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# NURSING WORKLOAD AND INTERVENTION IN A THERAPEUTIC INTENSIVE CARE UNIT

## CARGA DE TRABALHO DE ENFERMAGEM E INTERVENÇÕES TERAPÊUTICAS EM UMA UNIDADE DE TERAPIA INTENSIVA

## CARGA DE TRABAJO DE ENFERMERÍA E INTERVENCIONES TERAPÉUTICAS EN UNA UNIDAD DE TERAPIA INTESIVA

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**ABSTRACT**

***Objective:*** to evaluate the nursing workload, from NAS, in an intensive care unit of medical and surgical adult patients of a tertiary teaching hospital. ***Method:*** descriptive, cross-sectional study with a quantitative approach. Data were collected from April to June 2014, based on records of nursing and medical teams in patient´s records, in the observations of the researcher during the data collection, in the verbal information of the nursing team. The research project was approved by the Research Ethics Committee, CAAE Number 26122213.4.0000.5208. ***Results:*** the sample 52 patients most women, 28 (52.9%), being more than 50 years old (52.9%). Most of the patients came from the wards (80.4%) and the rest (19.6%) from surgical area. ***Conclusion:*** the patients had an increased need for care, with high demand for nursing. ***Descriptors:*** Intensive Care Unit; Nursing Interventions; Nursing Activities Score; Nursing Workload.

**RESUMO**

***Objetivo*:** avaliar a carga de trabalho de enfermagem, a partir do NAS, em uma unidade de terapia intensiva de pacientes adultos clínicos e cirúrgicos de um hospital de ensino de nível terciário. ***Método***: estudo descritivo, transversal, com abordagem quantitativa. Os dados foram coletados nos meses de abril a junho de 2014, com base nos registros das equipes de enfermagem e médica no prontuário do paciente, nas observações da pesquisadora durante a coleta de dados e nas informações verbais da equipe de enfermagem. O projeto de pesquisa foi aprovado pelo Comitê de Ética em Pesquisa, CAAE n° 26122213.4.0000.5208. ***Resultados***: a amostra foi constituída de 51 pacientes, com ligeira prevalência de mulheres, as quais corresponderam a 27 (52,9%), com mais de 50 anos (52,9%), Quanto à admissão, a maior parte dos pacientes era proveniente das enfermarias (80,4%) e o restante (19,6%) do bloco cirúrgico. ***Conclusão:*** os pacientes apresentaram elevada necessidade de cuidados, com alta demanda de enfermagem. ***Descritores:*** Unidade de Terapia Intensiva; Intervenções de Enfermagem; Nursing Activities Score; Carga de Trabalho de Enfermagem.

**RESUMEN**

***Objetivo*:** evaluar la carga de trabajo de enfermería, a partir de NAS, en una unidad de terapia intensiva de pacientes adultos clínicos y quirúrgicos de un hospital de enseñaza de nivel terciario. ***Método***: estudio descriptivo, transversal, con enfoque cuantitativo. Los datos fueron recogidos en los meses de abril a junio de 2014, con base en los registros de los equipos de enfermería y médica en el prontuario del paciente, en las observaciones de la investigadora durante la recolección de datos, en las informaciones verbales del equipo de enfermería. El proyecto de investigación fue aprobado por el Comité de Ética en Investigación, CAAE n° 26122213.4.0000.5208. ***Resultados***: la muestra fue constituida de 52 pacientes con prevalencia de mujeres que corresponden a 28 (52,9%), con más de 50 años (52,9%). Con respecto a la admisión, la mayor parte de los pacientes era proveniente de las enfermerías (80,4%) y el restante (19,6%) del bloco quirúrgico. ***Conclusión:*** los pacientes presentaron elevada necesidad de cuidados, con alta demanda de enfermería. ***Palabras clave:*** Unidad de Terapia Intensiva; Intervenciones de Enfermería; Nursing Activities Score; Carga de Trabajo de Enfermería.

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## INTRODUCTION

The incorporation of new technologies in health, especially in the area of intensive nursing, has been offering a dimensioning care environment and generating incremental changes in the care provided by nurses and the staff, requiring that particular professional, as a caregiver, knowledge and observation skills, communication, reflection, application of scientific knowledge as well as evaluation and decision-making.[1]

Nursing care in Intensive Care Units (ICU) is characterized by high a complexity care, as well as a greater demand for technical and scientific competence, since immediate decision-making and the adoption of safe behaviors are directly related to morbidity and mortality of patients.[2]

Their intrinsic characteristic is the clinical instability and the imminent risk of death, where the intensive care nurse has the practical knowledge, clinical reasoning skills and immediate decision, to carefully evaluate the needs/demands of patients in order to provide the best assistance to health.[3]

Demand indicators of care is essential to ensure the quality of care and provide subsidies to staff dimensioning in the different hospital units, especially in ICU due to the existence of a more onerous workload according to the inherent characteristics of the patients assisted in this unit.[4]

Significant impacts for patients´ safety and care happen as soon as the imbalance in the ratio between patients and nurses is evidenced, as the increased workload, staff turnover and other aspects related to health workers like Burnout syndrome and dissatisfaction repercussions on morbidity and mortality.[5]

The need for methods and tools to monitor the quality of intensive care has increased considerably, and the evaluation of nursing workload has emerged as an important ICU management tool to assess and adjust resources to provide what patients need as requirements to ensure quality of care and support the quantification of staff in different hospitals.[5,6]

Assessing the workload is an attempt to predict the time and skills needed to dispense nursing care to clients/patients. This definition considers that the nursing workload is the time the nursing staff of carrying out activities on their responsibility, directly or indirectly related to patient care.[7]

In the current context, the instruments that assess the clinical condition of patients and the need for care they require become indispensable when seeking to improve the cost/benefit in health care. Thus, care demand indicators are increasingly needed in nursing to ensure the quality of care, supporting the quantification of staff to provide safe care for patients and professionals. Among these instruments, there are the Nursing Activities Score (NAS), index created in 2003 from the (TISS-28), for measuring the nursing workload, based on time spent on nursing activities, regardless of the severity of the patient´s disease. It contains 23 items that cover basic activities, ventilatory, cardiovascular, renal, neurological, metabolic support and specific interventions.[8]

Each item has a score. The score assigned to a patient is the sum of the scores of patients´ direct and indirect needs for care. This score represents the total time of nursing care that was given to the patient in the past 24 hours. Turning into the assistance time, each NAS point is similar to 14.4 minutes. NAS was translated into Portuguese and validated by Queijo.[8]

It is understood that the implementation of NAS not only assist in adjusting the number of human resources and can also assess the demand of nursing care and activities that require further daily attention of nursing, justifying the study that aimed to:

- Evaluate the nursing workload, from NAS, in an intensive care unit of medical and surgical adult patients of a tertiary teaching hospital.

## METHOD

Descriptive, retrospective study with a quantitative approach, held in the Intensive Care Unit of a large teaching hospital in the state of Pernambuco. The unit has eight beds for medical patients and 4 beds reserved for patients undergoing major surgeries.

The sample were all patients hospitalized in the unit during the data collection period and who remain hospitalized for at least 24 hours and over 18 years old with a total

sample of 51 patients. Patients with shorter stays than 24 hours and with data and/or incomplete records in the medical records or other nursing forms, were excluded.

Data were collected from April to June 2014, based on nursing and medical teams records of the patient, in the observations of the researcher during the data collection, in the verbal information of the nursing team, and registered in an instrument divided into two parts: the first one with identification and clinical data of the patient and the second one by Nursing Activities Score (NAS). This score contains 23 items that cover basic activities, ventilatory, cardiovascular, renal, neurological, metabolic support and specific interventions.[8]

Each item has a score. Thus, the score assigned to a patient is the sum of the scores of items that match the direct and indirect assistance needs of patients. This score represents the total time of nursing care that was given to the patient in the past 24 hours. Turning to the time assistance given, each NAS point is similar to 14.4 minutes. NAS was translated into Portuguese and validated by Queijo.[8]

The data were stored in Microsoft Excel software 2007 spreadsheet and analyzed by SPSS 20.0 program. The characterization of the patients is expressed in absolute and relative frequencies, in average and standard deviations. In this study, NAS score is converted for 24 hours of care provided. To compare NAS at admission and at discharge, the paired t test was used for NAS average and the McNemar test for comparison of proportions between the recorded interventions.

The study was approved by the Research Ethics Committee of the Health Sciences Center of the Federal University of Pernambuco with the CAAE Number 26122213.4.0000.5208

## RESULTS

The sample consisted of 51 patients, most of them were women, 27 (52.9%), with more than 50 years old (52.9%), with an average age of 52.76 ± 17.45. As for the length of hospitalization, most patients remained in the ICU for more than 5 days (60.8%) having an average length of stay of 7.24 ± 2.98 days. After admission, 72.5% of patients were transferred to wards and 27.5% of the sample were deaths. (Tables 1 and 2)

As hospitalization, most patients came from the wards (80.4%) and the rest (19.6%) from the the surgical room. There was no patient from other health areas, featuring the predominance of elective surgeries. The main clinical admitted to the unit were general surgery (25.5%), medical clinic (17.6%) and Cardiology (9.8%), and the other clinics were responsible for the hospitalization of 56.9 % of patients. (Table 1)

**Table 1.** Characterization of patients according to gender, age and hospitalization aspects. Recife-PE, 2014

| Gender | n/% |
|---|---|
| Male | 24 / 47,1 |
| Female | 27 / 52,9 |
| Age (av±sd) | 52,76±17,45 |
| Time of hospitalization (av±sd) | 7,24±2,98 |
| Origin (n/%) | |
| Surgical Area | 10 / 19,6 |
| Ward | 41 / 80,4 |
| Clinical (n/%) | |
| Gederal Surgery | 13 / 25,5 |
| Medical Clinic | 9 / 17,6 |
| Cardiology | 5 / 9,8 |
| Other clinics | 29 / 56,9 |
| Destiny (n/%) | |
| Death | 14 / 27,5 |
| Wards | 37 / 72,5 |
| av±sd = average±standard deviation | |

The sample showed a significant reduction in the score reached between hospitalization and discharge (p=0.007). This reduction was statistically significant for men (p=0.04), ≥50 years old (p=0.009) from the ward (p=0.025) and among those who returned to the wards (p=0.001). Despite showing lower scores than patients from the ward, patients in postoperative decreased from NASS without statistical significance (p=0.12). The patients with length of stay longer than five days, had

higher scores of hospitalization and discharge, although not finding statistical significance, probably due to the sample size (p=0.055). (Table 2)

**Table 2.** Variability of NASS between hospitalization and discharge of patients in a intensive care unit. Recife-PE, 2014

| | n / % | NAS hospitalization | NAS discharge | p* |
|---|---|---|---|---|
| Sample | | 70,66±12,17 | 62,56±21,68 | 0,007 |
| Gender | | | | |
| Male | 24 / 47,1 | 71,75±10,41 | 61,04±24,03 | 0,040 |
| Female | 27 / 52,9 | 69,69±13,66 | 63,91±19,73 | 0,070 |
| Age | | | | |
| <50 years old | 24 / 47,1 | 70,21±12,04 | 66,87±20,29 | 0,340 |
| ≥50 years old | 27 / 52,9 | 71,07±12,49 | 58,72±22,52 | 0,009 |
| Origin | | | | |
| Ward | 10 / 19,6 | 75,66±10,25 | 66,6±8,53 | 0,025 |
| Segical area | 41 / 80,4 | 69,44±12,39 | 61,57±23,79 | 0,120 |
| Destiny | | | | |
| Death | 14 / 27,5 | 76,29±7,59 | 74,49±23,96 | 0,440 |
| Ward | 37 / 72,5 | 68,53±12,95 | 58,04±19,21 | 0,001 |
| Tme of hospitalization | | | | |
| ≤5 dyas | 20 / 39,2 | 66,62±11,51 | 54,85±25,65 | 0,057 |
| >5 days | 31 / 60,8 | 73,98±11,86 | 68,89±15,57 | 0,055 |

*paired t test

There were 104 NAS and nursing workload measures, presented as a percentage, as suggested by NAS, ranged from 70.66% to 62.56%, showing a significant reduction during hospitalization (p=0.007) (Table 2).

Understanding how the activities that patients now need less during hospitalization for the admission, those that showed a significant reduction in the frequency found in the sample among the nursing activities evaluated by NAS (Table 3) were: Presence at the bedside and observation or continuous activity for 4 hours or more (p=0.004), artificial airway care (p<0.001), treatment for improvement in lung function (p<0.001), independent of vasoactive medication type and dose (p=0.022), intravenous administration of large losses of fluid (p=0.022), cardiopulmonary resuscitation in the last 24 hours (p=0.003), treatment of acidosis/complicated metabolic alkalosis (p=0.01), specific interventions outside the intensive care unit (p=0.001).

Only one activity was more frequent in evaluations in discharge statistically significant: Presence at the bedside and observation or continuous activity for 2 hours or more (p=0.039). Most patients were asking presence at the bedside and observation or continuous activity for 4 hours or more at admission (82.4%) and the same occurred at discharge (60.8%).

There was no record of the following activities: Completion of the procedure(s) of mobilization and positioning 3 times in 24 hours or more than 3 times in 24 hours or with 2 nurses at any frequency; Performing administrative/managerial tasks requiring full dedication for about 4 hours or over time in any shift; Monitoring of the left atrium, with or without cardiac output measurement of intracranial pressure measurement.

The most prevalent admission items were: hour vital signs; Calculations and regular record of water balance (100%); Laboratory investigations: biochemical and microbiological (100%); Medication except vasoactive drugs (100%); Implementation of the procedure (s) having 3 or more nurses at any frequency (100%); Respiratory support (100%); Quantitative measure urine output (100%); Specific interventions in the intensive care unit (98.0%); Treatment for improving lung function (94.1%); Enteral nutrition; Through the gastric tube or other gastrointestinal tract (92.2%); Hygiene procedure of accomplishment that lasts more than 2 hours (86.3%); Presence at the bedside and observation or continuous activity for 4 hours or more (82.4%); Support and care to families and patients requiring full dedication for about an hour in any shift (82.4%); Performing administrative and managerial tasks requiring full dedication for about 2 hours in any shift (82.4%); Treatment of complicated metabolic acidosis/alkalosis (68.6%); Care of artificial airways (58.8%).

**Table 3.** Variation of frequency of nursing activities between hospitalization and discharge of patients in na intensive care unit. Recife-PE, 2014

| NAS indicators | NASS (n/%) | | p* |
|---|---|---|---|
| | Hospitalization | Discharge | |
| 1. Monitoriing and control | | | |
| 1a. Hour vital signs; Calculations and regular record of water balance. | 51 / 100 | 48 / 94,1 | 0,250 |
| 1b. Presence at the bedside and observation or continuous activity for 2 hours or more. | 9 / 17,6 | 17 / 33,3 | 0,039 |
| 1c. Presence at the bedside and observation or continuous activity for 4 h or more. | 42 / 82,4 | 31 / 60,8 | 0,004 |
| 2. Laboratory investigations: biochemical and microbiological | 51 / 100 | 48 / 94,1 | 0,083 |
| 3. Medication except vasoactive drugs | 51 / 100 | 48 / 94,1 | 0,250 |
| 4. Hygiene procedures | | | |
| 4a. OCleaning and disinfection procedures. | 7 / 13,7 | 5 / 9,8 | 0,727 |
| 4b. Hygiene procedure of accomplishment that lasts more than 2 hours. | 44 / 86,3 | 43 / 84,4 | 1,000 |
| 4c. The performance of hygiene procedures lasting more than 4 hours. | 0 / 0,0 | 0 / 0,0 | 1,000 |
| 5. Care drains - Everyone (except gastric tube) | 13 / 25,5 | 12 / 23,5 | 1,000 |
| 6. Mobilization and positioning | | | |
| 6a. Completion of the procedure (s) of mobilization and positioning up to 3 times in 24 hours. | 0 / 0,0 | 0 / 0,0 | 1,000 |
| 6b. Completion of the procedure (s) more than 3 times in 24 hours or 2 nurses at any frequency. | 0 / 0,0 | 0 / 0,0 | 1,000 |
| 6c. Completion of the procedure (s) with 3 or more nurses in any frequency. | 51 / 100 | 48 / 94,1 | 0,250 |
| 7. Support and care for family members and relatives | | | |
| 7a. Support and care to families and patients requiring full dedication for about an hour in any shift. | 42 / 82,4 | 37 / 72,5 | 0,332 |
| 7b. Support and care to families and patients requiring full dedication for 3 hours or more in any shift. | 9 / 17,6 | 9 / 17,6 | 1,000 |
| 8. Tarefas administrativas e gerenciais | | | |
| 8a. Performance of routine administrative and managerial tasks. | 10 / 19,6 | 14 / 27,5 | 0,424 |
| 8b. Administrative and managerial tasks requiring full dedication for about 2 hours in any shift. | 42 / 82,4 | 34 / 66,7 | 0,057 |
| 8c. Administrative/managerial tasks requiring full dedication for about 4 hours or longer in any shift. | 0 / 0,0 | 0 / 0,0 | 1,000 |
| 9. Respiratory support. | 51 / 100 | 43 / 84,4 | 0,080 |
| 10. Artificial airways care. | 30 / 58,8 | 17 / 33,3 | <0,001 |
| 11. Treatment for improving lung function. | 48 / 94,1 | 31 / 60,8 | <0,001 |
| 12. Vasoactive medication regardless the type and dose. | 22 / 43,1 | 13 / 25,5 | 0,022 |
| 13. Intravenous administration of large losses of fluids. | 22 / 43,1 | 13 / 25,5 | 0,022 |
| 14. Monitoring of the left atrium, with or without cardiac output measurement. | 0 / 0,0 | 0 / 0,0 | 1,000 |
| 15. Cardiopulmonary resuscitation in the last 24 hours (excluding chest punch) | 3 / 5,8 | 2 / 3,9 | 0,003 |
| 16. Hemofiltration techniques. Dialysis technics | 14 / 27,5 | 8 / 15,7 | 0,109 |
| 17. Quantitative measure urine output | 51 / 100 | 43 / 84,3 | 0,080 |
| 18. Intracranial pressure measure | 0 / 0,0 | 0 / 0,0 | 1,000 |
| 19. Complicated metabolic treatment of acidosis/alkalosis | 35 / 68,6 | 19 / 37,3 | 0,010 |
| 20. Intravenous hyperalimentation | 9 / 17,6 | 9 / 17,6 | 1,000 |
| 21. Enteral nutrition. Through gastric tube or other gastro intestinal tract. | 47 / 92,2 | 44 / 86,3 | 0,375 |
| 22. Specific interventions in the intensive care unit. | 50 / 98,0 | 47 / 92,2 | 0,375 |
| 23. Specific interventions outside the intensive care unit. Diagnostic or surgical procedures. | 22 / 43,1 | 7 / 13,7 | 0,001 |

* McNemar test

## DISCUSSION

This study showed a predominance of female patients (52.9%). In age, there was a higher prevalence in the age group above 50 years old (52.9%), and the average age was 52.76 ± 17.45. The higher frequency in this age group is similar to other national data, with elderly patients in ICU. This can be evidenced in a study performed in an audlt ICU, belonging to a private tertiary referral hospital in São Paulo, in which the average age was 65.8 years old.[9]

As for the length of hospitalization, most patients remained in the ICU for more than 5 days (60.8%) having an average length of stay of 7.24 ± 2.98 days. Studies have shown time varying from 1 to 7 days, confirming the national average, minimizing the negative effects of long hospitalization in intensive care, such as iatrogenic infections and other complications.[10]

The patients with length of stay longer than five days had higher scores on hospitalization and discharge. A research held in in ICUs in São Paulo found that the

high nursing workload was related to the time a patient stays in that sector.[9] Patients with long-term usually have higher scores, similar to other study that patients remain above six days had average NAS values higher compared to those with time up to 5 days.[10]

Regarding NAS variation between hospitalization and discharge, the sample showed a significant reduction in the score between hospitalization and discharge (p=0.007). The resulting workload from NAS in hospitalization was higher than the average of workload during hospitalization time and at the discharge, which was also observed in another national study.[11]

At hospitalization, most of patients are in serious condition, unstable, requiring assistance for complex health as well as greater efforts during their stay in the unit. On the other hand, patients on discharge from the unit require lower demand care and showed more clinical stability.

However, it was observed high NAS scores in patient´s discharge at the ward, as well as an association with poorer prognosis for the highest scores in the second evaluation. High scores on discharge have to alert to early discharges and may impact the need for dimensioning units that receive these patients. Premature discharges are associated with higher hospital mortality and higher readmission rates.[12]

Mortality in the sample (27.5%) is above that found in other studies that varied from 17.5% to 18.2% especially in those patients with elevated NAS scores, pointing to an association between high NAS in hospitalization, less variation throughout the stay in the Unit and ending in death.[13]

Patients who died demanded greater workload than those with discharge. Corroborating this finding, studies show that severe patients require more time nursing care, both at the time of hospitalization, as throughout their stay, due mainly organic instabilities of these units, as well as presenting the NAS elevated in patients who died. This data shows how reliable is the application of this instrument to scale professionals, according to care.[14]

The workload according to NAS, which refers to the time spent by the nursing staff in direct care to patients within 24 hours was higher than the scores found in national studies, which showed close to or higher scores than 60%.[9] This average also differs from a study of ward patients with a high dependency in which the NAS average was 51.47%. Such high average are justified by the fact that most of patients admitted to the ICU/URCC present greater hemodynamic, respiratory, neurological instability, requiring intensive clinical care and consequently greater nursing workload.[11,14]

In this sense, it is worth noting that the high nursing workload can act as negative predictive in quality of care, with a higher incidence of occupational risks for the team, with repercussions also on the quality of care provided to patients.

The activities related to monitoring of the patient, performing hygiene procedures, administrative and managerial tasks and respiratory support also collaborate to an increase in nursing workload data, which are similar to a study conducted in a general adult ICU demonstrating that most of the patients have hemodynamic and respiratory instability. It is observed that the highest scored items were in this study were mainly about care and administrative routine of intensive care units, demonstrating that these therapeutic interventions are performed in a satisfactory and constant frequency, and they are already the activities of the nursing team performance.[13-4]

Most of the indicators that were little or have not scored are specific interventions that are not part of the care profile of the units that therefore do not apply to all patients who need intensive care, justifying the low score of frequency of these items. An important item is the lack of information in the records about the mobilization and decubitus changes in patients performed by nursing professionals, emphasizing that such activities require time considerably increasing the nursing workload, in addition to increasing the risk of occupational diseases by the team.

The “support and care to families and patients” were also scored as a frequent activity in the units, since the family reception especially during visiting hours have been a present activity in the daily care by professionals in the therapy intensive rooms. The results of a review study showed that the family would like to be clarified by the nurses about the care provided on the unit and its functioning, equipment that assists patients, and what

they could do during visiting hours, especially on the interaction with their relatives.[14-5]

Being an Intensive Care Unit and the fact that there could be times of greatest clinical instability of the patient with the need to use a larger care and technological apparatus, cardiorespiratory reanimation was done in a very small frequency. The item “administrative and managerial tasks for about four hours” was considered only when patients would undergo procedures that are more complex and require the patient to move to another unit or when they die.

## CONCLUSION

The study highlights that most patients are women aged over 50 years old. The main clinics were general surgery, internal medicine and cardiology, and most patients remained in the unit for more than 5 days. The items and sub-items that appeared more frequently are related to nursing activities related to critical care, which is as expected for the profile of patients admitted to ICUs.

Patients admitted to the studied ICU had high need for care, with a high demand for nursing care. The results of this study provide an objective view about the nursing workload given to patients hospitalized in the Intensive Care Unit.

It is suggested to continue the study so that more data can be obtained in order to support the unit´s management, in search of a dimensioning of the nursing team to ensure best practices, risk-free to critical patients and the entire nursing team.

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