments were translated and validated for the Brazilian culture. The instruments were delivered to participants in individual envelopes to fill in sociodemographic data and nursing team work, along with the Clear and Informed Consent Form. The instruments were answered during their work shift. Data were analyzed using the Statistical Package for the Social Sciences (SPSS), version 19.0.

In order to calculate the EET (stress), MBI (Burnout), IWS (professional satisfaction) and perception of the care environment (NWI-R) scores obtained on each of the scales, the scores were stratified by the mean after the analysis procedures recommended by the instruments' authors.<sup>12-15</sup>

Data treatment was carried out through descriptive and inferential statistics. Absolute and relative frequencies, mean and minimum and maxi-

imum standard deviation were calculated in order to present patient's demographic and clinical characteristics, sociodemographic characterization of the professionals, stress level, Burnout, professional satisfaction and perception of the care environment by the nursing team, as well as the classification of incidents.

Pearson's correlation coefficient was used to analyze the incidents with age, hospitalization time and nursing workload (NAS), considering the data statistically significant if  $p < 0.05$ , and considering that the distribution of variables by the Kolmogorov-smirnov test was asymmetric.

## RESULTS

### Characterization of patients

A total of 195 ICU hospitalizations were found during the study period, with a majority of male patients (72.30%) coming from the surgical center (55.10%) and the emergency room (19.50%). The most prevalent diagnosis was external causes (55.90%), followed by cardiovascular and digestive diseases (15.30%, each). The majority of patients (89.90%) underwent unscheduled/emergency surgery and did not have preexisting comorbidities (57.60%).

The mean age of the patients was 51.55 (SD=119.43) years, minimum 18 and maximum of 99 years, with a mean ICU stay of 7.77 days (SD=9.99; zero, and maximum of 58 days). Most patients (81.00%) were discharged from the unit, while 19.00% did not survive.

Considering the nursing workload required to meet the patients' care needs, a mean NAS of 73.40% (SD=7.88, minimum of 35.00% and maximum of 123.00%) was observed, a result that characterizes the professionals' high work demands.

### Characterization of the nursing team

The staff of the Trauma ICUs consisted of a total of 53 nursing professionals, with 17 (32.10%) nurses and 36 (67.90%) nursing technicians and auxiliaries.

Most of the professionals were female (79.20%), single (50.90%), had children (62.30%), and considered having insufficient hours of sleep for their needs (73.60%).

In relation to work, a similar proportion (50.00%) of the professionals worked day and night

shifts, and 62.30% had fixed working hours. The majority (77.40%) had no other work relationship, reported feeling willing to work (49.10%), and that working in the ICU had not been a personal choice (64.20%). The majority of the professionals expressed that they liked working in the ICU (98.10%), they were happy to work in this unit (90.60%), they had no intention of leaving the institution (92.50%)

and that they would not abandon nursing as their profession (92.50%).

Also, when asked about their working conditions, the majority of the professionals (96.20% and 83.00%, respectively) reported insufficient human resources and inadequate material resources. Nevertheless, 81.10% considered that the quality of care was good.

**Table 1 - Sociodemographic data and levels of stress, Burnout, satisfaction, environment and professional satisfaction of the trauma intensive care unit nursing team. São Paulo, SP, Brazil, 2012**

Variable	n	Min	Max	Mean	SD
Age	53	25	56	39,32	8,48
Time/Experience in the category	53	1	29	10,71	6,49
Working time at the institution	53	0	29	9,36	6,61
Working time in the ICU	53	0	24	8,72	5,76
Working time in the ICU at the institution	53	0	24	8,31	5,65
Number of days without a day off	53	1	19	4,50	3,18
Number of hours of sleep you need per day	53	3	12	7,75	1,55
Number of hours you sleep per day	53	2	12	5,58	1,82
Time (h) spent commuting	53	0.30	4	1,47	0,73
Job Stress Scale	53	17	55	39,26	9,42
Maslach Burnout Inventory	53	21	79	44,81	12,44
Nursing Work Index	53	1.33	3.60	2,61	0,51
Professional Satisfaction Index	51	2.30	5.15	3,46	0,62

The data shows a group of adult professionals with mean age of approximately 40 years, with experience in the professional category (nurses and nursing assistants), with mean of ten years of profession and performance time in the institution and in the ICU of approximately eight years.

Regarding the number of days without a day off, the mean was 4.50 (SD=3.18) days. In relation to the hours of sleep that the professional reported needing per day, the result was 7.75 hours. The number of hours they actually slept was 5.58 hours, evidencing a deficit of almost 2 hours. The time spent commuting between home and work was 1.47 (SD=0.73) hours.

Regarding occupational stress at work, we found that the majority (77.40%) of the professionals had average levels of stress, followed by those with high levels (15.10%), compared to 7.50% with a low level of stress. Overall analysis of the Trauma ICU Nursing team shows that 92.50% had expressive stress levels, considering the characteristics of these ICUs. The mean stress score was 39.26 (SD=9.42), reiterating these results.

On the other hand, in analyzing Burnout we found that a significant part of the team (83.00%) did

not present this syndrome. In addition, it is relevant to note that nine (17.00%) were already in a Burnout state, according to the MBI.

The overall mean score of the NWI-R was 2.61 (SD=0.51) in the Trauma ICU, where 62.30% of the professionals of the total team reported a perception of dissatisfaction with the care environment in the ICU.

Concerning professional satisfaction in the ICU nursing team, 56.60% presented levels of professional dissatisfaction, with a mean IWS score of 3.46 (SD=0.62).

### Characterization of incidents

1,586 occurrences from the 195 hospitalizations analyzed were verified; there was some type of harm (AE) in 342 (21.56%) of those, opposed to 1,244 (78.44%) occurrences without harm.

Regarding the type of incidents, most occurrences were related to errors in documentation (40.60%), in clinical procedures/procedure (39.09%), followed by medication/fluids for intravenous medication (7.82%) and patient accidents (4.41%).

**Table 2 - Distribution of types of incidents. São Paulo, SP, Brazil, 2012**

Types of incidents	n	%
Documentation	644	40.60
Clinical procedure/procedure	620	39.09
Medication/intravenous fluids	124	7.82
Patient accidents	70	4.41
Clinical administration	23	2.08
Hospital infection	18	1.14
Nutrition	33	1.45
Behavior	20	1.26
Resources/organizational management	19	1.20
Medical equipment	12	0.76
Blood products	3	0.19
Total	1586	100

An analysis only focusing on the 1,586 harmful incidents showed that 101 events caused moderate severity (6.36%). Nevertheless, we observed that 25 (1.58%) of the harmful incidents had a severe degree of harm as a consequence.

Regarding the association of harmful incidents, no harm incidents and total occurrences with patient demographic and clinical characteristics showed a statistically significant correlation with ICU hospitalization time ( $p=0.000$ ). The incidents had a weak association with NAS ( $p=0.045$ ,  $r=0.143$ ), as shown in table 3.

**Table 3 - Correlation coefficient between harmful incidents, no harm incidents, total number of occurrences and the variables of length of hospitalization, Nursing Activities Score, and age. São Paulo, SP, Brazil, 2012**

Variable	r*	p
Harmful incidents		
Length of stay	0.524	0.000
Nursing Activities Score	0.065	0.366
Age	0.013	0.852
No harm incidents		
Length of stay	0.549	0.000
Nursing Activities Score	0.143	0.046
Age	-0.096	0.182
Total number of occurrences		
Length of stay	0.588	0.000
Nursing Activities Score	0.140	0.050
Age	-0,084	0,241

\*Pearson's correlation coefficient.

Qualitative analysis of the incidents with sociodemographic and work characteristics of

the professionals and their stress levels, Burnout, Nursing workload, professional satisfaction, and their perception of the working environment with Trauma ICU incidents indicated a relationship of these factors in patient safety.

## DISCUSSION

In the sample of 195 admissions from the study, the results confirmed the profile of patients seen in the Trauma ICU:<sup>16-17</sup> their mean age was 51.55 (SD=19.43) years, the majority were men (72.30%), and they were transferred from the surgical center (55.10%) and emergency room (19.50%). The predominant diagnosis was external causes (55.90%). The hospitalizations were mainly due to auto accidents and violence, reinforcing that external causes continue to have a great impact on society, representing an important public health problem and marked as a major epidemic of the 21<sup>st</sup> century.<sup>18</sup>

However, trauma ICUs have younger patients than those in other ICUs<sup>17-18</sup> due to the morbidity and mortality profile of individuals under 50 years of age. According to the Ministry of Health, the main cause of death in this group are external causes, considering, therefore, that men are more vulnerable to it than other groups.<sup>19</sup>

Nonetheless, surgical trauma patients were also admitted to the ICU due to acute cardiocirculatory and digestive aggravations present in older patients. In addition to the external causes, acute complications of preexisting conditions justified the observed age variation, ranging from 19 to 100 years in the hospitalized patients.

Thus, the mean stay in the unit was 7.77 (SD=9.98) days, with a minimum of one day and a maximum of 55 days. This length of stay was higher than that observed in other studies,<sup>6,20</sup> and can be explained by the clinical complexity of the trauma patient, although the majority of the patients are young, which would mean a faster recovery. Regarding their discharge from the ICU, 81.00% of the patients survived and 19.00% did not survive; a result that shows that the mortality was low in comparison to another investigation.<sup>1</sup>

The mean of the nursing workload was 73.40%, which was similar or higher than other Brazilian studies<sup>1,6,17</sup> and lower than what was found in a study in Norway.<sup>20</sup> This result is important, although it does show that trauma ICU patients require intensive nursing care. In this way, knowing the NAS measure can contribute to developing

strategies that aim at improving nursing care and adequate nursing design. Moreover, the incidents were associated with NAS, despite the low intensity, which shows the possible relationship between NAS and patient safety in the ICU.

Regarding nursing workers, the prevalence of women is due to the fact that nursing is known as a predominantly female profession. This is an important reality, considering that stress and burnout are predominant in women, since they expose their feelings more than men.<sup>13</sup>

Therefore, these results should be confronted and analyzed by ICUs and institutional nursing managers to prevent consequences such as absenteeism, job dissatisfaction and other negative repercussions for both the staff and the institution.

In relation to the number of days without rest, the average was 4.70. It is worth mentioning that in nursing, the weekly hours are between 36 and 40 hours, with rest periods/days off in between and between shifts. Still, with the demand for activities, it is common that the nursing team does not receive these moments in order to meet work demands, since the number of nursing professionals is inadequate in Brazil.<sup>21-22</sup> This situation may worsen when the majority of nursing professionals present a deficit of approximately two hours of sleep, as observed, between the identified needs and the hours actually slept. Another finding was that the commuting time between home and work consumed 1.47 (SD=0.73) hours of professionals' time, which may increase their irritation and fatigue, compromising their performance at work.

Most of the work of the nursing team (77.40%) presented worrying levels of stress, especially when 17.00% of the professionals were found to be experiencing Burnout Syndrome. Mean levels of stress as those found in this team were also observed in another Brazilian study with nurses.<sup>23</sup> At the same time, this result may mean confronting it and exerting some control over the stress, it also deserves attention, since the team may be close to its attrition limit, as a consequence of the various factors of the personal and professional life to which the professionals are exposed in the trauma ICU.

When asked about working conditions in the ICU, 63.30% of the professionals had an unsatisfactory perception of the working environment. According to the team's perception, the mean score of 2.60 on the NWI indicated that the work environment did not favor autonomy or a good relationship between the nursing team and medical team, nor did it offer professional support to

the professionals. This context worsened when we found that human resources were insufficient and material resources were inadequate in the trauma ICU for most professionals. Regarding professional satisfaction, 56.60% presented levels of professional dissatisfaction in relation to the total domains of the IST scale (remuneration, autonomy, occupational requirements, status, institutional norms and interaction among work teams).

In view of these results, the qualitative analysis suggests that the sums of all these factors favor the emergence of incidents in the Trauma ICU, which occurred in 21.56% of hospitalizations. This number may be considered low when compared to other international studies; however, it is a relevant percentage when compared to no harm incidents (78.44%). A Spanish study<sup>19</sup> found that 58.00% of the patients had incidents, and in another study,<sup>24</sup> the percentage of patients who suffered incidents was 32.00%; both values lower than those found in this study.

Although no harm incidents have predominated in hospitalizations, it is important to consider that the mean of harmful incidents per patient was high, especially when considering the consequences for these patients.

Considering that documentation, clinical procedures, administration of endovenous fluids, patient accidents and clinical administration were occurrences identified with this study, the consequences are worrisome. We found that mild and moderate lesions were predominant, however, there were also severe consequences and three deaths. The data association analysis showed that nursing workload and ICU stay were the only factors associated with incidents in the ICU.

When considering length of stay, a study conducted in Brazil identified an association between length of stay and occurrence of incidents, in addition to increasing workload.<sup>24</sup> Thus, the longer the hospitalization time, the greater the patient's exposure to possible care failures.

In this study, the qualitative data analysis showed that stress levels, professional dissatisfaction and inadequate work characteristics, as well as other characteristics inherent to the professionals and the work, may have helped the occurrence of incidents in the Trauma ICU. It is important to consider that in a subjective evaluation, most of the professionals reported that they liked working in the ICU (98.10%), they were happy to work in this unit (90.60%), they had no intention of leaving the institution (92.50%) and would not abandon nursing as a

profession (92.50%). Paradoxically, the evaluation of the same items measured by IWS and NWI showed that 56.60% of professionals were not professionally satisfied, 62.30% of them did not consider the work environment adequate, 77.40% had high moderate and high levels of stress, and 17.00% of the team was experiencing Burnout. We emphasize that working conditions are paramount for job satisfaction<sup>25</sup> and for quality of care.

## CONCLUSION

In this study, it was possible to verify that the patients hospitalized in the ICU of surgical emergencies are susceptible to incidents regarding the time of ICU stay, the procedures, the therapeutic interventions to which they are exposed, and to the nursing workload. In this context, nursing professionals may also suffer from high levels of stress, workload, inadequate work environment and professional dissatisfaction, which may compromise patient safety.

Therefore, future research may identify factors that make it difficult for ICUs to treat patients and trauma victims, in addition to helping the nursing team and managers propose actions to avoid the occurrence of incidents, thus improving patient safety. Moreover, further studies may consider larger samples with prospective designs and the inclusion of other variables that have an association between the working conditions of the nursing team and nursing workload.

## ACKNOWLEDGEMENTS

We thank the Coordination for the Improvement of Higher Education Personnel (CAPES), the Foundation for Research Support of the State of São Paulo (FAPESP), the National Council for Scientific and Technological Development (CNPq), the Institutional Scholarship Program for Scientific Initiation (PIBIC-USP) and *Fundación Mapfre* for the financial support.

## REFERENCES

- Daud-Gallotti RM, Costa SF, Guimarães T, Padilha KG, Inoue EN, Vasconcelos TN, et al. Nursing workload as a risk for healthcare associated infections in ICU: a prospective study. *PLOS One* [Internet]. 2012. Dec [cited 2016 Mar. 17]; 7(12): e52342. Available from: 2012: <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3531467>
- Santiago THR, Turrini RNT. Organizational culture and climate for patient safety in intensive care units. *Rev Esc Enferm USP* [Internet]. 2015 Dez [cited 2016 Jun 12]; 49(spe):123-30. Available from: [http://www.scielo.br/scielo.php?script=sci\\_arttext&pid=S0080-62342015000700123&lng=pt](http://www.scielo.br/scielo.php?script=sci_arttext&pid=S0080-62342015000700123&lng=pt)
- Kohn L, Corrigan J, Donaldson M. Institute of Medicine Report. To err is human: building a safer health system. Washington, DC: Institute of Medicine; 2000.
- Hiatt HH, Barnes BA, Brennan TA, Laird NM, Lawthers AG, Leape LL, et al. A study of medical injury and medical malpractice. *N Engl J Med*. 1989; 321(7):480-4.
- World Health Organization. A taxonomy for patient safety. Geneva: World Health Organization [Internet]. 2016 [cited 2016 Oct 9]. Available from: <http://www.who.int/patientsafety/implementation/taxonomy/en/>.
- Gonçalves LA, Andolhe R, Oliveira EM, Barbosa RL, Faro AC, Gallotti RM, Padilha KG. Nursing allocation and adverse events/incidents in intensive care units. *Rev Esc Enferm USP* [Internet]. 2012 Oct [cited 2016 Jun 12]; 46(spe):71-7. Available from: [http://www.scielo.br/scielo.php?script=sci\\_arttext&pid=S0080-62342012000700011&lng=en](http://www.scielo.br/scielo.php?script=sci_arttext&pid=S0080-62342012000700011&lng=en)
- Nogueira LS, Ferretti-Rebustini REL, Poveda VB, Gengo e Silva RC, Barbosa RS, Oliveira EM, et al. Carga de trabalho de enfermagem: preditor de infecção relacionada à assistência à saúde na terapia intensiva? *Rev Esc Enferm USP* [Internet]. 2015 Dez [cited 2016 Jun 13]; 49 (spe):36-42. Available from: [http://www.scielo.br/scielo.php?script=sci\\_arttext&pid=S0080-62342015000700036&lng=pt](http://www.scielo.br/scielo.php?script=sci_arttext&pid=S0080-62342015000700036&lng=pt)
- Aiken LH, Sermeus W, Heede KV, Sloane DM, Busse R, McKee M, et al. Patient safety, satisfaction, and quality of hospital care: cross sectional surveys of nurses and patients in 12 countries in Europe and the United States. *BMJ* [Internet]. 2012 [cited 2016 Jun 12]; 20(344):1-14. Available from: <http://www.bmj.com/content/344/bmj.e1717.long>
- Novaretti MCZ, Santos EV, Quitério LM, Daud-Gallotti RM. Sobrecarga de trabalho da enfermagem e incidentes e eventos adversos em pacientes internados em UTI. *Rev Bras Enferm* [Internet]. 2014 [cited 2016 Oct 10]; 67(5):692-9. Available from: <http://www.scielo.br/pdf/reben/v67n5/0034-7167-reben-67-05-0692.pdf>
- WHO. Conceptual framework for the international classification for patient safety. Version 1.1. Final Technical Report. Geneva: World Health Organization [Internet]. 2009 [cited 2016 May 12]. Available from: [http://www.who.int/patientsafety/taxonomy/icps\\_full\\_report.pdf](http://www.who.int/patientsafety/taxonomy/icps_full_report.pdf).
- Miranda DR, Raoul N, Rijk A, Schaufeli W, Iapichino G. Nursing activities score. *Crit. Care Med*. 2003; 31(2):374-82
- Paschoal T, Tamayo A. Validação da escala de estresse no trabalho. *Estud Psicol* [Internet]. 2004 [cited 2016

- Jun 12]; 9(1):45-52. Available from: <http://www.scielo.br/pdf/epsic/v9n1/22380.pdf>
13. Maslach C, Jackson SE. The measurement of experienced burnout. *J Occupat Behavior*. 1981; 2:99-113.
  14. Aiken LH, Patrician PA. Measuring organizational traits of hospitals: the revise nursing work index. *Nurs Res*. 2000; 49(3):146-53.
  15. Stamps PL, Piedmonte EB. Nurses and work satisfaction: an index for measurement. *Ann Arbor, Health Administration Press Perspectives*; 1986.
  16. Goulart LL, Aoki RN, Vegian CFL, Guirardello EB. Nursing workload in a trauma intensive care unit. *Rev Eletr Enferm [Internet]*. 2014 [cited 2016 Oct 10]; 16(2):346-51. Available from: <http://dx.doi.org/10.5216/ree.v16i2.22922>
  17. Setterval CHC, Domingues C, Nogueira LS. Preventable trauma deaths. *Rev Saúde Pública [Internet]*. 2012 Apr [cited 2016 Jun 12]; 46(2):367-75. Available from: [http://www.scielo.br/scielo.php?script=sci\\_arttext&pid=S0034-89102012000200020&lng=en](http://www.scielo.br/scielo.php?script=sci_arttext&pid=S0034-89102012000200020&lng=en)
  18. Ministério da Saúde (BR). Datasus. Informações de saúde. Estatísticas de mortalidade. Óbitos por ocorrências, segundo causas externas no Brasil [Internet]. Brasília: MS; 2012 [cited 2012 Jan 10]. Available from: <http://qgwww.tabnet.datasus.gov.br/cgi/tabcgi.exe?sim/cnv/obtuf.def>
  19. Merino P, Alvarez J, Martin MC, Alonso A, Gutierrez I. Adverse events in spanish intensive care units: the SYREC study. *Inter Jr Quality Health Care [Internet]*. 2012 [cited 2016 Jun 12]; 24(2):105-13. Available from: <http://intqhc.oxfordjournals.org/content/24/2/105.long>
  20. Stuedahl M, Vold S, Klepstad P, Stafseth SK. Interrater reliability of Nursing Activities Score among intensive care unit health professionals. *Rev Esc Enferm USP [Internet]*. 2015 Dez [cited 2016 Oct 09]; 49 (spe):117-22. Available from: [http://www.scielo.br/scielo.php?script=sci\\_arttext&pid=S0080-62342015000700117&lng=pt](http://www.scielo.br/scielo.php?script=sci_arttext&pid=S0080-62342015000700117&lng=pt)
  21. Schmoeller R, Gelbcke FL. Indicativos para o dimensionamento de pessoal de enfermagem em emergência. *Texto Contexto Enferm [Internet]*. 2013 Dec. [cited 2016 Jun 12]; 22(4):971-9. Available from: [http://www.scielo.br/scielo.php?script=sci\\_arttext&pid=S0104-07072013000400013&lng=en](http://www.scielo.br/scielo.php?script=sci_arttext&pid=S0104-07072013000400013&lng=en)
  22. Minuzzi AP, Salum NC, Locks MOH. Assessment of patient safety culture in intensive care from the health team's perspective. *Texto Contexto Enferm [Internet]*. 2016 [cited 2016 Oct 12]; 25(2):e1610015. Available from: [http://www.scielo.br/scielo.php?script=sci\\_arttext&pid=S0104-07072016000200313&lng=pt](http://www.scielo.br/scielo.php?script=sci_arttext&pid=S0104-07072016000200313&lng=pt)
  23. Kurebayashi LFS, Gnatta JR, Borges TP, Belisse G, Coca S, Minami A, et al. Aplicabilidade da auriculoterapia com agulhas ou sementes para diminuição de estresse em profissionais de enfermagem. *Rev Esc Enferm USP [Internet]*. 2012 [cited 2016 Jun 12]; 46(1):89-95. Available from: [http://www.scielo.br/scielo.php?script=sci\\_arttext&pid=S0080-62342012000100012&lng=en](http://www.scielo.br/scielo.php?script=sci_arttext&pid=S0080-62342012000100012&lng=en)
  24. Novaretti MCZ, Santos EV, Quitério LM, Daud-Gallotti RM. Sobrecarga de trabalho da enfermagem e incidentes e eventos adversos em pacientes internados em UTI. *Rev. Bras Enferm [Internet]*. 2014 [cited 2016 Oct 9]; 67(5):692-9. Available from: <http://www.scielo.br/pdf/reben/v67n5/0034-7167-reben-67-05-0692.pdf>
  25. Wisniewski D, Silva ES, Évora YDM, Matsuda LM. Satisfação profissional da equipe de enfermagem x condições e relações de trabalho: estudo relacional. *Texto Contexto Enferm [Internet]*. 2015 Set [cited 2016 Oct 12]; 24(3):850-8. Available from: [http://www.scielo.br/scielo.php?script=sci\\_arttext&pid=S0104-07072015000300850&lng=pt](http://www.scielo.br/scielo.php?script=sci_arttext&pid=S0104-07072015000300850&lng=pt)
- Correspondence: Rafaela Andolhe  
Universidade Federal de Santa Maria

Centro de Ciências da Saúde  
Departamento de Enfermagem, Prédio 26, sala 1339, 3º andar  
Av. Roraima, n. 1000  
97.105-900 – Camobi, Santa Maria, RS, Brasil  
E-mail: [rafaela.andolhe@ufsm.br](mailto:rafaela.andolhe@ufsm.br)

Recived: June 23, 2016  
Approved: November 23, 2016