

THE IMPACT OF COVID-19 ON NURSING WORKLOAD

Impacto da covid-19 na carga de trabalho de enfermagem

Impacto del COVID-19 en la carga de trabajo de enfermeira

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ABSTRACT

Background: the Coronavirus triggered the biggest challenge to the health system in modern times. Presented with this unexpected scenario, new factors influenced the nursing workload. **Objective:** to assess the nursing workload of the critical COVID-19 patient through the Nursing Activities Score (NAS). **Methodology:** observational and retrospective study carried out with critical care patients. Data concerning demographic, clinical and NAS variables was obtained through clinical records. **Results:** the median NAS obtained in the level II patient was 55, with a maximum of 81.7 and a minimum of 41, ranging from 81.7 to 44.1 on the first day. The median NAS obtained in the level III patient was 58, with a maximum of 89.5 and a minimum of 42.8, ranging from 89.5 and 49.6 on the first day. **Conclusion:** it was found the nursing workload was higher in COVID-19 infected patients comparing with previous data regarding non COVID-19 infected patients. Nursing workload was also higher in type III COVID-19 patients.

Keywords: covid-19; critical care nursing; health resources; quality of health care

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RESUMO

Enquadramento: o Coronavírus desencadeou o maior desafio dos últimos tempos para o sistema mundial de saúde. Perante este cenário inesperado, novos fatores influenciaram a carga de trabalho de enfermagem. **Objetivo:** avaliar a carga de trabalho de enfermagem do doente internado com infeção provocada por COVID-19 num Serviço de Medicina Intensiva através do Nursing Activities Score (NAS). **Metodologia:** estudo observacional e retrospectivo, realizado com doentes internados num Serviço de Medicina Intensiva Polivalente. Para a colheita das variáveis demográficas, clínicas e NAS foi efetuada consulta dos registos clínicos. **Resultados:** o NAS mediano obtido no doente de nível II foi de 55 com máximo de 81,7 e mínimo de 41, variando entre 81,7 e 44,1 no primeiro dia. O NAS mediano obtido no doente de nível III foi de 58 com máximo de 89,5 e mínimo de 42,8, variando entre 89,5 e 49,6 no primeiro dia. **Conclusão:** verificou-se que a carga de trabalho de enfermagem foi superior com doentes COVID-19. A carga de trabalho de enfermagem também foi superior nos doentes COVID-19 de nível III.

Palavras chave: covid-19; enfermagem de cuidados críticos; recursos em saúde; qualidade da assistência à saúde

RESUMEN

Marco contextual: el Coronavírus há desencadenado el mayor desafío de los últimos tempos para el sistema de salud mundial. Ante ese escenario inesperado, nuevos factores influyeron la carga de trabajo de enfermería. **Objetivo:** evaluar la carga de trabajo de enfermería del paciente COVID-19 hospitalizado en una unidad de cuidados intensivos (UCI) mediante el Nursing Activities Score (NAS). **Metodología:** estudio observacional y retrospectivo, realizado con pacientes hospitalizados en una UCI. Para la recolección de variables demográficas, clínicas y NAS se consultaron historias clínicas. **Resultados:** la mediana de NAS obtenida en el paciente de nivel II fue 55 con máximo de 81,7 y mínimo de 41, variando de 81,7 a 44,1 al primer día. La mediana de NAS obtenida en el paciente de nivel III fue 58 con máximo de 89,5 y mínimo de 42,8, variando entre 89,5 y 49,6 al primer día. **Conclusión:** se constató que la carga de trabajo de enfermería fue mayor en los pacientes COVID-19. La carga de trabajo de enfermería también fue mayor en los pacientes tipo III con COVID-19.

Palabras clave: covid-19; enfermería de cuidados críticos; recursos en salud; calidad de la atención de salud

INTRODUCTION

The Coronavirus triggered the greatest challenge in recent times for the global healthcare system, with an increased need for various material and professional resources. Portugal, like other countries, had to restructure its material and human resources to meet emerging needs.

Worldwide, various countries tried to ensure healthcare with minimal risk to patients and professionals while maintaining quality and safety. In this unexpected scenario, new factors influenced the nursing workload. These patients required prophylactic measures to prevent and contain the spread of the virus to other patients and professionals, such as complex personal protective equipment, specific decontamination procedures, and dedicated material storage areas. The approach to patients and their families changed, with visits being cancelled, making healthcare professionals the communication link between them. All these measures may have increased the nursing workload, not only due to the time required for their implementation but also for their organization and management. Thus, this research study was developed to assess the nursing workload for COVID-19 patients admitted to an Intensive Care Unit (ICU) in a hospital in the northern region using the Nursing Activities Score (NAS), to evaluate if COVID-19 patients had a higher nursing workload compared to non-COVID-19 patients, and to understand the difference in nursing workload between critically ill level II and level III COVID-19 patients.

BACKGROUND

Santos (2021), using data from Direção Geral da Saúde, states that the new Coronavirus, better known as

COVID-19, responsible for severe acute respiratory syndrome (SARS), first appeared on December 31, 2019, in Wuhan, China, and spread worldwide. In Portugal, the first case was registered on March 2, 2020, leading to the implementation of general contact avoidance measures. Since March 11, the World Health Organization (WHO) classified the disease as a pandemic, and on March 18, 2020, a state of emergency was declared nationwide.

According to Valente et al. (2020), 20% of those infected require hospitalization, with only a quarter of these needing intensive care units.

One of the most valuable resources for planning and evaluating ICUs are indexes that quantify the nursing workload. Simões (2020) concludes with evidence that critically ill individuals present various interrelated factors that imply variability in the nursing workload. Constant monitoring of these factors allows for the reformulation and implementation of appropriate interventions, adapting nursing staffing to the work context and consequently managing human resources. Garcia (2020) states that the increase in nursing care hours provided to patients is directly associated with improved quality of care and a decrease in adverse events such as pressure injuries, medication-related incidents, nosocomial pneumonia, wound infections, complications with medical devices, and postoperative complications.

Given the growing number of COVID-19 patients requiring care in the hospital's ICU, there was a need to implement a contingency plan, which was dynamic throughout the various waves of the pandemic.

During the peak of critical COVID-19 patient demand, the ICU restructured and expanded its capacity, with 43 beds allocated to COVID-19 patients and 6 beds for non-COVID-19 patients.

Ensuring the appropriate allocation of nursing professionals to guarantee patient safety according to their needs is a priority for nursing managers. Therefore, the scientific instrument used to measure the nursing workload in ICU is the Nursing Activities Score (NAS), according to Garcia (2020). Thus, ICU nurses should perform daily monitoring of the nursing workload required by hospitalized patients.

In 2019, a study evaluated the nursing workload using the NAS scale, revealing an average score of 54.25 points, equivalent to an average of 781.2 minutes of nursing care per day (Silva, A. 2023).

According to Lucchini et al. (2020), some reports identify that the nursing workload is dramatically higher in COVID-19 patients. Beyond the severity of the disease, the nursing workload increased due to the need to provide humanistic care in the absence of family. The introduction of mobile device calls helped patients alleviate feelings of isolation and kept families updated on the clinical condition of patients. The same authors managed to quantify an increase in the nursing workload by about 33%.

A study conducted by Bruyneel et al. (2021) in 3 hospitals in Belgium also concluded that ICU patients due to COVID-19 require significantly more nursing care time, needing an average ratio of nearly 1 nurse per patient. Similarly, in Belgium, Reper et al. (2020) found an increase in NAS scale assessments and consequently in the nursing workload for COVID-19 patients, highlighting the need to reinforce nursing teams.

METHODOLOGY

This is an observational and retrospective study involving patients admitted to the ICU of a hospital in

the northern region, from March 18, 2020, to December 31, 2021.

During the study period, three different ICUs were prepared to meet the need for admissions of COVID-19 patients. Based on clinical criteria, it was decided to group patients whose maximum level of ventilatory support consisted of non-invasive ventilation, allocating them to physical spaces initially designated for the treatment of level II critical patients. Meanwhile, patients requiring invasive ventilation and/or other organ support were allocated to spaces for level III critical care. Patients admitted during this period were classified as level II and level III. Furthermore, the results obtained with the NAS instrument were grouped into two categories based on the maximum level of ventilatory support: invasive ventilation and non-invasive ventilation.

For the study period, researchers accessed the database of patients admitted to SMIP stored in the electronic record system, applied inclusion/exclusion criteria, and retrospectively calculated the daily NAS score for patients meeting the inclusion criteria.

The study population consists of 502 patients admitted to the ICU of the hospital with a diagnosis of Pneumonia due to the SARS-CoV-2 coronavirus, from March 18, 2020, to December 31, 2021. This group of patients has a median age of 64 years (IQR 15), with a minimum age of 25 years and a maximum age of 87 years. The population is also divided into 353 (70.3%) male and 149 (29.7%) female patients.

Among these 502 patients, 364 (72.5%) received a maximum respiratory support of non-invasive ventilation (oxygen therapy, high-flow nasal oxygen therapy, bilevel non-invasive ventilation, and Helmet CPAP), while 138 (27.5%) were subjected to invasive ventilation.

The impact of COVID-19 on nursing workload

Regarding the severity of the clinical condition presented by the patients admitted to ICU, the Simplified Acute Physiology Score II (SAPS II) was recorded, with a median of 31 (range 6 - 81) and an IQR of 12, reflecting a 11.7% probability of in-hospital mortality.

The average length of stay in the ICU was 7.6 days, with a median of 4.3 days (range 0.2 - 60) and an IQR of 5.3. The clinical condition of the study population at the time of discharge from the ICU is also an important indicator of the work carried out during the study period. It was found that 66 (13.1%) patients died during the study period; 19 (3.8%) were discharged from the ICU in a stable condition, specifically in cases where comfort care was prioritized, when the clinical condition was expected to deteriorate over time; 19 (3.8%) were discharged from SMIP in a aggravated condition, including those who needed to be transferred to other healthcare units, such as referrals for extracorporeal membrane oxygenation (ECMO); and 398 (79.3%) patients showed improved clinical conditions at the time of discharge from the ICU.

The NAS workload assessment instrument was retrospectively applied to 253 patients (50.4%) of COVID-positive patients admitted to the hospital's ICU during the study period. In this sample, 183 patients (72.3%) received a maximum respiratory support of non-invasive ventilation, while 70 (27.7%) patients were subjected to invasive ventilation.

The sample of patients admitted as level II includes 122 males and 61 females, with a median age of 64 years (range 31 - 87) and an IQR of 19.

The sample of patients admitted as level III includes 54 males and 16 females, with a median age of 63 years (range 39 - 77) and an IQR of 14.

Patients with a length of stay of over 24 hours were included in the sample, and patients with a stay of less than 24 hours and those admitted to the second COVID ICU were excluded. At this second COVID ICU not all nurses were trained on the NAS instrument, leading to a lack of uniformity in the nursing records. Simultaneously, in this specific ICU the electronic record system did not have the latest updates, preventing the recording of NAS scores. Thus, the sample does not reflect the total number of patients requiring intensive care at the hospital.

The NAS workload score was applied to patients included in the sample, with the criteria for application being retrospective monitoring of scores once daily at 00 hours. The score assessment was performed on patients admitted to ICU with an admission time of over 6 hours, ensuring that if there was no record of the score assessment at the time of discharge (transfer/discharge/death), it was conducted at that moment using data from the previous 24 hours.

The collection of demographic variables (sex and age), clinical variables (type of admission, severity indexes), and nursing workload score was performed by consulting patient's clinical records in the Bsimple program and analysed using Microsoft Office Excel 2013.

Regarding ethical considerations, confidentiality and anonymity of the data were ensured. Since this is a retrospective study involving data routinely entered by healthcare professionals into the patient's electronic record, obtaining informed consent was not planned. Data was collected and stored in an encrypted database accessible only to the researchers, pseudo-anonymized using a sequential alphanumeric code. No identifying personal data was included. This information was only kept until the conclusion of the

study. The study was submitted to and approved by the ethics committee of the hospital with registration CES No. 45_2022.

The study did not involve financial costs and ensured no conflicts of interest.

RESULTS

Between January 1, 2020, and December 31, 2021, a total of 1495 patients were admitted to the ICU of the hospital, with COVID-19 accounting for 33.6% of admissions, amounting to 502 of the total hospitalizations. The first admission diagnosed with pneumonia due to the SARS COV-2 coronavirus occurred on March 18, 2020, and from that day until the end of the study period, the ICU continuously treated COVID-19 patients. The number of COVID-19 patients admitted to the ICU at any given time coincided with the pandemic waves.

In the studied sample, the 183 patients admitted as level II were subjected to 703 NAS score evaluations, presenting a median of 55 (792 minutes/day) with an IQR of 10.3 (148 minutes/day), a maximum of 81.7 (1177 minutes/day), and a minimum of 41 (590 minutes/day). It was also possible to evaluate the workload presented on the first day of admission, with a median of 67.4 (971 minutes/day) and IQR of 19 (274 minutes/day), a maximum of 81.7 (1177 minutes/day), and a minimum of 44.1 (635 minutes/day).

The 70 patients admitted as level III were subjected to 1296 NAS score evaluations, with a median of 58 (835 minutes/day) and IQR of 8.5 (122 minutes/day), a maximum of 89.5 (1289 minutes/day), and a minimum of 42.8 (616 minutes/day). For this sample, on the day of admission, the median NAS score was 72.9 (1050 minutes/day) with an IQR of 12.3 (177 minutes/day), a

maximum of 89.5 (1289 minutes/day), and a minimum of 49.6 (714 minutes/day).

DISCUSSION

The increase of critical COVID-19 patients led to an exponential pressure of ICU admissions worldwide. Hospitals were forced to transform, reorganize, and expand their structures to maximize resources, even utilizing spaces not originally designed for level II and/or level III critical patients.

This study aims to understand the nursing workload for COVID-19 patients, whether it was higher than for non-COVID-19 patients, and the difference in nursing workload between level II and level III critical patients. Compared to a previous study that revealed an average NAS score of 54.25 points (Silva, A. 2023), equivalent to an average of 781.2 minutes per day of nursing care, there was an increase in the nursing workload for both level II patients (57.4, corresponding to 827 minutes per day) and level III patients (59.3, corresponding to 854 minutes per day). The nursing workload is higher for level III COVID-19 patients, as theoretically expected.

This increase in the nursing workload can be explained by several factors:

COVID-19 patients in the ICU require mechanical ventilation or non-mechanical ventilation in the prone position (Langer, T. 2021), necessitating more nursing staff for positioning.

The high turnover of level II patients (see the number of patients versus the number of evaluations) combined with the higher workload in the first hours of hospitalization brings the average workload closer to that of the theoretically more complex level III patients.

The limitation of visits during much of the pandemic period is relevant because the NAS score item related to time spent on relational communication skills with patients and/or families did not apply for long periods when level III patients were under deep sedation, and contact with families was made by other team members rather than nurses. In contrast, level II patients required more support and consequently more time due to the emotional context and frequent neurological dysfunction, compared to the pre-pandemic context.

The NAS scale represents 81% of nursing activities regardless of the severity of the pathology. Therefore, there are other factors that may have influenced the nursing workload, which could not be measured and are not reflected in the scale, including the restructuring of the nursing team according to the contingency plan, the mobilization of nurses from other departments without ICU experience and needing tutoring, and the use of specific personal protective equipment with specific handling rules.

Another limitation is the inability to include all COVID-19 patients in the sample due to the lack of standardization and recording of the NAS score in all ICU's.

In summary, this data shows that the nursing workload for COVID-19 patients has increased for both level II and level III patients. It is suggested that factors such as the time to don and doff personal protective equipment, the additional time required to provide care while using it, the need for remote communication between patient and family, and the need to control the increased incidence and severity of agitation and delirium due to the isolated environment should be reviewed as a necessity to increase nursing workload scores.

CONCLUSION

One of the major challenges in managing nursing care in the ICU is the nursing workload. Over time, the ways of assessing the nursing workload have evolved in an attempt to adjust to new realities. This study reinforces the idea that this evolution must consider other factors not measurable by the NAS score.

Despite the challenges related to treating COVID-19 patients in a pandemic context, it was possible to calculate the nursing workload using the NAS score during the study period. It was found that the nursing workload for COVID-19 patients during the pandemic period was higher than the previously calculated workload for non-COVID-19 patients. It was also concluded that the nursing workload was higher for level III critical COVID-19 patients compared to level II critical COVID-19 patients.

Despite the challenge presented by the heterogeneity in the ICU nursing team's experience, this was an enriching period with a very positive evaluation at all levels.

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