







ASSOCIATION OF NURSING ACTIVITIES SCORE WITH CRITICAL PATIENT OUT- COMES

ASSOCIAÇÃO DAS PONTUAÇÕES DAS ATIVIDADES DE ENFERMAGEM COM DESFECHOS DE PACIENTES CRÍTICOS

ASOCIACIÓN DEL PUNTUAJE DE LAS ACTIVIDADES DE ENFERMERÍA CON RESULTADOS CRÍTICOS DEL PACIENTE

David da Silva Santos¹, Cleidinaldo Ribeiro de Goes Marques², Iris Aline Gomes Santos³, Mirena Siqueira
Costa Neta⁴, Hendyara Oliveira Carvalho Almeida⁵, Eduesley Santana Santos⁶.

ABSTRACT

Objective: to analyze the association of Nursing Activities Score with outcomes presented by patients in the Intensive Care Unit. **Method:** this is a cross-sectional analysis of a prospective cohort study, using an instrument developed by central researchers, with a focus on the Nursing Activities Score, which scores the need for nursing care within 24 hours. **Results:** there were 50 participants of each gender, mostly from the emergency room (74%), suffering from cardiovascular disorders (31%) and with Systemic Arterial Hypertension as the underlying disease (58%). During his hospital stay, the use of norepinephrine and fentanyl prevailed (both with 14%) and the use of SVD (35%). In the outcome, it was observed that 47% developed an infection, 37% used mechanical ventilation for more than 48 hours, 29% developed acute kidney injury and 27% died. **Conclusion:** The Nursing Activities Score allowed us to trace the clinical profile of patients and associate a greater workload with patients with harmful outcomes.

Descriptors: Intensive Care Units; Nursing; Workload; Nursing Care; Critical Care Outcomes; Outcome Assessment, Health Care.

RESUMO

Objetivo: analisar a associação do Nursing Activities Score com desfechos apresentados por pacientes em Unidade de Terapia Intensiva. **Método:** trata-se de uma análise transversal de um estudo do tipo coorte prospectivo, utilizando um instrumento elaborado pelos pesquisadores centrais, com o foco

ao Nursing Activities Score, que pontua a necessidade de cuidados de enfermagem em 24 horas.

Resultados: houve 50 participantes de cada sexo, em sua maioria procedente da emergência (74%), acometidos por distúrbios cardiovasculares (31%) e com Hipertensão Arterial Sistêmica como doença de base (58%). Durante a sua internação, prevaleceu o uso de noradrenalina e fentanil (ambos com 14%) e o uso de SVD (35%). No desfecho, observou-se que 47% desenvolveram infecção, 37% usaram ventilação mecânica por mais de 48 horas, 29% desenvolveram lesão renal aguda e 27% evoluíram a óbito. **Conclusão:** o Nursing Activities Score permitiu traçar o perfil clínico dos pacientes e associar uma maior carga de trabalho aos pacientes com desfechos prejudiciais.


Descritores: Unidade de Terapia Intensiva; Enfermagem; Carga de Trabalho; Cuidados de Enfermagem; Resultados de Cuidados Críticos; Medidas de Desfechos.

RESUMEN

Objetivo: analizar la asociación del Puntaje de Actividades de Enfermería con los resultados presentados por los pacientes en la Unidad de Cuidados Intensivos. **Método:** se trata de un análisis transversal de un estudio de cohorte prospectivo, utilizando un instrumento desarrollado por investigadores centrales, con enfoque en el Puntaje de Actividades de Enfermería, que puntúa la necesidad de cuidados de enfermería en 24 horas. **Resultados:** hubo 50 participantes de cada sexo, en su mayoría de urgencias (74%), con trastornos cardiovasculares (31%) y con Hipertensión Arterial Sistémica como enfermedad de base (58%). Durante su estancia hospitalaria, predominó el uso de norepinefrina y fentanilo (ambos con 14%) y el uso de SVD (35%). En el resultado, se observó que el 47% desarrolló infección, el 37% utilizó ventilación mecánica por más de 48 horas, el 29% desarrolló daño renal agudo y el 27% progresó hasta la muerte. **Conclusión:** el Nursing Activities Score permitió rastrear el perfil clínico de los pacientes y asociar una mayor carga de trabajo con pacientes con desenlaces nocivos.

Descriptores: Unidades de Cuidados Intensivos; Enfermería; Carga de Trabajo; Atención de Enfermería; Resultados de Cuidados Críticos; Evaluación de Resultado em La Atención de Salud.

¹ Universidade Tiradentes/UNIT Aracaju (SE), Brasil. ¹ <https://orcid.org/0000-0002-7246-3675>.

² Universidade Federal de Sergipe/UFS Aracaju (SE), Brazil. ² <https://orcid.org/0000-0003-2026-1112>.

³ Universidade Tiradentes/UNIT Aracaju (SE), Brazil. ³ <https://orcid.org/0000-0001-9534-3740>.

⁴ Universidade Tiradentes/UNIT Aracaju (SE), Brazil. ⁴ <https://orcid.org/0000-0002-9896-7273>.

⁵ Universidade Tiradentes/UNIT Aracaju (SE), Brazil. ⁵<https://orcid.org/0000-0003-1923-4766>.

⁶ Universidade Federal de Sergipe/UFS Aracaju (SE), Brazil. ⁶<https://orcid.org/0000-0003-2420-107X>.

How to cite this article

Santos DS, Marques CRG, Santos IAG, Costa Neta MS, Almeida HOC, Santos ES. Association of nursing activities score with critical patient outcomes. J Nurs UFPE online. 2021;15 (2):e245761 DOI: <https://doi.org/10.5205/1981-8963.2021.245761>

INTRODUCTION

Within the hospital environment, the Intensive Care Unit (ICU) is the sector in which patients need intensive care and a high percentage of complex therapeutic interventions. At the same time, it demands technological support and specific technical skills from professionals working in it.^{1,2}

Nurses are the health professionals responsible for providing assistance to the individual within 24 hours a day, distributing the activities in specific shifts for each team.³ As a result, it requires a high workload, with adequate staffing so that patient safety and quality of care are guaranteed.¹

Health institutions discuss the nursing workload due to the effects on the quality and safety of care provided to patients. In the context of the ICU, the concern is more discussed due to the clinical instability of patients and the high number of interventions and devices they are submitted during treatment.⁴

The identification of factors associated with workload can provide valuable information for determining staffing needs, as well as for the management of nursing care in an ICU.⁵ Thus, it can be associated with the occurrence of adverse events, professional exhaustion and clinical outcomes harmful to patients.^{1,6}

The Nursing Activities Score (NAS) is an instrument used to measure the workload of the nursing team in the ICU, offering contributions to the adequate dimensioning of professionals. The instrument has 7 categories subdivided with 23 items. The score result represents how much time from a nursing professional the patient required in the last 24 hours. Currently, it is used to replace the Therapeutic Intervention Scoring System (TISS 28).⁷

This instrument is an indicator of best health practices, as observed in the review study carried out by Oliveira et al. (2016). The authors identified the influence of work overload on the events of infection, pressure ulcers (PU), and medication errors in adult ICU patients. Also, NAS was considered a protective factor for the development of PU.⁴

Thus, we justified working with this theme because there is an impulse to investigate the relationship between the clinical evolution of ICU patients and the nurses' workload. The study is based on the perspective of bringing evidence that makes the activities carried out by Nursing in the ICU and the time required for their performance more representative, in scientific terms, while allowing for substantial changes in the activities carried out by this professional category.

OBJECTIVE

To analyze the association of the Nursing Activities Scores with clinical outcomes presented by patients in the Intensive Care Unit.

METHOD

This is a cross-sectional analysis of a prospective cohort study linked to the project entitled UTISE, which was carried out in a private ICU, located in Aracaju-SE, starting in July 2018 and ending in July 2019.

The hospital had 25 ICU beds in operation during the research, 20 beds for clinical patients, and 5 for surgical patients. The convenience sample was obtained in a non-probabilistic way.

We included all patients admitted to the ICU aged 18 years or over and with a minimum stay of 24 hours in the unit. We excluded patients transferred to another unit or institution during the first 24 hours or those who were discharged or died within the first 24 hours of admission.

An instrument developed by the central researchers was used for data collection, containing clinical and sociodemographic characteristics of the patients, support for admission to the ICU, monitoring of laboratory tests, fluid balance, vital signs, tests or procedures performed and measurement of care scores, such as NAS, Sequential Organ Failure Assessment (SOFA), Charlson Comorbidity Index (CCI) and Simplified Acute Physiology Score (SAPS III).

We chose the NAS for the analysis of scores and outcomes. It is an instrument that points out the need for nursing care in 24 hours, consisting of 7 categories subdivided into 23 items. A score is assigned to each item, ranging from 1.2 to 32.0. The final result represents the percentage of time spent by the nursing professional; each point is equivalent to 14.4 minutes.⁸

Patients were monitored during the ICU stay with a daily recording of the data collection instrument until the seventh day of hospitalization and the outcome of discharge, transfer, or death. After the outcome of the ICU, the patients were followed up to the outcome concerning the hospital.

The data obtained in tables in Excel 2010 were plotted; later, they were exported and submitted to statistical analysis in the Statistical Package for Social Sciences (SPSS) version 25.0. We used the Kolmogorov-Smirnov test to verify data normality. Categorical variables were presented as absolute

and relative frequencies and continuous variables as mean and standard deviation or median and interquartile range.

The descriptive statistical analysis performed constituted the presentation of the clinical and demographic characteristics of the sample. The Chi-square test or Fisher's exact test was applied to verify the existence of differences in the proportions of categorical variables between groups. Student t-tests were used to test the difference between continuous variables. The significance level of $p < 0.05$ was used.

The study followed the recommendations of the National Health Council resolution 466/12 and was developed after approval by the Research Ethics Committee of the Federal University of Sergipe under opinion nº 2.830.187 (CAAE 92517018.0.0000.5546).

RESULTS

The study resulted in 100 patients included within the randomly established collection time. The sample was equally composed of 50 participants of each gender, with a mean age of 68 ± 19 years old, weight 71 ± 16 kg, median height in 1.63cm, and body mass index (BMI) of 27 ± 6 Kg/m².

These patients were admitted to the health unit from the emergency department (74%) and were mostly affected by cardiovascular disorder (31%). In an analysis of past and current life history, the main personal antecedents were previous surgery (44%) and previous Acute Myocardial Infarction (15%) and systemic arterial hypertension (SAH) (58%), Dyslipidemia (33%), and Diabetes Mellitus (DM) (30%).

In this analysis, admission support consisted of the use of sedatives, vasoactive drugs, and devices at admission and within one hour. Thus, the use of pharmacological therapy with Noradrenaline and Fentanyl (14% both) and invasive devices with Delaying Vesical Tube (SVD) (35%) and Central Venous Catheter (CVC) (29%) prevailed.

The mean admission score for the CCI was 4 ± 3 , SAPS III 28 ± 12 , SOFA 3 ± 3 , and NAS 47 ± 16 . At the same time, on the day of the outcome, the mean SOFA value was 2 ± 4 , SAPS III 29 ± 16 , and NAS 46 ± 17 . Table 1 shows data regarding clinical and sociodemographic characteristics, as well as support for admission to the ICU and care scores.

VARIABLES	Total
-----------	-------

	(n=100)
Gender	
Male, n(%)	50 (%)
Age, mean years ± Standard Deviation	68±19
Weight, mean ± Standard Deviation	71±16
height, median, quartiles	1.63 [1.42-1.86]
Body Mass Index, mean ± Standard Deviation	27±6
Origin	
Emergency, n(%)	74 (74%)
Surgery Center, n(%)	18 (18%)
Hospitalization, n(%)	8 (8%)
Diagnosis by system	
Cardiovascular, n(%)	29 (31%)
Respiratory, n(%)	19 (19%)
Infectious, n(%)	13 (13%)
Neurological, n(%)	12 (12%)
Digestive, n(%)	11 (11%)
Renal, n(%)	4 (4%)
Personal background	
Previous surgery, n(%)	44 (44%)
Previous Acute Myocardial Infarction, n(%)	15 (15%)
Previous smoker, n(%)	12 (12%)
Previous Stroke, n(%)	9 (9%)
Basal Creatinine >1,5	9 (9%)
Comorbidities	
Systemic Arterial Hypertension, n(%)	58 (58%)
Dyslipidemia, n(%)	33 (33%)
Diabetes Mellitus, n(%)	30 (30%)
Arrhythmia, n(%)	15 (15%)
Chronic obstructive pulmonary disease, n(%)	11 (11%)
hypothyroidism, n(%)	11 (11%)
Cardiac insufficiency, n(%)	10 (10%)

I, n(%)	1 (1%)
II, n(%)	3 (3%)
III, n(%)	3 (3%)
IV, n(%)	3 (3%)
Admission support	
Noradrenaline, n(%)	14 (14%)
Fentanyl, n(%)	14 (14%)
Dormonid, n(%)	13 (13%)
Devices in use	
Delayed Vesical Tube, n(%)	35 (35%)
Central Venous Catheter, n(%)	29 (29%)
Nasoenteral tube, n(%)	15 (15%)
orotracheal tube, n(%)	15 (15%)
Drain, n(%)	6 (6%)
Nasogastric tube, n(%)	6 (6%)
tracheostomy, n(%)	4 (4%)
Admission scores	
CCI, mean ± Standard Deviation	4±3
SAPS III, mean ± Standard Deviation	28±12
SOFA 24 h, mean ± Standard Deviation	3±3
NAS 24 h, mean ± Standard Deviation	47±16
Outcome Scores	
SOFA, mean ± Standard Deviation	2±4
SAPS III, mean ± Standard Deviation	29±16
NAS, mean ± Standard Deviation	46±17
Variables	
TOTAL	
N= 100%	
Patient absenteeism	683
Clinical problems	147
Giving up before entering the operating room	09

patient ate	18
Clinical improvement	07
Others	32
Total	896

In the analysis of patient outcomes, we identified that 47 (47%) developed an infection, 37 (37%) used mechanical ventilation (MV) for more than 48 hours, 29 (29%) developed Acute Kidney Injury (AKI) and 27 (27%) died. Table 2 shows other outcomes occurring to patients.

TABLE 2- Patient outcomes. Aracaju (SE), Brazil, 2019

OUTCOMES	TOTAL (n=100)
Infection, n(%)	47 (47%)
Mechanical ventilation > 48h, n(%)	37 (37%)
Acute Kidney Injury, n(%)	29 (29%)
KDIGO I, n(%)	7 (24%)
KDIGO II, n(%)	13 (45%)
KDIGO III, n(%)	9 (31%)
Pressure Ulcer, n(%)	24 (24%)
Death, n(%)	27 (27%)
Dialysis, n(%)	19 (19%)
Hospital length of stay, days, median, quartiles	16 [3-110]
Length of stay in the Intensive Care Unit, days, median, quartiles	8 [2-104]
Readmission, n (%)	14 (14%)

According to the mean found in the NAS score calculated in the first 24 hours after admission to the ICU, the sample was divided between patients with $NAS \geq 47$ and those with a lower value, with 50 for each group after analysis.

Table 3 shows the outcomes by group and the association with the NAS score. The analysis allowed us to identify that in those who demanded greater nursing workload, that is, $NAS > 47$, the highest

outcome was infection (60%), MV>48 h (56%), and AKI (40%). The length of hospital stay (LHS) was 32 days and 17 days in the ICU (ICUT), both being superior to patients with less need for nursing hours in care.

TABLE 3- Analysis of the association of outcomes of patients with NAS.
Aracaju (SE), Brazil, 2019

OUTCOMES	NAS<47 (n=50)	NAS≥47 (n=50)	p- value
Infection, n(%)	17 (34%)	30 (60%)	0.009
Hospitalization time, days, mean ± Standard Deviation	16±10	32±25	0.000
Mechanical ventilation >48h, n(%)	9 (18%)	28 (56%)	0.000
Death, n(%)	10 (20%)	17 (34%)	0.115
Pressure Ulcer, n(%)	7 (14%)	17 (34%)	0.019
Length of stay in the Intensive Care Unit, days, mean ± Standard Deviation	9±7	17±18	0.004
Readmission, n(%)	2 (4%)	12 (24%)	0.008
Dialysis, n(%)	4 (8%)	15 (30%)	0.009
Acute Kidney Injury, n(%)	9 (18%)	20 (40%)	0.015

There was a significant difference in the association of infection outcomes (p=0.009), LHS (p=0.000), MV> 48h (p=0.000), PU (p=0.019), ICUT (p=0.004), readmission (p =0.008), dialysis (p=0.009) and AKI (p=0.015) with NAS score≥ 47.

DISCUSSION

This study allowed tracing the sociodemographic profile of critically ill patients admitted to the ICU. There was no predominance of gender among the participants. As for the age group, it was identified that the elderly people were predominant. In similar research, of the 1024 patients admitted to a private ICU, 64% were men, showing that the highest rates of hospitalization and absolute mortality are found in the age group of 62 to 71 years old.⁹

Due to the increase in life expectancy and, concomitantly, a higher prevalence of chronic-degenerative diseases, the elderly people are likely to occupy the largest number of ICU beds and more

frequently when compared to younger patients.¹⁰ Also, the men tend to have a higher number of hospitalizations resulting from acute conditions that lead to hospitalization, such as car accidents, as well as decompensation of chronic diseases due to non-adherence established therapy.^{9,11,12}

The ICU of the institution where the research was developed does not have a well-defined patient care profile, as it is a large general hospital that is a reference in its geographic location. However, there was a predominance of patients with clinical cardiovascular disorders from the emergency room.

This characteristic is refuted with the projection made by the World Health Organization, which establishes Cardiovascular Diseases (CVD) as the main cause of death in adult patients. Among CVDs, ischemic are the main ones.¹³ The clinical evolution of ischemic diseases is linked to the search for emergency services with the emergence of clinical manifestations and, as a treatment measure, a large number of patients undergo angioplasty with subsequent admission to the ICU.

These data reinforce the understanding of the ICU as a complex sector that assists critically ill patients in need of invasive and intensive care. Therefore, the sector must be equipped with specialized material and human resources to recover the health status of the patients who are in serious conditions.¹⁴

In that ICU, admission support was focused on the use of sedative and vasoactive drugs, as well as the use of invasive devices that ensured the hemodynamic stability of patients. As for pharmacological support with vasoactive drugs, an analysis performed in 156 patients during the entire period of hospitalization in an ICU showed that 85 required the use of these drugs, with noradrenaline being the most used.¹⁵

The importance of the domain of pharmacological therapy by intensive care nurses is perceived to avoid undesirable complications for patients since they are drugs that act systemically and generate impacts on other organs.¹⁶

Other authors emphasize the importance of using technologies in the ICU through essential devices in the hemodynamic control of a critically ill patient.¹⁷ However, they should be evaluated daily regarding their permanence to clear the patient as soon as possible to avoid additional complications.¹⁸

In this perspective, the three main outcomes of the patients in this study were infection, MV >48h, and AKI, respectively. Even offering technical and technological support in ICU care, unfavorable outcomes for patients during hospitalization are still frequent.¹⁹ Similar data were found in other studies, showing the incidence of sepsis in 57%, use of MV in 79.2%, and AKI in 44.7%.^{20,21,22}

The constant changes in the patient's hemodynamic parameters require nurses working in this sector to continuously monitor to identify any complications. Thus, professionals must be specialized and qualified to exercise intensive care techniques.¹⁹

In this study, the nursing workload measured by the NAS was 47 points, equivalent to 11 hours and 18.8 minutes of care, a value considered close to that found in a study carried out in Brazil (13.78 hours).²³ Another study activities that demanded greater nursing workload are monitoring and controls, laboratory investigations, medication, hygiene procedures, mobilization, and positioning administrative and management tasks.²⁴

As for the analysis of the NAS in hospitals outside Brazil, we noted that the workload found in our study was lower than the average value obtained in three ICUs of Portuguese hospitals (63.04%) and Belgian hospitals (68.6%).^{25,26} In the latter, the score values per shift were presented, showing the greater distribution of workload in the morning (61.3%), followed by afternoon (58.4%) and night (55%), respectively.²⁶ The variations found can be justified by the particularity of each hospital and the socioeconomic reality of each country.

When comparing the NAS and the occurrence of patient outcomes, patients who demanded a higher workload were those who were associated with the development of infection, use of MV for more than 48 hours, pressure injury, readmission, dialysis, AKI, and length of hospital and ICU stay.

Thus, this study suggests that the profile of patients in a critical unit may be correlated with high levels of severity scores, as well as the chances of mortality and use of complex therapeutic equipment, directly interfering with the workload.

This correlation is based on the assumption that patients newly admitted to the ICU require high care in the first 24 hours due to monitoring care devices and procedures, directly influenced by the cause of admission. A cohort study carried out in Brazil supports our data by presenting a higher mean nursing workload on admission (71.69%) compared to that measured at the time of clinical outcome (52.35%).²³

The NAS is shown as an instrument that allows counting the procedures performed directly on the patient during the hospitalization period, and the administrative and support activities for the families. It also estimates the cost of care, comparing it with the cost available to adjust the number of professionals in the unit, as well as assisting with care demands and monitoring the patient's clinical evolution.⁸

However, even though it is an important tool for assessing the nursing workload and subsidizing the necessary quantity of professionals for the dynamics of the sector's functioning, a deficit in the sizing of professionals is still evident in the literature when correlated to the NAS value.²⁴ An

observational study carried out in Brazil identified a deficit of 22 and 7 professionals, respectively, in two analyzed ICUs.²⁷

This study allows us to understand the demand for the workload of nurses in the intensive care sector. As it was carried out in a private institution, its data do not allow generalization, as aspects related to human, structural, and material resources have a direct impact on the activities performed by nurses. Also, the patient care profile must be taken into account, since in some hospitals the sector can be dedicated to post-surgical, clinical, cardiology patients, among others, also influencing nursing activities.

CONCLUSION

The analysis of the NAS score in this study allowed tracing the clinical profile of patients treated in a private ICU and identified an association with a higher NAS score. Thus, greater demand for nursing care, with infection outcome, length of hospital stay, use of MV for more than 48 hours, development of pressure injury, length of stay in the ICU, readmission, dialysis, and acute kidney injury.

The data presented here provide subsidies to carry out a more adequate dimensioning of the nursing team to the unit's profile, which can be used as a reference in clinical practice and/or in studies that address the topic.

CONTRIBUTIONS

We inform that all authors contributed equally in the design of the research project, data collection, analysis, and discussion, as well as in the writing and critical review of the content with intellectual contribution and the approval of the final version of the study.

CONFLICT OF INTERESTS

Nothing to declare.

FINANCING

This study had no external funding sources.

ACKNOWLEDGEMENTS

To the Primavera Hospital and the Teaching and Research Center for their contribution to data collection.

REFERENCES

1. Padilha KG, Barbosa RL, Andolhe R, Oliveira EMD, Ducci AJ, Bregalda RS et al. Carga de trabalho de enfermagem, estresse/burnout, satisfação e incidentes em unidade de terapia intensiva de trauma. *Texto & Contexto-Enfermagem* [Internet]. 2017 [cited 2020 Jan 08]; 26(3). Available from: https://www.scielo.br/scielo.php?pid=S0104-07072017000300322&script=sci_arttext&tlng=pt
2. Santos JS, Santos LBP, Lima JR. Síndrome de Burnout em Enfermeiros de Unidade de Terapia Intensiva: Produção Científica de Enfermagem. *Rev Destaques Acadêmicos* [Internet]. 2018 [cited 2020 Jan 10]; 10(3). DOI: <http://dx.doi.org/10.22410/issn.2176-3070.v10i3a2018.1960>
3. Santos J, Santos JJ, Ribeiro JB, Santos LFS, Santos ES. Nursing Activities Score (NAS) e seu Impacto nas Unidades de Terapia Intensiva (UTI). In Congresso Internacional de Enfermagem [Internet]. 2017 [cited 2020 Jan 11]; 1(1). Available from: <https://eventos.set.edu.br/index.php/cie/article/view/5679>
4. Oliveira ACD, Garcia PC, Nogueira LS. Nursing workload and occurrence of adverse events in intensive care: a systematic review. *Revista da Escola de Enfermagem da USP* [online]. 2016 [cited 2021 Jun 01]; 50(4):0683-0694. DOI: <https://doi.org/10.1590/S0080-623420160000500020>
5. Menegueti MG, Araújo TR, Nogueira TDA, Gulin FS, Laus AM. Fatores associados à carga de trabalho de enfermagem em unidade de terapia intensiva: revisão integrativa. *Ciencia y Enfermería* [Internet]. 2017 [cited 2020 Jan 12]; 23(2): 69-79. Available from: <https://www.redalyc.org/pdf/3704/370454976007.pdf>
6. Oliveira EMD, Secco LMD, Figueiredo WBD, Padilha KG, Secoli SR. Nursing Activities Score and the cost of nursing care required and available. *Rev Brasileira de Enfermagem* [Internet]. 2019 [cited 2020 Jan 10]; 72: 137-142. Available from: https://www.scielo.br/scielo.php?pid=S003471672019000700137&script=sci_arttext&tlng=pt
7. Serafim CTR et al. Severity and workload related to adverse events in the ICU [online]. 2017 [cited 2021 Jun 01]; 70 (5):942-948. DOI: <https://doi.org/10.1590/0034-7167-2016-0427>.
8. Oliveira PMV, Nakahata KS, Marques IR. Avaliação da demanda de intervenções de enfermagem em terapia intensiva segundo o Nursing Activities Score (NAS). *Rev Eletrônica Acervo Saúde* [Internet]. 2019 [cited 2020 May 03]; 11(10): 453-453. Available from: <https://www.acervomais.com.br/index.php/saude/article/view/453>
9. Matias G, D'artibale EF, Almeida MM, Tenuta TF, Caporossi C. Perfil dos pacientes em Unidade de Terapia Intensiva em um hospital privado de Mato Grosso no período de 2013 a 2017. *COORTE-Rev*

- Científica do Hospital Santa Rosa [Internet]. 2018 [cited 2020 Apr 22]; 08. Available from: <http://www.revistacoorte.com.br/index.php/coorte/article/view/99>
10. Bonfada D, Santos MMD, Lima KC, Garcia-Altés A. Análise de sobrevida de idosos internados em Unidades de Terapia Intensiva. Rev Brasileira de Geriatria e Gerontologia [Internet]. 2017 [cited 2020 Feb 22]; 20(2): 197-205. Available from: http://www.scielo.br/scielo.php?pid=S1809-98232017000200197&script=sci_arttext&tlng=pt
11. Corassa RB, Falci DM, Gontijo CF, Machado GVC, Alves PAB. Evolução da mortalidade por causas externas em Diamantina (MG), 2001 a 2012. Caderneta Saúde Coletiva [Internet]. 2017 [cited 2020 Mar 03]; 25(3): 302-314. Available from: <http://www.scielo.br/pdf/cadsc/v25n3/1414-462X-cadsc-1414-462X201700030258.pdf>
12. Marques SHB, Souza A, Vaz AP, Pelegrini AHW, Linch GFC. Mortalidade por causas externas no Brasil de 2004 a 2013. Rev Baiana de Saúde Pública [Internet]. 2017 [cited 2020 Feb 22]; 41(2): 394-409. DOI: <https://doi.org/10.22278/2318-2660.2017.v41.n2.a2368>
13. Nascimento BR et al. Cardiovascular Disease Epidemiology in Portuguese-Speaking Countries: data from the Global Burden of Disease, 1990 to 2016. Arquivos Brasileiros de Cardiologia [online]. 2018 [cited 2021 Jun 1] 110(6): 500-511. DOI: <https://doi.org/10.5935/abc.20180098>.
14. Fernandes AMG, Melo GTS, Silva LKAM, Silva MC, Carvalho GAFC, Sena DCS. Atuação da enfermagem na detecção precoce e tratamento da sepse na terapia intensiva. Rev Humano Ser [Internet]. 2018 [cited 2020 Feb 22]; 3(1). Available from: <https://periodicos.unifacex.com.br/humanoser/article/view/1008>
15. Melo EM, Oliveira TMM, Marques AM, Ferreira AMM, Silveira FMM, Lima VF. Caracterização dos pacientes em uso de drogas vasoativas internados em unidade de terapia intensiva. Rev de Pesquisa: Cuidado é Fundamental Online [Internet]. 2016 [cited 2020 Mar 04]; 8(3): 4898-4904. Available from: <http://www.seer.unirio.br/index.php/cuidadofundamental/article/viewFile/4408/pdf>
16. Barbosa WF. A importância do enfermeiro em ter conhecimento em medicações utilizadas na UTI. In: II Congresso Internacional do Grupo Unis. Fundação de Ensino e Pesquisa do Sul de Minas [Internet]. 2016 [cited 2020 Mar 04]. Available from: <http://repositorio.unis.edu.br/handle/prefix/440>
17. Souza TB, Batista RC. Avanço da tecnologia na unidade de terapia intensiva. Rev Medius [Internet]. 2019 [cited 2020 Mar 04]; 3(3). Available from: <http://periodicos.pdl.ifmt.edu.br/index.php/medius/article/view/26>
18. Silva PLN, Santos AGP, Rodrigues BG, Novi BR, Ramos DZ, Rocha PT et al. Aspectos epidemiológicos, clínicos e assistenciais da monitorização hemodinâmica invasiva: uma revisão

- bibliográfica. JMPHC | Journal of Management & Primary Health Care | ISSN 2179-6750 [Internet]. 2019 [cited 2020 Mar 04]; 10. Available from: <http://www.jmphc.com.br/jmphc/article/view/334>
19. Castro AS, Arboit ÉL, Ely GZ, Dias CAM, Arboit J, Camponogara S. Percepções da equipe de enfermagem acerca da humanização em terapia intensiva. Rev Brasileira em Promoção da Saúde [Internet]. 2019 [cited 2020 Mar 05]; 32. Available from: <https://periodicos.unifor.br/RBPS/article/view/8668>
20. Moura JM, Sanches E, Pereira R, Frutuoso I, Werneck AL, Contrin LM. Diagnóstico de sepse em pacientes após internação em unidade de terapia intensiva. Arquivos de Ciências da Saúde [Internet]. 2017 [cited 2020 Mar 20]; 24(3): 55-60. Available from: <http://www.cienciasdasaude.famerp.br/index.php/racs/article/view/675>
21. Silva A, Hummel JR, Cabral TS, Carvalho CCR, Busanello J. Índices de sedação e ventilação mecânica em paciente sob cuidados intensivos. Anais do Salão Internacional de Ensino, Pesquisa e Extensão [Internet]. 2019 [cited 2020 Mar 23]; 11(2). Available from: <https://periodicos.unipampa.edu.br/index.php/SIEPE/article/view/101385>
22. Guedes JR, Silva ES, Carvalho ILN, Oliveira MD. Incidência e fatores predisponentes de insuficiência renal aguda em unidade de terapia intensiva. Cogitare Enfermagem [Internet]. 2017 [cited 2020 Mar 25]; 22(2). Available from: <https://www.redalyc.org/jatsRepo/4836/483654815021/483654815021.pdf>
23. Salgado PO et al. Carga de trabajo de enfermería requerida por los pacientes durante la hospitalización en una UCI: estudio de cohorte. Enfermería Global [Internet]. 2020 [cited 2021 Jun 02]; 19(59): 450-478. Available from: <https://revistas.um.es/eglobal/article/view/400781/284321>.
24. Pereira BDSL et al. Aplicação do nursing activities score (NAS) em uma unidade de terapia intensiva (UTI). Rev. Fun Care (Online). 2020 [cited 2021 Jun 02] 12:79-87. DOI: <http://dx.doi.org/10.9789/2175-5361.rpcfo.v12.7052>.
25. Macedo APMC, et al. Validação do Nursing Activities Score em unidades de cuidados intensivos portuguesas. Rev. bras. enferm. 2016 [cited 2021 Jun 02] 69(5): 826-32. DOI: <https://doi.org/10.1590/0034-7167-2016-0147>.
26. Bruyneel A et al. Measuring the nursing workload in intensive care with the Nursing Activities Score (NAS): A prospective study in 16 hospitals in Belgium. J Crit Care. 2019 [cited 2021 Jun 02] 54:205-211. DOI: [10.1016/j.jcrc.2019.08.032](https://doi.org/10.1016/j.jcrc.2019.08.032).
27. Paola MVO, Karisa SN, Isaac RM. Avaliação da demanda de intervenções de enfermagem em terapia intensiva segundo o Nursing Activities Score (NAS). Revista Eletrônica Acervo Saúde (Online). 2019 [cited 2021 Jun 02]; 11(10), e453-e453. DOI: <https://doi.org/10.25248/reas.453.2019>.

Correspondência

David da Silva Santos

E-mail: david_enff@hotmail.com

Submission: 05/18/2020

Approval: 05/13/2021

Copyright© 2021 Revista de Enfermagem UFPE on line/REUOL.



Este é um artigo de acesso aberto distribuído sob a Atribuição CC BY 4.0 [Creative Commons Attribution-ShareAlike 4.0 International License](https://creativecommons.org/licenses/by/4.0/), a qual permite que outros distribuam, remixem, adaptem e criem a partir do seu trabalho, mesmo para fins comerciais, desde que lhe atribuam o devido crédito pela criação original. É recomendada para maximizar a disseminação e uso dos materiais licenciados.