

**Applicability of the Nursing Activities Score in an adult oncology intensive care unit***Aplicabilidad del Nursing Activities Score en una unidad de cuidados intensivos de oncología de adultos**Aplicabilidade do Nursing Activities Score em uma unidade de terapia intensiva oncológica de adultos***Bruna da Silva Louredo Pereira<sup>1</sup>**

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**Submission:** 02-11-2021**Approval:** 03-01-2021**Abstract**

The aim was to evaluate the nursing workload dedicated to patient care through the application of the NAS in an adult oncology ICU; describe the demographic profile of patients admitted to the unit; measure the workload/percentage of nursing time through the application of the NAS instrument; demonstrate the recommended dimension for the unit's nursing staff according to the NAS. The study was descriptive, quantitative, and cross-sectional observational. Developed in the ICU (10 beds) of an oncology hospital in Rio de Janeiro, between December 2019 and January 2020, in a total of 20 days, generating 181 NAS evaluations in 32 patients. The results were: the predominance of male patients (56%), the average age was 60 years, and the average length of stay was 14.06 days. The average NAS percentage observed was 64.41%, corresponding to 16.41 hours of nursing care in 24 hours, with a recommendation of at least 05 nursing professionals per shift. The application of the NAS adjusted to the recommendations of the Federal Council of Nursing contributes to the proper dimensioning of nursing professionals, aiming at safe and quality care.

**Descriptors:** Workload; Intensive Therapy; Nursing Care; Personnel Management; Critical Care.**Resumen**

El objetivo fue evaluar la carga de trabajo de enfermería dedicada al cuidado del paciente mediante la aplicación del NAS en una UCI de oncología de adultos; describir el perfil demográfico de los pacientes ingresados en la unidad; medir la carga de trabajo / porcentaje de tiempo de enfermería mediante la aplicación del instrumento NAS; demostrar la dimensión recomendada para el personal de enfermería de la unidad según la NAS. El estudio fue descriptivo, cuantitativo y observacional transversal. Desarrollado en la UCI (10 camas) de un hospital de oncología de Río de Janeiro, entre diciembre de 2019 y enero de 2020, en un total de 20 días, generando 181 evaluaciones NAS en 32 pacientes. Los resultados fueron: predominio del sexo masculino (56%), la edad promedio fue de 60 años y la estadía promedio fue de 14.06 días. El porcentaje promedio de NAS observado fue de 64,41%, correspondiente a 16,41 horas de atención de enfermería en 24 horas, con una recomendación de al menos 05 profesionales de enfermería por turno. Se puede observar que la aplicación del NAS ajustado a las recomendaciones del Consejo Federal de Enfermería contribuye al adecuado dimensionamiento de los profesionales de enfermería, apuntando a una atención segura y de calidad.

**Descriptores:** Carga de Trabajo; Terapia Intensiva; Cuidados de Enfermería; Administración de Personal; Cuidados Críticos.**Resumo**

Objetivou-se avaliar a carga horária de enfermagem dedicada à assistência aos pacientes por meio da aplicação do NAS em uma UTI oncológica de adultos; descrever o perfil demográfico dos pacientes internados na unidade; mensurar a carga de trabalho/percentual de tempo da enfermagem por meio da aplicação do instrumento NAS; demonstrar o dimensionamento recomendado para a equipe de enfermagem da unidade segundo o NAS. O estudo foi observacional descritivo, quantitativo e transversal. Desenvolvido na UTI (10 leitos) de um hospital oncológico no Rio de Janeiro, entre os meses de dezembro de 2019 e janeiro de 2020, num total de 20 dias, gerando 181 avaliações do NAS em 32 pacientes. Obtivemos como resultados: a predominância de pacientes do sexo masculino (56%), a média de idade foi de 60 anos e tempo de internação médio foi de 14,06 dias. O percentual do NAS médio observado foi de 64,41%, correspondendo a 16,41 horas de assistência de enfermagem nas 24 horas, com recomendação de no mínimo 05 profissionais de enfermagem por turno. Pode-se perceber que a aplicação do NAS ajustado às recomendações do Conselho Federal de Enfermagem contribui para o dimensionamento adequado dos profissionais de enfermagem, objetivando uma assistência segura e de qualidade.

**Descriptores:** Carga de Trabalho; Oncologia; Cuidados de Enfermagem; Terapia Intensiva; Gestão de Recursos Humanos em Saúde.

## Introduction

The theme of this research is the applicability of the Nursing Activities Score (NAS) in an adult oncology Intensive Care Unit (ICU) and its object of study was the nursing workload.

The cancer patient is a complex patient, which must be considered in its multiple biopsychosocial and spiritual aspects. The evolution of most cancers encompasses several stages of treatment which take place over many years. The three main treatment modalities for cancer are: chemotherapy, radiotherapy and surgery<sup>1,2</sup>.

The increased survival of critically ill patients with cancer is related to early diagnosis and advances in cancer treatment, surgeries, chemotherapy, and radiotherapy, which are increasingly effective and aggressive. Thus, the number of cancer patients in ICUs has increased, as these sectors are characterized by being dedicated to critical patient care, which requires intensive and continuous care<sup>1-3</sup>.

Intensive care requires specificities that directly reflect on the nursing workload; therefore, strategies are needed to identify the real workload of the nursing team so that the correct dimensioning of the team can be carried out, seeking the quality of care and the patient safety<sup>2,4</sup>.

In the literature, there are several instruments aimed at measuring the nursing workload, among them, the NAS stands out<sup>5,6</sup>.

The NAS has stood out as a tool that enables the direct measurement of the nursing workload. It is the most complete and validated instrument in Brazil, so far, to measure the nursing workload in the ICU, as it covers 80.8% of nursing activities, accounting for the time spent on direct therapeutic procedures and interventions for the patient and on indirect activities, such as administrative tasks and support for the patients' families<sup>7,8</sup>.

The NAS is an instrument that has 7 major categories and 23 items that cover basic activities, ventilatory support, cardiovascular, renal, neurological, metabolic, and specific interventions. Each item is assigned a score; therefore, a patient's score results from the sum of the scores for the items that correspond to the needs of direct and indirect assistance to patients. This score represents how much time was required from a nursing professional by the patient in the last 24 hours<sup>2,6</sup>.

After searching the literature, we showed that studies with specific tools for oncology are still scarce and that the use of the NAS to assess the nursing workload can contribute to the management of care<sup>4,9</sup>.

In this context, the following research question was defined: What is the nursing workload dedicated to patient care, through the application of the NAS in an adult oncology ICU?

The objectives of this study were to assess the nursing workload dedicated to patient care through the application of the NAS in an adult oncology ICU; describe the demographic profile of patients admitted to the unit; measure the workload/percentage of nursing time through the application of the NAS instrument; demonstrate the

recommended sizing for the unit's nursing staff, according to the NAS.

## Methodology

This study had a descriptive and quantitative observational approach and a cross-segment period.

It was developed in the ICU of an oncology hospital located in the city of Rio de Janeiro. This ICU has a total of 10 beds for clinical patients as a priority. The sector already applies the NAS daily through a spreadsheet in the Microsoft Office Excel program and, later, they are allocated in Epimed<sup>®10</sup>.

Epimed<sup>®</sup> is a hospital management software whose main concern is patient safety, with improved quality of care, prevention of adverse events and hospital infections. Epimed Solutions specializes in clinical and epidemiological information management solutions that improve the efficiency of hospital care and patient safety.

The permanent nursing team that is directly in care is composed of: 03 nurses and 05 technicians in the day shift (SD) and 02 nurses and 05 technicians in the night shift (SN).

Data collection took place between December 2019 and January 2020, in a total of 20 days, through the application of the NAS instrument. This collection was through non-participant observation of patient care, records of nursing professionals in the patient's medical record and analysis of information during the shift change.

After collection, the data were compiled into a computerized database in the Microsoft Office Excel 2007 software. Descriptive statistics were used for the total NAS score, considering the minimum and maximum variation; mean and median and the measure of dispersion Standard Deviation (SD). And the calculation of the nursing workload was done by multiplying each NAS point by 14.4 minutes as described in the literature<sup>11</sup>.

To determine the ideal dimensioning of the nursing professional staff according to the NAS, the calculation reported in the literature<sup>8</sup> was performed using the average number of professionals estimated by the NAS and adapting this number to the recommendations of COFEN Resolution No. 543/2017<sup>12</sup>, with addition of the Technical Safety Index-IST (refers to a 15% increase in the number of nursing staff to cover all types of absences), thus defining the proportion of nurses and nursing technicians ideal.

The mathematical formula is described below.

$$PE = [E. (u \text{ NAS}/100)] + 15\%$$

Wherein:

- PE = number of nursing professionals needed.
- E = number of nursing teams.
- u NAS = NAS point average.

Hospitalizations with a period longer than 24 hours were used as inclusion criteria, so that data referring to the previous 24 hours could be collected.

The financial resources allocated to the research were the sole responsibility of the researcher.

Ethical Aspects: The research complied with the norms of Resolution nº 466/2012<sup>13</sup>, of the National Commission for Ethics and Research (CONEP), which guides



research involving human beings and the ethical principles of autonomy, beneficence, non-maleficence and justice were respected.

After the sector head was released, this study was sent to the Research Ethics Committee of the José Alencar Gomes da Silva National Cancer Institute (INCA), following institutional and research recommendations, and approved under opinion number 3.773. 727.

**Results**

From the final sample consisting of 32 patients, 181 NAS assessments were obtained resulting from daily data collection.

Regarding the demographic characteristics of the studied patients, 14 were female (44%) and 18 were male (56%) and the mean age was 60 years, with a minimum age of 24 years and a maximum age of 85 years. The length of stay observed varied between 3 and 42 days and had a mean of 14.06 (± 10.15).

As for the reason for admission, the most prevalent was postoperative, with 11 cases (34.4%), followed by respiratory failure with seven cases (22%), acute renal failure four (12.5%), febrile neutropenia three (9.4%) and sepsis two cases (6.2%). It is important to report that other causes were also observed (septic shock, lowered level of consciousness, thrombocytopenia, and anemia), but all associated with some other reason mentioned above as the primary cause of hospitalization. Other reasons for hospitalization were also

found, suspicion of Pulmonary Thromboembolism (PTE) and meningitis, transfusion reaction, intestinal obstruction, and lytic lesions, with one case each (3.10% each).

Regarding origin, it was observed that 15 (46.85%) of the patients came from clinical units, followed by 11 (34.40%) surgical units, eight from the Surgical Center (SC) and three from the Post Unit. -Operative (UPO), four (12.5%) from the emergency room and two (6.25%) from other places (home and another hospital - one each).

Regarding comorbidities, 19 of the patients (59%) had one or more comorbidities. The main ones are systemic arterial hypertension (SAH) and diabetes mellitus (DM), present in 15 (79%) and eight (42%) of the patients, respectively. Other comorbidities were also found, in lower proportions, such as: atrial fibrillation (AF), dyslipidemia, chronic renal failure (CRF), previous acute myocardial infarction (AMI), Alzheimer, asthma, liver cirrhosis and acquired immunodeficiency syndrome (AIDS) or Acquired Immunodeficiency Syndrome (AIDS). It is noteworthy that only 13 (41%) of the 32 patients observed did not have any comorbidity. Among the 19 who had comorbidities, seven (36.84%) had only one isolated comorbidity and 12 (63.15%) had associated comorbidities.

About measuring the workload/percentage of nursing time through the application of the NAS instrument, Table 1 describes the average score of the patients evaluated, for further analysis of the recommended dimensioning.

**Table 1.** Mean NAS score of the evaluated patients. Rio de Janeiro, RJ, Brazil, 2020

No. of Patient	NAS average per patient	Overall average of NAS	Standard Deviation
1	75,49		
2	78,90		
3	75,38		
4	68,06		
5	73,73		
6	72,44		
7	77,45		
8	68,75		
9	73,92		
10	56,40		
11	66,64		
12	78,75		
13	68,76		
14	43,57		
15	76,60		
16	77,05		
17	79,53	68,41	±9,86
18	66,25		
19	66,57		
20	40,55		
21	72,10		
22	71,50		
23	64,60		
24	51,80		
25	62,07		
26	81,00		
27	57,63		
28	67,07		
29	62,30		
30	70,21		
31	68,17		
32	75,95		

Source: Pereira<sup>14</sup>.



Table 1 shows the mean NAS per patient and the overall mean NAS, which in this study was 68.41 points (SD ± 9.86), with a minimum recorded value of 40.55 points and a maximum of 81.00 spots.

Evaluating the workload obtained by the NAS in hours, considering that each point corresponds to 14.4 minutes, (68.41 x 14.4 = 985.10 / 60 = 16.41h) we reach a total of 16.41 hours of nursing in patient care.

Since some patients present variations in their nursing care, it was necessary to record the main activities performed during the study period, which can be seen in Table 2.

Table 2 demonstrates that of the 181 measurements performed, all items referring to basic activities were scored in 100% of the evaluations, except for the activities that referred to drain care, which scored in 23%.

**Table 2.** Frequency of NAS scores in basic activities obtained by patients. Rio de Janeiro, RJ, Brazil, 2020

Basic activities	Frequency	%
<b>1. MONITORING AND CONTROLS</b>		
1a. Hourly vital signs, calculation and recording of water balance (4,5).	8	4%
1b. Bedside presence and observation or continuous activity for 2 hours or more on any shift for reasons of safety, severity, or therapy, such as: non-invasive mechanical ventilation, weaning, agitation, mental confusion, prone position, organ donation procedures, preparation and administration of fluids or medication, assistance, and specific procedures (12,1).	164	91%
1c. Presence at the bedside and observation or continuous activity for 4 hours or more on any shift for reasons of safety, severity, or therapy, such as the examples above (19,6).	9	5%
<b>2. LABORATORY INVESTIGATIONS:</b> biochemical and microbiological (4,3).	181	100%
<b>3. MEDICATION,</b> except vasoactive drugs (5,6).	181	100%
<b>4. HYGIENE PROCEDURES</b>		
4a. Hygiene procedures such as: wound dressing and intravascular catheters, change of bedding, patient body hygiene in special situations (incontinence, vomiting, burns, secretion wounds, complex surgical dressings with irrigation), special procedures (e.g., insulation), etc. (4.1).	145	80%
4b. Performing hygiene procedures that last more than 2 hours, in any shift (16.5).	34	19%
4c. Performing hygiene procedures that last more than 4 hours in any shift (20.0).	2	1%
<b>5. DRAINS' CARE</b> - All (except gastric tube) (1,8).	43	24%
<b>6. MOBILIZATION AND POSITIONING</b> including procedures such as: change of position, patient mobilization; transfer from bed to chair; mobilization of the patient in a team (eg immobile patient, traction, prone position).		
6a. Performing the procedure(s) up to 3 times in 24 hours (5.5).	13	7%
6b. Performing the procedure(s) more than 3 times in 24 hours or with 2 nurses at any frequency (12.4).	168	93%
6c. Carrying out the procedure(s) with 3 or more nurses at any frequency. (17,0).	-	-
<b>7. SUPPORT AND CARE FOR FAMILY AND PATIENTS</b> including procedures such as phone calls, interviews, counseling. Often, support and care, whether to family members or patients, allow the team to continue with other nursing activities (e.g., communication with the patient during hygiene procedures, communication with family members while present at the bedside observing the patient).		
7a Support and care for family members and patients who require exclusive dedication for about an hour on a shift, such as: explaining clinical conditions, dealing with pain and anguish, dealing with difficult family circumstances (4.0).	181	100%
7b. Support and care for family members and patients who require exclusive dedication for 3 hours or more on a shift, such as: death, laborious circumstances (e.g., large number of family members, language problems, hostile family members) (32.0).	-	-
<b>8. ADMINISTRATIVE AND MANAGEMENT TASKS</b>		
8a. Performing routine tasks such as: processing clinical data, requesting tests, exchanging professional information (e.g., shift change, clinical visits) (4,2)	165	91%
8b. Carrying out administrative and managerial tasks that require full dedication for about 2 hours in any shift, such as: research activities, application of protocols, admission, and discharge procedures (23,2).	16	9%
8c. Carrying out administrative and managerial tasks that require full dedication for about 4 hours or more on a shift, such as: death and organ donation procedures, coordination with other disciplines (30.0).	-	-

Source: Pereira<sup>14</sup>.



Table 3. Frequência da pontuação do NAS, nas atividades de suporte, obtida pelos pacientes. Rio de Janeiro, RJ, Brazil, 2020

Support activities	Frequency	%
<b>VENTILATORY SUPPORT</b>		
9. Respiratory support: Any form of mechanical ventilation/assisted ventilation with or without positive end-expiratory pressure, with or without muscle relaxants; spontaneous breathing with or without positive end expiratory pressure (eg, CPAP or BiPAP), with or without an endotracheal tube; supplemental oxygen by any method (1,4).	149	82%
10. Beware of artificial airways. Endotracheal tube or tracheostomy tube. (1.8).	120	66%
11. Treatment to improve lung function. Chest physiotherapy, stimulated spirometry, inhalation therapy, endotracheal aspiration (4,4).	121	67%
<b>CARDIOVASCULAR SUPPORT</b>		
12. Vasoactive medication independent of type and dose (1,2).	87	48%
13. Intravenous replacement of large fluid losses. Fluid administration >31/m /day, regardless of the type of fluid administered (2.5).	1	1%
14. Monitoring of the left atrium. Pulmonary artery catheter with or without cardiac output measurement (1,7).	-	-
15. Cardiorespiratory resuscitation in the last 24 hours (excluding precordial thump) (7,1).	-	-
<b>RENAL SUPPORT</b>		
16. Hemofiltration techniques. Dialytic techniques (7,7).	53	29%
17. Quantitative measurement of urinary output (eg, indwelling urinary catheter) (7.0).	168	93%
<b>NEUROLOGICAL SUPPORT</b>		
18. Intracranial pressure measurement (1,6).	-	-
<b>METABOLIC SUPPORT</b>		
19. Treatment of complicated metabolic acidosis/alkalosis. (1,3).	95	52%
20. Intravenous hyperalimentation (2.8).	24	13%
21. Enteral feeding. Through a gastric tube or other gastrointestinal route (eg, jejunostomy) (1,3).	90	50%
<b>SPECIFIC INTERVENTIONS</b>		
22. Specific interventions in the intensive care unit. Endotracheal intubation, pacemaker insertion, cardioversion, endoscopy, emergency surgery within the last 24 hours, gastric lavage. Routine interventions without direct consequences for the patient's clinical conditions, such as: X-ray, ultrasound, electrocardiogram, dressings or insertion of venous or arterial catheters are not included (2,8).	59	33%
23. Specific interventions outside the intensive care unit. Diagnostic or surgical procedures (1,9).	6	3%

Source: Pereira<sup>14</sup>.

Table 3 shows that of the 181 measurements performed, the highest percentages obtained in support activities referred to: Renal Support n 168 (93%), Ventilatory support n 82 (82%) and Metabolic support n 95 (52%). Specific interventions within the ICU scored in 59 (33%) patients, these referred to the insertion of a urinary catheter, nasogastric or nasoenteric catheter, endotracheal intubation, and assistance in the installation of central or arterial venous catheters. Of the cardiovascular support activities, related to the use of vasoactive medications was present in 87 (48%) of the patients.

### Discussion

Among the demographic characteristics, males were predominant n=18 (56%), which is in line with the literature, which indicates the predominance of men hospitalized in Intensive Care Units<sup>1,9,15,16</sup>. This data may result from their low adherence to primary care services, with the demand for the health service occurring when the disease is already aggravated, thus requiring more aggressive treatments<sup>15,17</sup>.

Due to the demographic transition process, with the aging of the population and increased life expectancy, there is an increase in elderly admissions to ICUs<sup>3,16,18</sup> since the incidence of chronic degenerative diseases increases with

age<sup>1,15</sup>, which corroborates the findings of this study, which shows that 19 (59%) of the patients were 60 years or older.

Regarding comorbidities, our results showed that 19 (59%) of the patients had one or more comorbidities, with SAH being present in a greater number with 15 (79%), followed by DM with eight (42%). Other studies also demonstrate that most elderly patients have comorbidities, with SAH and DM being the most prevalent<sup>16,18</sup>.

Regarding the length of stay in intensive care, investigations show that most patients remain in the hospital for 7 days or less<sup>1,3,15</sup>. The average found in this study was 14 days, which is considered high according to the literature, which defines hospitalizations between 7-14 days as long stay, considering the profile of the unit and patients<sup>19</sup>. Research data indicate that the Surgical Center (SC) is the sector from which the largest number of patients come to intensive care units. The hospitalization of patients from SC in the postoperative period in ICUs is justified by the need for stricter control and monitoring of these patients, given their instability, especially in major surgeries<sup>1,15,16</sup>.

The references diverge from the data found in this study, which brought the operating room in second place with 11 (34.4%) admissions, with the inpatient units in first place in terms of the origin of these patients with 15 (46.85%) occurrences. This can be justified because the



Hospital where the research was carried out had an exclusive ICU for surgical patients.

As for the average NAS score found in this research, 68.41%, this is considered high, since NAS results greater than 50% show a high nursing workload and portray that the professional can fully care for only one patient per work shift<sup>20,21</sup>.

The mean NAS found is comparable to other studies that show means between 60 and 70% in general ICUs. It is important to point out that most of the studies found were carried out in general ICUs, that is, not specialized in oncology. In any case, the comparison with these ICUs is valid, as research specifically dealing with oncology ICUs is scarce<sup>1,2,18,20,21</sup>.

Study<sup>1</sup> analyzed clinical and surgical patients from an oncology ICU brought an average of 74.2%, a higher value than in the present study. Another paper<sup>2</sup>, which was developed in the same field of study of the current research, brought an average of 79.04%, which is 10.64% higher than the average of the present research. Therefore, we can state that even if patients are equally classified as intensive care patients, according to COFEN Resolution No. 543/2017<sup>12</sup>, these must be evaluated individually and daily, as they may have different support and care demands according to their profile.

The Monitoring and Controls item, which encompasses the verification of vital signs, oxygen saturation, water balance recording, surveillance due to agitation, mental confusion, mechanical ventilation, sedation, and invasive devices, scored in 181 (100%) of the assessments, where 164 (91%) of the score was related to item 1b, corroborating other findings in the literature<sup>1,2</sup>.

A relevant study<sup>4</sup> adapted the NAS content to measure the workload of cancer patients. It included some activities specific to cancer patients, such as administration of antineoplastic agents, management of extravasation, care for cancer skin lesions and guidance on diagnosis, treatment, and course of the disease. Thus, in our research, in the monitoring and controls score 1b, patients who were using antineoplastics and patients who had frequent changes in body temperature were included, as it is understood that these needed more frequent control, such as recommended in the cited study.

Regarding laboratory investigations, the item scored in 181 evaluations (100%), showing that all ICU patients, whether general or specialized, are routinely subjected to collection of laboratory tests in order to control and monitor changes in the clinical condition of the patient. However, studies<sup>22</sup> show that laboratory tests influence about 60% to 70% of medical procedures and the daily request for laboratory tests can generate unnecessary tests and procedures, as well as increased costs.

The item medication also appeared in 181 (100%) of the evaluations, which was expected, since all patients admitted to the ICU need some type of medication support, confirming data from previous studies<sup>1,2</sup>.

As for the item Hygiene procedures, 145 (80%) of the patients were scored in item 4a, item related to normal hygiene procedures, such as changing vascular access

dressings, changing wound dressings, changing clothes for bed, inside others. As for mobilization and positioning, 168 (93%) of the scores were related to item 6b, as 02 nursing professionals were used in its performance, demonstrating the degree of dependence of patients, which suggests an increase in care time<sup>2</sup>.

In the item Administrative and management tasks, we obtained a score of 165 (91%) in sub-item 8a, showing that the nursing workload goes beyond direct patient care, it has activities such as admission procedures, discharge, application of protocols, transfer on duty, transfer between units, multiprofessional discussions, referrals to specific exams, among others<sup>1,2,4</sup>.

Regarding ventilatory support, renal support and metabolic support items, our data compares with research already carried out in oncological ICUs<sup>1,2</sup>.

We obtained 149 (82%) records in item 9, which demonstrates that most patients needed some ventilatory support, whether invasive or not, which was expected, as part of the admissions had respiratory failure as a reason for hospitalization.

In item 17, there were 168 (93%) records, which were related to measures of quantification of urinary output, a routine activity in critically ill patients, as they need a strict control of the fluid balance, considering the risk of progression to acute renal failure (ARI), a common complication in cancer patients. Surveillance of urinary output can increase the sensitivity of early detection of ARF in these patients.

We scored 90 (50%) on item 21, related to enteral feeding through a nasogastric or orogastric, nasoenteric or oroenteric catheter. Enteral feeding, according to the literature<sup>23</sup>, is recommended if oral nutrition remains inadequate (no food for more than a week, or less than 60% of the need for more than 2 weeks, despite nutritional interventions (counseling and oral nutritional supplements).

Also, within metabolic support, item 19, which refers to the treatment of metabolic acidosis or alkalosis, scored 95 (52%) of the assessments, reflecting their severity and demonstrating that critically ill patients have several metabolic changes<sup>2</sup>.

The item specific interventions within the ICU appeared in 59 (33%) of the scores, which were pertinent to endotracheal intubation, assistance in the installation of central venous catheters, insertion of vesical catheters, nasogastric or orogastric, nasoenteric or oroenteric catheters, common procedures in therapy intensive.

Cardiovascular support, related to the use of vasoactive medications, was not one of the most scored, appearing in 87 (48%) of the patients evaluated, which may have been a characteristic of the sample in the period of data collection.

Comparing the most scored items and sub-items in this research with the results presented in studies carried out in oncology intensive care units, we found that the procedures with the highest scores in our study are in line with the others already performed<sup>1,2</sup>.

To determine the nursing workload, in hours, we performed the calculation described in the literature<sup>11</sup> which



states that each NAS point is equivalent to 14.4 minutes, thus obtaining a total of 16.41 hours of nursing care for the patient. This time is close to the hours of nursing care recommended by COFEN Resolution No. 543/2017<sup>12</sup>, which means that patients classified as dependent on intensive care require 18 hours of nursing care. Another Resolution that addresses the issue of staff sizing is RDC No. 26/2012<sup>24</sup> says that it is necessary at least 01 clinical nurse for every 10 (ten) beds or fraction, in each shift and at least 01 nursing technician for each 02 beds in each shift, meeting, before this Resolution, the staff of effective professionals in the sector carrying out the appropriate study.

The NAS is considered one of the most complete tools for quantitative and qualitative assessment of the professional staff, validated in Brazil, being an instrument that measures the workload of nursing, covering 80.8% of nursing activities<sup>6,7</sup>.

That said, to establish the ideal dimensioning of the nursing professional staff according to the NAS, the calculation described in the literature was performed, which uses the average number of workers estimated by the NAS and adjusts this number to the recommendations of COFEN Resolution No. 543/2017<sup>12</sup>, with the addition of the Technical Safety Index-IST.

Performing this calculation with the data obtained in this study, we have:

$$PE = [6. (384,42 / 100)] + 15\%$$

$$PE = (6. 3,84) + 15\%$$

$$PE = 23,04 + 15\%$$

$$PE = 26,54$$

Thus, a total of 26.54 is needed, adjusted for 27 nursing professionals to make up the total staff of the sector, with 5 professionals per team. Considering the minimum proportion of 52% of nurses over the total number of nursing workers established by Resolution No. 543/2017<sup>12</sup>, the sector should have at least 14 nurses, distributed in 6 teams, which would give a minimum of 2.3 nurses per team.

The calculation shows that the dimensioning in the sector is adequate to the minimum number of nursing professionals needed, as it has 03 nurses during the Day Service (SD) and 02 nurses during the Night Service (SN) and 05 nursing technicians in the SD and we do not. Appropriate sizing of professionals is a contributing factor to patient safety and quality of care, in addition to being beneficial to the physical and mental health of professionals<sup>25,26</sup>.

The quantitative and qualitative adequacy of the nursing professional staff is not the reality of all hospitals.

Studies claim that nursing constantly works with undersized teams, thus being exposed to a high workload, being a risk factor for patient safety, as the inadequacy of the professional staff is a factor that compromises the quality of care<sup>25,26</sup>.

Researchers suggest that the proper dimensioning of nurses, with ideal proportionality between patient and professional, helps to reduce the incidence of adverse events, which result in better indicators of quality of care, management, and patient safety<sup>26-28</sup>.

It is important to emphasize that this is the minimum adequate number of professionals estimated by the average of the NAS in this study, appropriate to COFEN Resolution No. 543/2017<sup>12</sup> and that the instrument must be applied daily to assess the demands of each patient and be able to perform an adequate dimensioning, subsidizing safer and more quality care practices.

## Conclusion

From this research, it was possible to identify the demographic profile of patients hospitalized in an oncology intensive care unit, measure the percentage of nursing time through the application of the NAS instrument and present the recommended dimension for the nursing team of the nursing unit. according to the NAS and Resolution No. 543/2017<sup>12</sup>.

Were found some incomplete nursing records in the data collection, which could make it impossible to correctly fill out our research instruments, however the presence of the researcher during the shift change was essential to resolve doubts and seek complete information with the team for reliability to the data.

Cancer patients demand specific care, such as psychological support in coping with the disease, administration of anticancer drugs, social assistance, monitoring by a nutritionist with an adequate diet to reduce adverse reactions, among others. Comprehensive care is needed, with a properly sized team so that these demands, which are essential for the development of treatment and the new adaptation to the disease, are met<sup>4</sup>.

It is notorious that the NAS has been shown to be applicable to Oncology ICUs for an adequate dimensioning of nursing professionals that, added to the technical-scientific knowledge, skills and competences of professionals are essential for the improvement of care and patient safety.

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