Nursing Activities Score and its relation to diagnosis and nursing care among critical adults

Nursing Activities Score e sua relação com diagnósticos e cuidados de enfermagem entre adultos críticos

Nursing Activities Score y su relación con el diagnóstico y cuidados de enfermería en adultos críticos

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RESUMO

Objetivo: avaliar a relação entre Nursing Activities Score, diagnósticos e cuidados de enfermagem. **Método**: coorte retrospectiva em hospital público. Participantes com idade ≥ 14 anos, do Centro de Terapia Intensiva que obtiveram Nursing Activities Score no primeiro dia de internação. A análise ocorreu nos softwares R e SPSS. Certificado de Apresentação de Apreciação Ética: 16288619.0.0000.5327. **Resultados**: 3.284 pacientes com 59,6 (P25: 45,4; P75: 69,2) anos; sexo masculino (55%). A relação entre o escore e o número de diagnósticos de enfermagem (r = 0,043), o número de cuidados de enfermagem (r = 0,225) e entre o número de diagnósticos e de cuidados (r = -0,170) demonstraram força de relação muito fraca, sendo a última, inclusive, inversa. Todos os valores-p foram < 0,05. **Conclusão:** a relação do escore com os diagnósticos e cuidados de enfermagem foi muito fraca e a relação dos diagnósticos com os cuidados de enfermagem foi inversa.

Descritores: Carga de trabalho; Diagnóstico de enfermagem; Cuidados de enfermagem; Unidades de terapia intensiva; Cuidados críticos.

ABSTRACT

Objective: to evaluate the relationship between Nursing Activities Score, diagnosis and nursing care. **Method:** retrospective cohort in a public hospital. Participants aged ≥ 14 years, from the Intensise Care Unit who obtained a Nursing Activities Score on the first day of hospitalization. The analysis took place using R and SPSS software. Certificate of Presentation of Ethical Appreciation: 16288619.0.0000.5327. **Results:** 3,284 patients aged 59.6 (P25:45.4; P75 69.2) years; male (55%). The relationship between the score and the number of nursing diagnoses (r=0.043), the number of nursing care (r=0.225) and between the number of diagnoses and care (r=-0.170) demonstrated very weak relationship strength, the last one being even inverse. Alll p-values were <0.05. **Conclusion**: the relationship between the score and nursing diagnoses and care was vey weak and the relationship between diagnoses and nursing care was inverse.

Descriptors: Workload; Nursing diagnosis; Nursing care; Intensive care unit; Critical care.

RESUMEN

Objetivo: evaluar la relación entre el Nursing Activities Score, los diagnósticos y los cuidados de enfermería. **Método:** cohorte retrospectiva en un hospital público. Participantes con edad ≥ 14 añoes, del Centro de Cuidados Intensivos que obtuvieron un Nursing Activities Score el primer día de internación. El análisis se realizo mediante el software R y SPSS. Certificado de Presentación de Apreciación Ética: 16288619.0.0000.5327. **Resultados:** 3.284 pacientes con edades de 59,6 (P25:45,4; P75:69,2) años; masculino (55%). La relación entre el puntaje y el número de diagnósticos enfermería (r=0,043), el número de cuidados de enfermería (r=0,225) y entre el número de diagnósticos y cuidados (r=-0,170) demostraron una fuerza de relación muy débil, esta última siendo incluso inverso. Todos los valores de p fueron <0,05. Conclusión: la relación entre el puntaje y los diagnósticos y cuidados de enfermería fue uy débil y la relación entre los diagnósticos y los cuidados de enfermería fue inversa.

Descriptores: Carga de trabajo; Diagnóstico de enfermería; Atención de enfermería; Unidades de cuidados intensivos; Cuidados críticos..

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Introduction

The Intensive Care Unit (ICU) is a hospital area that receives critically ill patients, who need highly complex care and constant attention from professionals[1]. To meet the needs of these patients, a set of qualified professionals and a multidisciplinary team is needed. Nursing, composed of nurses, nursing technicians and auxiliaries, is part of this team, where these professionals provide most of the care at the bedside[2].

The services provided by the nursing team are guided by the Nursing Process (NP). It is a set of systematized actions that enable the conduction of clinical reasoning and consists of 5 (five) stages: data collection, nursing diagnosis (ND), nursing care (CE), implementation of care and evaluation of implemented care[3]. The implementation of the NP increases the autonomy of nurses, improves nursing care, provides a holistic and individualized view of the client, corroborates the safety of the client and the professional, in addition to enabling evidence-based care; However, to obtain its benefits, it is necessary to apply correctly and have technical-scientific knowledge[4].

In 2009, the Federal Council of Nursing (COFEN), through Resolution No. 358/2009, provided for the need to implement NP in environments where professional nursing care occurs. To assist in the application of the EP, different instruments have been produced. The North American Nursing Diagnosis Association-International (NANDA-I) standardizes the definitions and language used in the definition of nursing diagnoses (ND); The Nursing Outcomes Classification (NOC) refers to standardization in order to evaluate the results of nursing interventions, and the Nursing Interventions Classification (NIC) deals with the standardization of nursing interventions. These three instruments together are known as NNN and are used to perform the NP[5].

The implementation of NP in the Intensive Care Unit (ICU) can be a challenge. The lack of knowledge about the framework, little or absence of institutional support for the adoption of the NP systematization, and work overload may be the greatest impediments6. In the intensive care setting, it is common for patients to present several clinical diagnoses, which are dependent on hard technologies and exposed to a large number of interventions, demanding a lot of care, and, therefore, increasing the workload of nursing professionals[7].

Workload: this is the relationship between the work process and the effects on the worker's body that results in wear and tear[8]. Much is discussed about how much of the total nursing hours each patient demands and, consequently, about the number of professionals needed for care. In order to contribute with information that supports human resource management, some scales have been developed over the years[9].

In 1974, the Therapeutic Intervention Scoring System (TISS) scale was created to classify critically ill patients and estimate the nursing workload. It was adapted in 1983 to form TISS-76 and, in 1996, TISS-28[10-13]. Based on the TISS-28, in 2003, the Nursing Activities Scores (NAS) scale was created, which proposes to measure the nursing workload in the ICU based on the analysis of information on how the last 24 hours of each patient have passed[14].

The NAS evaluates the following categories: (1) monitoring and controls, (2) laboratory investigations, (3) medication, (4) hygiene procedures, (5) drain care, (6) mobilization and positioning, (7) support and care for family members and patients, and (8) administrative and managerial tasks15. Considering the purpose for which the NAS was developed (estimating the nursing workload), it is important to highlight how much it is related to the NP, especially with nursing diagnoses and care. Thus, the objective of the present study is to evaluate the relationship between the NAS and nursing diagnoses and care in critically ill adults.

Method

This is a retrospective cohort study, based on the steps proposed in the guidelines Strengthening the Reporting of Conservation Studies in Epidemiology (STROBE).

The study was carried out in an Intensive Care Unit (ICU) of a tertiary referral hospital in southern Brazil. The data refer to the period from January 2020 to December 2021 and include the first day of ICU admission. At the time of data collection, the ICU had two ICUs that received critical patients, clinical and surgical, except trauma (totaling 28 beds) and also, during the Coronavirus Disease (COVID-19) pandemic, the COVID-19 ICU was opened, with 95 beds.

The study participants were individuals aged >14 years, hospitalized in ICU 1, ICU 2 and COVID ICUs, regardless of clinical history or reason for hospitalization who obtained NAS evaluation for the first day of hospitalization. The study data are from the first day of ICU admission. Readmissions were not selected, as well as patients with a NAS record less than 24 hours after admission to the ICU, and patients without a nursing prescription.

The study data come from a database that already exists at the host institution, which stores care information about patients (electronic medical records). A query was requested, with data collected in the ICUs: ICU 1, ICU 2, and COVIDs. The institution's information management department provided an electronic report in spreadsheet format (Excel), constructed according to the information (variables) requested by the researchers.

All variables came from the electronic medical record, the NAS values, the diagnoses and the nursing care come from specific records made by the nurses in the medical records. NAS registration is performed every 24 hours of stay in the ICU; On the other hand, the records of nursing diagnoses and nursing care are performed according to the nursing process, once a day in the electronic medical records.

- The NAS values were categorized according to the one proposed by Vieira et al.16, as follows:
- - NAS < 50%, light workload, one professional for every 3 patients; - NAS 50.1% to 75%, moderate workload, one professional for every two patients; - NAS 75.1% TO 99.9%, heavy workload, one professional per patient; - NAS > 100%, heavy workload, two professionals per patient.

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The patients were selected through a program in the hospital's patient management system, following the criteria previously listed by the researchers. Data were checked in order to exclude duplicates, identify discrepant information, and complete missing data.

There was no calculation of a priori sample estimate. The study planned to include all records, for the convenience of the researchers, during the stipulated period. Based on the sample consisting of 88.4% of the study population, for an error of 5% and a significance level of 95%, a sampling power of 90% was calculated. Data analysis was performed using the Statistical Package for the SocialSciences (SPSS) version 20.0 and R. Continuous variables were tested for their distribution (normality test) and expressed as mean ± deviation or median (25th percentile – 75th percentile). Categorical variables were expressed as absolute and relative frequencies. The relationships between NAS and nursing diagnoses (ND) and between NAS and nursing care (CE) were tested using Spearman's correlation coefficient, adopting a significance level of 5%.

The present study derives from a matrix project, approved in terms of its methodological and ethical aspects by the Ethics Committee of the institution under the Certificate of Presentation of Ethical Appraisal number: 16288619.0.0000.5327.

Results

A total of 3,716 patients were admitted to the ICU during the study period, of which 3,496 had NAS records on the first day of hospitalization. Of these, 3,284 were part of the study. The reason for non-inclusion was NAS evaluation records of patients with less than 24 hours of ICU admission. In a second moment, the records of patients who were readmitted and/or without a nursing prescription were excluded (Figure 1).
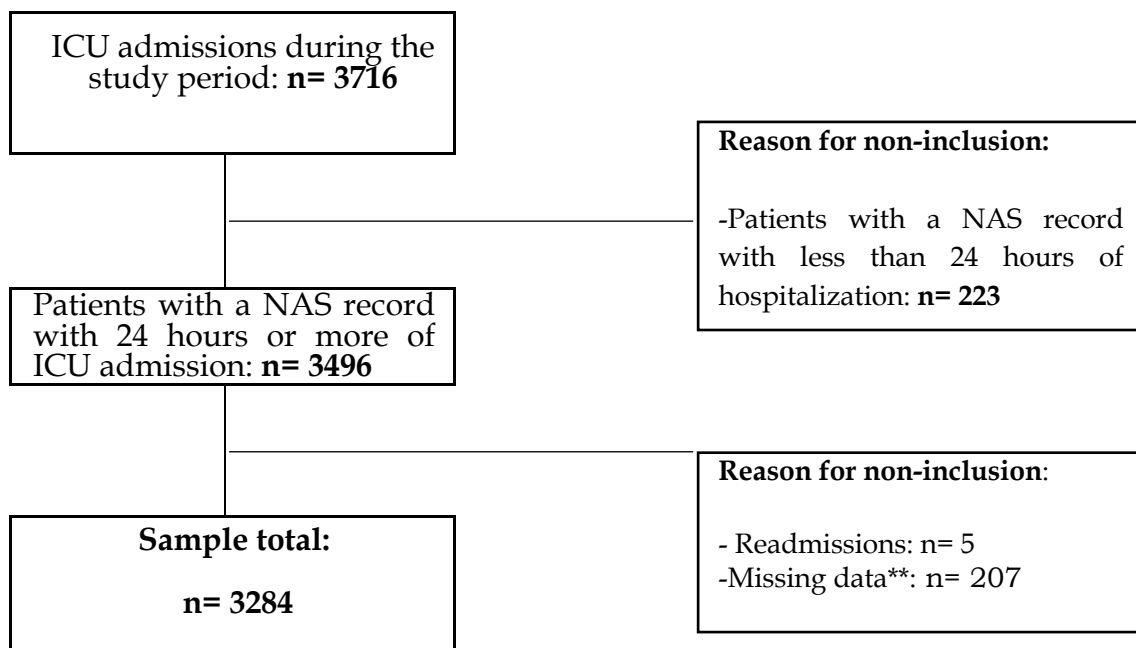

Figure 1 – Flowchart with total admissions to the Intensive Care Unit during the study period, candidates for inclusion and total sample. Porto Alegre, RS, Brasil, 2022. Caption: ICU – Intensive Care Unit. NAS - Nursing Activities Score. 24h – Twenty-four hours.

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The median age of the patients was 59.6 (p25: 45.4 - p75: 69.2) years; the sample was predominantly male (55%), the median ICU stay was 7 (p25: 3; p75: 14) days, and 42.4% of the total patients died. The median NAS value was 93.4% (p25: 78.7 - p75: 102.6); minimum value of 25.3% and maximum of 161.7%. Considering the total number of patients, the most frequent NAS category was heavy care, followed by very heavy care (Figure 2).

Figure 2 – Categories of *Nursing Activities Score*. Porto Alegre, RS, Brazil, 2022
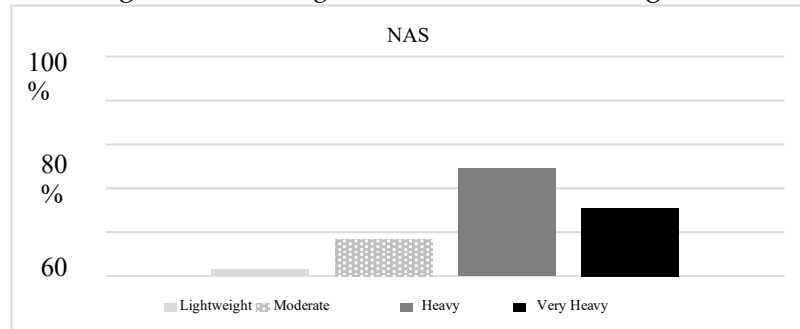
By stratifying the NAS into its items, it was identified that more than 60% of the sample underwent laboratory investigations, used some type of medication, required care with drains and quantitative measurement of urine output, needed ventilatory support, as well as care with artificial airways and treatment of pulmonary function and interventions in the ICU. On the other hand, few patients underwent intravenous replacement, left atrial monitoring, cardiopulmonary resuscitation, dialysis hemofiltration, intracranial pressure monitoring, and intravenous hyperalimentation. Although there is a statistical relationship between the NAS value and the DE number ($r = 0.043$), the NAS value and the EC number ($r = 0.225$) and between the DE and CE number ($r = -0.170$), the strength of the relationship was very weak, or almost zero, and the latter relationship was even inverse. All p-values were <0.05 (Figure 3).

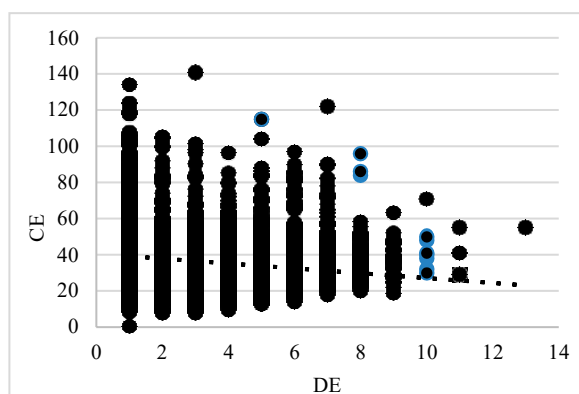3a.   3b.
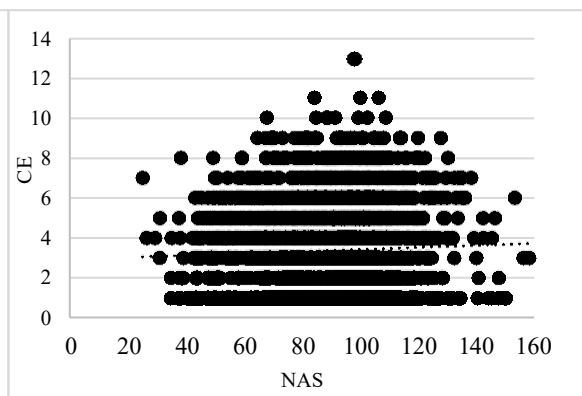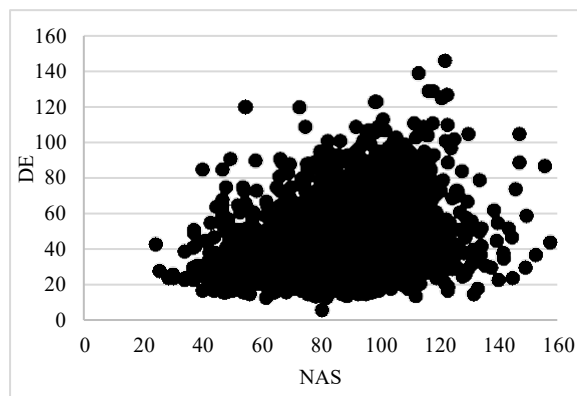
3c.

Figure 3 - Scatter plots of the relationship between (3a) Nursing Activities Score and nursing diagnoses; (3b) Nursing Care and Nursing Activities Score; (3c) Nursing diagnoses and nursing care. Porto Alegre, RS, Brazil, 2022. Legend: NAS- Nursing Activities Score; DE – Nursing diagnosis, CE – Nursing care.

A total of 81 different diagnoses were prescribed, and a maximum of 13 diagnoses were obtained for a single individual, when comparing each of the diagnoses that reached at least 10% frequency in the sample. It was found that for the following NDs, there was a higher percentage of NAS in the very heavy category ($p<0.05$): Self-care deficit syndrome; Impaired spontaneous ventilation; Risk of corneal injury. Risk of pressure injury. Moderate NAS for Self-care deficit: bathing and/or hygiene, and mild NAS for ED: Ineffective breathing pattern (Table 1).

Table 1 - Nursing diagnoses with a frequency greater than or equal to 10% of the sample and their relationship with the categories of the Nursing Activities Score. Porto Alegre, RS, Brazil, 2022.

Diagnostics	Light weight (%)	Moderate (%)	Heavy (%)	Very Heavy (%)	P Value
Risk of infection	48 (46,2)	313 (57,2)	892 (55,3)	553 (54,2)	0,196
Balance syndrome Impaired physiological	59 (56,7)	257 (47,0)	774 (48,0)	500 (49,0)	0,308
Deficit syndrome Self-care	25 (24,0)*	185 (33,8)	591 (36,6)	406 (39,8)	0,004
Spontaneous ventilation Impaired	8 (7,7)*	100 (18,3)*	461 (28,6)	415 (40,7)*	<0,001
Risk of Pressure Injury	14 (13,5)*	117 (21,4)*	428 (26,5)	290 (28,4)*	<0,001
Ineffective breathing pattern	23 (22,1)	515 (21,0)*	311 (19,3)	125 (12,3)	<0,001
Risk of falls	13 (12,5)	85 (15,5)	259 (16,1)**	126 (14,4)**	0,056
Tissue integrity	6 (5,8)**	64 (11,7)	211 (13,1)	146 (14,6)*	0,066
Self-care deficit: bathing and/or hygiene	12 (11,5)	87 (15,9)*	497 (12,2)	83 (8,1)	<0,001
Risk of bleeding	10 (9,6)	67 (12,2)	163 (10,1)	109 (10,71)	0,553
Risk of corneal injury	7 (6,7)	35 (6,4)*	161 (10,0)	142 (13,9)*	<0,001

Legend: * Indicate categories where differences were evidenced, based on the evaluation of adjusted residuals, in variables whose $p<0.05$ value; ** Indicate residuals adjusted ≥ 2.0 in variables whose p-value ≥ 0.05.

A total of 535 different nursing care units were identified in the sample; The maximum number of patients received care was 141. ECs (Table 2) with a frequency higher than 60% were highlighted. When analyzing them, there was a difference ($p<0.05$) in relation to the NAS categories and ECs: Perform oral hygiene by applying 0.12% aqueous chlorhexidine; Perform oral hygiene by applying standard mouthwash; Implement a care protocol for the prevention and treatment of pressure ulcers; Perform urinary meatus hygiene; Dressing the central venous catheter; Change valves - oxygen extender - ambu.

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Table 2 - Nursing care with a frequency greater than or equal to 60% of the sample and its relationship with the categories of the Nursing Activities Score. Porto Alegre, RS, Brazil, 2022.

CE	Light weight (%)	Moderate (%)	Heavy (%)	Very Heavy (%)	P Value
Apply standard disinfectant to equipment and surfaces	96 (92,3)	487 (89,0)**	1434 (88,9)	938 (92,0)**	0,053
Perform bed bath	87 (83,7)	450 (82,3)**	1380 (85,6)	884 (86,7)	0,120
Perform oral hygiene by applying 0.12% aqueous chlorhexidine	69 (66,3)*	417 (76,2)*	1301 (80,7)	898 (88,0)*	<0,001
Perform oral hygiene by applying standard mouthwash	51 (49,0)*	363 (66,4)*	1232 (76,4)	1232 896 (87,8)*	<0,001
Keep Headboard Elevated	79 (76,0)	391 (71,5)**	1205 (74,7)	788 (77,3)**	0,086
Implement care according to the fall care protocol	69 (66,3)	391 (71,5)**	1168 (72,4)	730 (71,6)*	0,598
Implement a care protocol for the prevention and treatment of pressure ulcers Perform urinary meatus hygiene	47 (45,2)	321 (58,7)	1171 (72,6)	768 (75,3)	<0,001
	49 (47,1)*	327 (59,8)*	1078 (66,8)	732 (71,8)*	<0,001
Dressing the central venous catheter	25 (24,0)*	202 (36,9)*	992 (61,5)	801 (78,5)	<0,001
Changing Valves - Oxygen Extender - Ambu	43 (41,3)*	270 (49,4)*	974 (60,4)	726 (71,2)*	<0,001

Legend: * Indicate categories where differences were evidenced, based on the evaluation of adjusted residuals, in variables whose p<0.05 value; ** Indicate residuals adjusted ≥2.0 in variables whose p-value ≥ 0.05.

Discussion

In this study, we identified that there is a relationship between the increase in workload and the number of nursing diagnoses, the increase in workload and the number of nursing care, and an inverse relationship between the number of nursing diagnoses and care; however, these relationships proved to be weak or almost non-existent. When the NAS score was analyzed, the median value of 93.4% was identified (p25: 78.7 - p75: 102.6), and with this, it was found that the workload was concentrated in the heavy category, which suggests the need for one professional per patient.

In the study by Ferreira, et al.[17], carried out in an ICU of a private hospital in the city of Natal/RN, from June to August 2014, they analyzed that the mean NAS score was 69.8% (±24.1), indicating a moderate workload. In comparison, the study by Buffon, et al.[18], conducted in an adult ICU of a public and university hospital in the city of Porto Alegre/RS, from March to June 2020, found that the mean NAS score was 86% (SD±20.3), which demonstrates heavy workload, as in the present study.

The differences in the findings may occur due to differences in the profile of the clientele and institution, the mode of application of the NAS, and the period of the study; the Coronavirus Disease – 2019 (COVID-19) pandemic began in 2020, thus changing the complexity of patients undergoing intensive care due to clinical complications, and consequently increasing the nursing burden[19]. According to Barros, et al.[20], the pandemic scenario had a direct impact on the routine of care practice, where there was an increase in the complexity of care, inadequate dimensioning and incorrect implementation of the nursing process, all of which was related to the overload of health services and an increase in the nursing workload.

Evaluating the relationship between the nursing process and workload is important in the context of intensive care, a high-impact study demonstrated an association between nursing team size and patient outcomes. Diya et al.[21] demonstrated that in-hospital mortality and readmissions are related to adequate levels of nursing staff.

Novelli and Castro et al.[22] recently assessed the workload using the NAS. However, differently from our objective, they compared the score with the care and management activities of the unit. The authors found that a greater workload was concomitant with the implementation of care sites and the expansion of the area. As well as in the period of technological incorporation and in the accreditation of hepatic transplantation.

An integrative review conducted by authors from São Paulo revealed that the execution of the nursing process aims to improve the quality of care, valuing the autonomy of the nursing team (Moreira). This finding corroborates the data of our study, as we showed that there was an association between the increase in

workload and the number of nursing diagnoses, and between the increase in workload and the number of nursing care.

Among the possible limitations of the present study, the fact that the data were from a single center and the data collection covered the period of the pandemic, when the health services were mischaracterized, as well as their workforce and standards of care, may have contributed to the findings.

Conclusion

This study showed that the relationship of the Nursing Activities Score, as an instrument for assessing the workload of nursing professionals, was weakly related to stages of the nursing process (nursing diagnoses and care) during the pandemic period.

Factors related to the disorganization of work processes during this period, such as the emergency hiring of nursing workers inexperienced in the care of critically ill patients, may have contributed to this weak correlation. Studies that evaluate whether the NAS and NP stages are related in scenarios with trained teams and crisis-free environments could better elucidate the theme.

Acknowledgment

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