






ORIGINAL ARTICLE

COMPARISON OF NURSING WORKLOAD BETWEEN CLINICAL AND SURGICAL INTENSIVE CARE PATIENTS

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ABSTRACT

Objective: to comparatively evaluate nursing workload between clinical and surgical patients in an intensive care unit.

Method: prospective cohort conducted in an Intensive Care Unit of the capital city of Sergipe, northeastern Brazil, with patients admitted from August 2018 to July 2019. Data were analyzed by Epi-Info 7.2 software.

Results: clinical patients had longer hospital stay and higher mortality rate. The means, Simplified Acute Physiology Score 3, 24 hours and discharge and Charlson Comorbidity Index showed significant difference between the groups. The overall average workload according to the Nursing Activities Score was 53.31, and a significant difference was observed regarding workload only at unit discharge.

Conclusion: the application of the indexes and the measurement of the workload among the different groups, as in this study, helps in the appropriate sizing, adds safety and quality of care.

DESCRIPTORS: Intensive Care Units; Workload; Nursing Care; Patient Care; Critical Care.

COMPARACIÓN DE LA CARGA DE TRABAJO DE ENFERMERÍA ENTRE PACIENTES CLÍNICOS Y QUIRÚRGICOS EN CUIDADOS INTENSIVOS

RESUMEN:

Objetivo: evaluar comparativamente la carga de trabajo de enfermería entre pacientes clínicos y quirúrgicos en una unidad de cuidados intensivos. **Método:** cohorte prospectiva realizada en una Unidad de Cuidados Intensivos de la capital de Sergipe, noreste de Brasil, con pacientes ingresados desde agosto de 2018 hasta julio de 2019. Los datos se analizaron con el software Epi-Info 7.2. **Resultados:** los pacientes clínicos tuvieron una estancia hospitalaria más larga y una mayor tasa de mortalidad. Las medias, Simplified Acute Physiology Score 3, 24 horas y a la salida y el índice de Comorbilidad de Charlson mostraron diferencias significativas entre los grupos. La media global de la carga de trabajo según el Nursing Activities Score fue de 53,31 y se observó una diferencia significativa respecto a la carga de trabajo sólo en el momento del alta de la unidad. **Conclusión:** la aplicación de los índices y la medición de la carga de trabajo entre los diferentes grupos, como en este estudio, ayuda a dimensionar adecuadamente, añade seguridad y calidad asistencial.

DESCRIPTORES: Unidades de Cuidados Intensivos; Carga de Trabajo; Atención de Enfermería; Atención al Paciente; Cuidados Críticos.

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INTRODUCTION

The most advanced therapeutic measures employed in Intensive Care Units (ICU) have allowed reversal of diseases previously without prognosis. These advances have changed the profile of the patients admitted and, consequently, demanded from the nursing team greater resourcefulness and safety in the care provided⁽¹⁾.

Harm-free nursing care is one of the main targets for the achievement of quality care and health indicators since the occurrence of adverse events is related to this care. The inadequate dimensioning of these professionals, the excess of assistance tasks and the incorrect judgment of the patients' needs constitute intervening factors in this process⁽²⁾. It is also important to emphasize the relationship between the number of nurses and the increase in complication rates, such as infections, falls, ventilator-associated pneumonia, accidental extubation and skin lesions - events that may be decisive for patients in the intensive care environment⁽¹⁾.

To perform the appropriate dimensioning and ensure the quality of care provided, the severity profile of the patients seen, and the nursing activities required for care should be considered⁽³⁾. The Nursing Activities Score (NAS) is an instrument used as a possibility to systematize and manage quality care. This instrument has been associated with the use of severity and mortality predictor scores in order to provide conditions for adequate management, considering that an oversized team is expensive, and a reduced team implies in the reduction of care effectiveness, which prolongs hospitalization, increases the risk of morbidity and mortality, and increases costs for healthcare institutions⁽⁴⁾.

The NAS is composed of 23 items with scores ranging from a minimum of 1.2 to a maximum of 32.0. The result of the sum of the scores obtained represents the percentage of time spent in the last 24 hours by the nursing team in patient care, and its final score may reach a maximum of 176.8%⁽⁵⁾. Each point obtained in NAS is equivalent to 14.4 minutes⁽⁶⁾.

A study conducted in the Netherlands resulted in important evidence regarding nursing workload. It was found that a higher nursing activity score per nurse was associated with higher in-hospital mortality. In contrast, no association was found between the proportion of patients per nurse and mortality. Thus, it would be more important to focus on the nursing workload that patients generate than on the number of patients the nurse must care for in the ICU⁽⁷⁾.

From this perspective, it is known that the proposal of NAS is to include the organization of care and nursing quantity according to the specificity and workload that each patient generates. Thus, when considering that one can care for patients of different origin in the ICU and that each patient behaves subjectively, demanding from nursing a differentiated care in terms of quality and quantity of care⁽⁸⁾, the question is: what is the difference of the nursing workload between clinical and surgical patients in the intensive care environment? To answer the enunciated question, the proposed objective was to comparatively evaluate the nursing workload with surgical and clinical patients in an intensive care unit of a university hospital.

METHOD

This is a prospective cohort study carried out in the adult intensive care unit of a teaching hospital in the capital of Sergipe, in the northeastern region of Brazil. The ICU has five beds, the morning shift nursing team has four nurses and eight nursing technicians, and the afternoon shift has three nurses and nine technicians, working six hours a day. The

night team has one nurse and five technicians on duty for 12 hours. Of the beds, three are for surgical patients, one for patients in the hospital's inpatient clinics, and one for the Inter-federative Universal Access Guarantee System, with redistribution done to meet occasional existing demands.

The study sample was composed of 169 patients, aged 18 years or older, admitted to the ICU from August 2018 to July 2019. Data collection systematically occurred by filling out a standardized instrument based on data from medical records. The collection started after the patient's admission, being recorded daily for the first seven days and later on the day of discharge or death in the ICU.

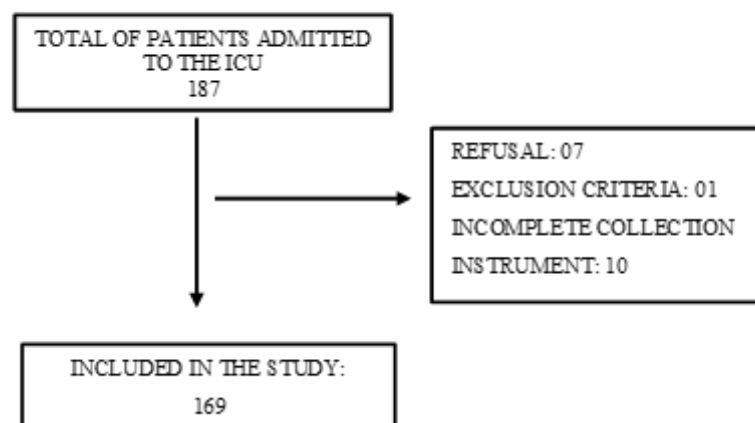


Figure 1 - Flowchart of inclusion of patients in the study. Aracaju, SE, Brazil, 2020
Source: Authors (2020)

Seven nurses, three graduate students, and one nursing technician participated in the collection, all previously trained by a nurse specialist with clinical experience in the cardiac ICU area.

The data collection instrument was subdivided into sociodemographic data, clinical characterization, ICU admission support, laboratory values and severity index assessment by the Simplified Acute Physiology Score 3 (SAPS 3) and Charlson Comorbidity Index (CCI). In addition to nursing workload assessment by Nursing Activities Score (NAS) and outcomes.

The sociodemographic and clinical characterization of the sample was performed by analyzing the variables: age, gender, sector of origin and presence of comorbidities. The diagnoses were grouped according to the organ system based on the reason for hospitalization specified in the medical records. The severity of outcomes was also assessed by the length of stay and mortality in the ICU.

The nursing workload was verified using the NAS instrument⁽⁹⁾. According to the original publication, this was developed as a predictor of nursing workload, regardless of patient severity, and consists of a set of items related to medical and nursing interventions to which the patient may be submitted in the ICU; the result of the sum of the scores obtained represents the percentage of time spent in 24 hours.

The NAS is formulated in six areas of care: respiratory, cardiovascular, renal, neurological, metabolic support and basic activities, which is subdivided into eight categories

- monitoring and controls, laboratory investigations, medication, hygiene procedures, drain care, mobilization and positioning, family and patient support and care, and administrative and managerial tasks⁽⁵⁾. The NAS was calculated 24 hours after admission and daily until the seventh day, based on the information of the last 24 hours available in the medical chart. Afterwards, it was calculated again on the day of death or discharge from the ICU, based on the interventions until the time of discharge, regardless of whether or not they have completed 24 hours.

The CCI is a severity classification system that uses secondary diagnosis registry data to assign the weight of morbidity. The method uses a score according to the comorbidities presented by the patient; the total sum is increased by a score according to age, starting at 50 years of age and adding one point every 10 years⁽¹⁰⁾. The CCI was calculated upon admission of the patient to the ICU, based on information available in the medical chart or collected from the patient or responsible family member.

SAPS 3 is a severity score, the higher value of which indicates that the greater the expected severity. In addition, the value of this index can be translated into patients' likelihood of death. This score assesses demographic variables, reasons for ICU admission, and physiological variables that represent the degree of disease impairment and health status assessment prior to hospital admission, indicative of the premorbid condition⁽¹¹⁾. The SAPS 3 was calculated at the time of admission and later at the date of ICU discharge or death.

Data were analyzed using Epi-Info software, version 7.2. For categorical variables, distribution frequencies were calculated, for quantitative variables, the corresponding measures of central tendency and dispersion. The normality distribution of the data was tested by the D'Agostino-Pearson test. Differences between the clinical and surgical groups were checked for categorical variables by the chi-square test; for quantitative variables, the T-test or Mann-Whitney test was used.

The research followed the ethical precepts according to resolution 466/12 of the National Health Council and was approved by the research ethics committee of the Federal University of Sergipe, under opinion number 2,830,187. It is part of the research project entitled "Clinical characterization, severity profile, and outcome of patients in Intensive Care Units".

RESULTS

Of the 169 patients included in the study, the majority, 120 (71.01%), were classified as surgical. There was no significant difference regarding gender. Clinical patients had longer ICU length of stay, as well as higher mortality rate. The mean 24-hour SAPS 3 and exit and CCI in surgical and clinical patients showed statistically significant difference (Table 1).

Table 1 - Clinical and demographic characteristics of critically ill patients admitted to ICU according to type of hospitalization, from August 2018 to July 2019. Aracaju, SE, Brazil, 2020 (continues)

	Clinical	Surgical	Total	p-value
Total	28,99 (49)	71,01 (120)	100 (169)	
Gender, % (n)				

Male	44,90 (22)	44,05 (52)	43,79 (74)	0,493*
Female	55,10 (27)	55,95 (68)	56,21 (95)	
Output conditions % (n)				
Survivors	38,78 (19)	92,50 (111)	76,92 (130)	<0,001*
Non-survivors	61,22 (30)	7,50 (9)	23,08 (39)	
Age - mean (SD)	55,59 (16,93)	56,27 (16,29)	56,07 (16,43)	0,809***
Length of stay median (IIQ)	8 (4-13)	1(1-3)	2 (1-6)	<0,001**
SAPS 3 24h - mean (SD)	29,06 (10,57)	15,47 (9,13)	19,43 (11,38)	<0,001***
SAPS 3 output - mean (SD)	27,22 (14,22)	12,62 (9,80)	16,86 (13,03)	<0,001***
CCI-admission- mean (SD)	4,41(2,88)	3,11(2,83)	3,49 (2,90)	<0,001***

Legend: SAPS 3-Simplified Acute Physiology Score 3; ICC- Charlson Comorbidity Index; Med- Median; IIQ- interquart range; SD- Standard Deviation Note: * Descriptive level of probability of the Chi-square test; ** Descriptive level of probability of the Mann-Whitney test; ***Descriptive level of probability of the T test

Source: Authors (2020)

In the total sample, the mean nursing workload according to NAS was 53.31, and there was no statistically significant difference between the mean of the two groups. However, a significant difference was observed regarding nursing workload at ICU discharge, and the highest value of the NAS score corresponded to clinical patients (Table 2).

Table 2 - Mean of the Nursing Activities Score (NAS), according to type of hospitalization of patients admitted to the ICU, from August 2018 to July 2019. Aracaju, SE, Brazil, 2020

	Clinical Average (SD)	Surgical Average (SD)	Total Average (SD)	p-value
NAS average	54,39 (6,36)	52,87 (8,05)	53,31(7,61)	0,195
NAS 24h	50,32 (5,10)	48,66 (7,92)	49,44 (6,75)	0,227
NAS output	65,22 (13,09)	55,41 (11,08)	58,26 (12,48)	<0,001
NAS 24h survivor	50,44 (4,35)	48,21 (8,41)	48,87 (7,47)	0,29
NAS 24h non-survivors	50,24 (5,61)	51,06 (4,00)	50,42 (5,28)	0,702
NAS output Survivor	58,17(10,40)	54,08(9,30)	54,67(9,54)	0,086
NAS output non-survivors	69,71(12,75)	71,88(17,55)	70,21(13,78)	0,684

Legend: NAS - Nursing Activities Score; SD - Standard Deviation.

Source: Authors (2020)

DISCUSSION

The study presents a comparison of the nursing workload measured by NAS among clinical and surgical patients admitted to a general ICU of a teaching hospital. It was observed that there was no significant difference regarding gender, differing from most studies, whose higher percentages are male⁽¹²⁻¹⁵⁾. However, it is compatible with what was revealed by a study of the Brazilian Intensive Care Medicine Association, which shows a percentage of admissions, like that found in this study, with 48.24% women and 51.76% men in 2019 in adult ICUs in Brazil⁽¹⁶⁾.

Thus, the numerical difference, although small, found in this study can be justified because it is a hospital with elective referrals and because of the relatively low demand of men to the health service, which leads to increased severity of the condition and consequently are more frequent in open-door hospitals and those that attend to emergencies⁽¹⁷⁾.

The overall mean age of the patients seen was similar to that found in the literature, ranging from 56.4 to 77 years old^(1,18), a characteristic that follows a pattern resulting from the demographic change in the country, whose elderly population has progressively increased, changing the profile of the patients seen and increasing the number of elderlies in the intensive care environment⁽¹⁸⁾.

The fact that clinical patients have longer ICU stays is explained by the expected profile of decompensation, lower level of functionality, with a causal factor that, in most cases, requires more time for resolution. Besides the weight of comorbidities that, as observed, clinical patients showed higher mean CCI, correlating to longer ICU stay and higher in-hospital mortality risk⁽¹⁹⁾, since this is an important identifier of organ reserve, revealing the impact on the survival of these individuals in the critical environment.

In addition, the burden of disease measured by the CCI may not only be an indicator of greater severity, but also of the possibility of probable complications, since the patient may have greater difficulty in recovering, which is increased if the patient is elderly⁽¹⁹⁾.

Surgical origin also comprised the majority of those admitted to the intensive care unit^(8,12-14). The high number of patients admitted to the postoperative period results from the fact that some surgeries have as protocol the coming of the patient to the ICU, because attention is required in the evolution, since complications are still frequent, occurring in about one third of patients. Age, SAPS 3 and SOFA at ICU admission are associated with 28-day mortality and postoperative complications⁽¹³⁾.

Despite the elective surgical profile, another factor that may influence the need for close monitoring, and consequently admission to the ICU, is the fact that the hospital is a reference in elective surgeries of the digestive tract, head and neck, thoracic, gynecological, and surgical breast, related to diagnosis, resection, reconstruction, and palliation, with neoplasia being the most prevalent diagnosis for admission to the ICU.

However, despite the prevalence of surgical origin, the mean of the 24-hour SAPS 3 values of surgical patients was significantly lower than that found in a study with surgical patients from two ICU of tertiary hospitals in the São Paulo region, whose mean SAPS 3 value was 48.5 ± 18.1 . This study also considered that the SAPS 3 index value of 57 showed better sensitivity (75%) and specificity (86%) for hospital mortality⁽¹¹⁾. Therefore, scores lower or equal to 57 present higher survival rates, which is seen in this study, considering the low mortality rate (7.50%) of surgical patients.

As for nursing workload, the overall mean NAS was considerably lower than that found in other investigations in which NAS ranged from 61.9 to 98.37^(12-15,18). There was no statistically significant difference in mean and 24-hour NAS between the groups, i.e., NAS values were similar for surgical and clinical patients, both overall mean and on admission.

Even with an elective surgery profile, the post-operative period demands from the professionals both direct care activities and organizational and administrative activities. In addition, because it is an immediate postoperative period, these patients require attention

to the possible complications and care arising from each surgical specificity.

Therefore, it was observed that, although the patients were elective surgical patients and stayed in the ICU for a short time, they demanded as much from the nursing team as the clinical patients. This statement corroborates what was found in a study that evidenced a negative correlation (-0.23) between NAS and length of stay, that is, the shorter the length of stay, the higher the NAS⁽⁸⁾.

In the investigations, the NAS on admission had obtained a higher value, decreasing throughout hospitalization in survivors and progressively increasing in non-survivors⁽¹²⁾. In this study, the mean NAS value at 24 hours and discharge remained linear in survivors and increased in non-survivors. A research conducted in a teaching hospital showed a higher mean NAS value for both clinical NAS 66.7% and surgical NAS 72.5%⁽⁸⁾.

The NAS at discharge showed a statistically significant difference, with the highest mean referring to the clinical group. We also observed a significant difference between the exit SAPS 3 values, showing a profile of greater severity of clinical patients, consequently demanding from the nursing team the implementation of targeted interventions and systematic assessment. Moreover, the mortality outcome at the time of discharge requires the team a series of administrative activities and family support, also considered in the application of NAS. Therefore, the difference found in the NAS at exit correlates with the mortality rate (23.08%) of clinical patients. This association is also observed in other studies, whose mortality also increased the exit NAS^(8,12).

The mortality rate evidenced is among the numbers described in national studies, ranging from 10.3 to 36.6^(11,15,20), however the mean value of SAPS 3 was lower when compared to studies carried out in ICU of São Paulo region, with SAPS 3 means in 44.2 to 48.5^(11,14). It is noteworthy that despite the lower patient severity scores, the mortality rate remained similar.

In agreement with what was found in another study⁽¹²⁾, the ICU in question has a small number of beds available, as well as the state, delaying interventions that prevent the deterioration of the clinical picture and improvement of the patient's prognosis, because many are transferred from regional hospitals in the surrounding municipalities and from the interior of the state. This fact may influence the NAS values with no drop throughout the hospitalization and mortality rate.

Thus, the NAS as an instrument that enables the analysis of the nursing workload in the ICU, considers the various factors and specificities of the patients cared for. Its use in studies is well disseminated, with critical populations of different conformations, evidencing its feasibility to measure the nursing workload in different groups of patients⁽¹⁴⁾. Measuring the workload considering clinical and surgical admissions and the demand for care to these patients is a useful tool for nurses in their daily routine and can add greater safety and quality of care.

As a limitation of this research, we highlight the use of data from a single institution and the difference between the number of patients between the groups. However, the results suggest the viability of the methodology used, besides revealing important information about the nursing workload for clinical and surgical patients.

CONCLUSION

The results allowed us to conclude that, regardless of length of stay and origin, surgical and clinical patients had statistically similar nursing workloads. The overall mean value of NAS found was lower than that described in several studies, however, the ICU has

a high mortality rate of clinical patients, increasing the nursing workload during discharge of these patients.

Thus, the application of indexes and comparative workload measurements, such as those used in this study, can help intensive care unit nursing managers to adequately dimension their workload, aiming at greater safety and quality of care, besides enabling the presentation of results in a practical and objective manner.

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