

NURSING WORKLOAD: CARE PROFILE IN NEONATHOLOGY

CARGA DE TRABALHO DE ENFERMAGEM: PERFIL DA ASSISTÊNCIA EM NEONATOLOGIA

CARGA DE TRABAJO DE ENFERMERÍA: PERFIL DE LA ATENCIÓN EN NEONATOLOGÍA

Midori Dantas Fogaça¹, Clarita Terra Rodrigues Serafim², Meire Cristina Novelli e Castro³, Natália

Conteçote Russo⁴, Wilza Carla Spiri⁵, Silvana Andrea Molina Lima⁶

ABSTRACT

Objective: to identify the care profile, based on the workload shown by the Nursing Activities Score (NAS), in a Neonatal Intensive Care Unit (NICU). **Method:** this is a descriptive and cross-sectional study, with a quantitative approach, performed in the Neonatal ICU of a teaching hospital. **Results:** the care profile was identified through the frequency of the NAS items whose global mean value found was 56.1%. The most scored NAS items show the predominance of vital signs recording activities, schedules, calculation and regular notes of water balance; administration of non-vasoactive medications regardless of the route, hygiene procedures and support for patients and their relatives who require exclusive dedication, for about an hour, on a shift. Differences were found in the workload among the days of the week, the lowest score being 55.7 on Sunday and the highest 57.8 on Friday. **Conclusion:** the NAS identified the care profile in the neonatal ICU and can help nurses to adjust the sizing of staff, in addition to identifying the greatest demands in the care of their unit.

Descriptors: Nursing; Workload; Neonatal Intensive Care Units; Nursing Care; Nursing Staff; Neonatology.

RESUMO

Objetivo: identificar o perfil assistencial, com base na carga de trabalho evidenciada pelo Nursing Activities Score (NAS), Unidade de Terapia Intensiva Neonatal (UTIN). **Método:** trata-se de um estudo descritivo, transversal, de abordagem quantitativa, realizado na UTI Neonatal de um

hospital escola. **Resultados:** identificou-se o perfil assistencial por meio da frequência dos itens do NAS cujo valor médio global encontrado foi de 56,1%. Os itens do NAS mais pontuados mostram o predomínio de atividades de registro de sinais vitais, horários, cálculo e registro regular do balanço hídrico; administração de medicações não vasoativas independentemente da via, procedimentos de higiene e suporte aos pacientes e familiares que requerem dedicação exclusiva, por cerca de uma hora, em algum plantão. Encontraram-se diferenças na carga de trabalho entre os dias da semana, o menor escore pontuado foi de 55,7 no domingo e o maior de 57,8 na sexta-feira. **Conclusão:** o NAS identificou o perfil assistencial em UTI neonatal e pode auxiliar o enfermeiro na adequação do quantitativo de pessoal, além de identificar as maiores demandas no cuidado da sua unidade.

Descritores: Enfermería; Carga de trabajo; Unidades de Cuidado Intensivo Neonatal; Atención de Enfermería; Personal de Enfermería; Neonatología.

RESUMEN

Objetivo: identificar el perfil de atención, a partir de la carga de trabajo evidenciada por el Nursing Activities Score (NAS), en una Unidad de Cuidados Intensivos Neonatales (UCIN). **Método:** se trata de un estudio descriptivo y transversal, con enfoque cuantitativo, realizado en la UCI Neonatal de un hospital escuela. **Resultados:** el perfil de atención se identificó mediante la frecuencia de los ítems del NAS cuyo valor promedio global encontrado fue del 56,1%. Los ítems del NAS más puntuados muestran el predominio de actividades de registro de signos vitales, horarios, cálculo y re anotación regular del balance hídrico; administración de medicamentos no vasoactivos independentemente de la vía, procedimientos de higiene y apoyo a pacientes y parientes que requieran dedicación exclusiva, durante aproximadamente una hora, en un turno. Se encontraron diferencias en la carga de trabajo entre los días de la semana, donde la puntuación más baja obtenida fue de 55,7 el domingo y la más alta de 57,8 el viernes. **Conclusión:** el NAS identificó el perfil de atención en la UCI neonatal y puede ayudar a los enfermeros a ajustar el número de personal, además de identificar las mayores demandas en la atención de su unidad.

Descriptores: Nursing; Workload; Neonatal Intensive Care Units; Nursing Care; Nursing Staff; Neonatology.

¹⁻⁶ São Paulo State University "Julio de Mesquita Filho" / UNESP. Botucatu (SP), Brazil. ¹  <https://orcid.org/0000-0003-47351134> ²  <https://orcid.org/0000-0002-3736-1665> ³  <https://orcid.org/0000-0002-0590-4127> ⁴  <https://orcid.org/0000-0002-7763-0524> ⁵  <https://orcid.org/0000-0003-0838-6633> ⁶  <https://orcid.org/0000-0001-9945-2928> ² Galileu College. Botucatu (SP), Brazil. ²  <https://orcid.org/0000-0002-3736-1665>

* Article extracted from the End-of-Course Paper << Nursing workload in a Neonatal ICU - the care profile >>. São Paulo State University "Julio de Mesquita Filho" / (UNESP), 2019.

How to cite this article

Midori DF, Serafim CTR, Castro MCN, Russo NC, Spiri WC, Lima SAM. Nursing workload: Care profile in neonathology. Rev enferm UFPE on line. 2021;15(2):e246921 DOI: 10.5205/1981-8963.2021.246921

INTRODUCTION

The Neonatal Intensive Care Unit (NICU) is intended to serve newborns in serious or life-threatening conditions, needing complex care and requiring high-tech equipment and devices, as well as a specialized multiprofessional team.¹

Given the specificity required for the care of newborns, the work of the nursing team that continuously assists patients by providing direct and indirect intensive care should be highlighted, which can often generate work overload for these professionals due to the association between the clinical severity of the newborns and the constant technological evolution.²

Care demand indicators are increasingly necessary as requirements to ensure the quality of care. In this sense, the use of the Nursing Activities Score (NAS), an instrument to assess the workload of the nursing team, allows the assessment of the care profile of the population to which it is applied, since it encompasses 81% of the activities held by the nursing team, which are divided into seven main categories: basic activities, ventilatory support, cardiovascular support, renal support, neurological support, metabolic support and specific interventions, which are explained in 23 sub-items.³

The NAS measures the workload of the nursing team according to the care provided during a period of 24 hours. Each activity is equivalent to a determined score, where the needs of the patients met by the team can be converted into working hours, considering that each NAS point corresponds to 14.4 minutes of care.⁴

The use of NAS is widely promoted in adult ICUs. Although its use has been expanded to other care sites, there are still few studies on its use in NICUs that show the association between nursing team's dedication time and care complexity.⁵⁻⁶

In order to make the systematic calculation of employees, i.e., the nursing staff sizing, it is advantageous to work with an instrument that allows the visualization of the type and frequency of interventions performed on the patient, thus providing precision in the calculation of the nursing workload. In addition, the nurse is responsible for qualitatively and quantitatively equating his/her team, as well as providing access to instruments such as NAS, which allows correlating the care profile to the profile of the available team.⁷

The correct sizing implies the safety and quality of care provided to patients and in the health and the quality of life of nursing professionals.⁶

Accordingly, NAS can be considered as a valuable instrument for patient classification and workload assessment, thus being able to be used by the nursing staff in the NICU setting.⁸

The creation of a computer application to use the NAS showed that its application allows diagnosing the care needs of adult ICU clientele, characterizing them by analyzing the frequency of

care provided described in each item of the instrument. The knowledge about the workload contributes to the nursing team in the managerial, care and research scope. In addition, it optimizes the nurse's time when recording data collection, ensuring more time for direct patient care.⁹

For nurses in critical units, it is important to know the care profile through a nursing workload score to assess the main characteristics of care in this unit, in order to characterize patients individually and/or collectively. Accordingly, this study seeks to answer questions about the care profile of newborns admitted to a NICU, based on the Nursing Activities Score instrument.

OBJECTIVE

To identify the care profile, based on the workload shown by the NAS, in a NICU.

METHOD

This is a descriptive and cross-sectional study, with a quantitative approach, developed in a reference NICU of a Teaching Hospital in the countryside of the state of São Paulo, comprising 17 beds. All newborns admitted in the period from October 2018 to March 2019, who remained hospitalized for at least 24 hours, were included.

Data collection was performed in July 2019 and was based on managerial reports generated by the institution's computerized system. The data identified to characterize the sample were: gender, age in weeks of gestation, birth weight and days of life at admission. NAS is routinely used in the unit, at night, by a nurse on duty, duly trained in the use of the computerized system, which uses the version of NAS for the NICU setting¹⁰, adapted for the institution's computerized system.¹¹

NAS is a nursing workload assessment instrument, divided into 23 items, subdivided into seven categories: basic activities, ventilatory support, cardiovascular support, renal support, neurological support, metabolic support and specific interventions. Items 1, 4, 6, 7 and 8 are mutually exclusionary, and the others may or may not be scored.³⁻⁴

With different scores, according to the therapeutic interventions held, the total NAS score can reach 176.8 points, which corresponds to the percentage of time spent per the nursing team professional with the patient, where each point corresponds to 14.4 minutes.

Thus, a patient with a score of 100 needs 100% of the working time of a nursing professional in 24 hours, i.e., a professional must serve a maximum of two patients with a NAS score less than or equal to 50%.³⁻⁴

Data were transferred to an Excel® database, Windows 2010 version, and the results were submitted to descriptive statistics of relative, absolute and mean frequencies, with stratified analysis of the NAS items

The study was duly approved by the Research Ethics Committee of the Botucatu College of Medicine, under the substantiated opinion number 2.879.373.

RESULTS

The sample consisted of 189 newborns admitted to the NICU during a period of six months. Of the total, 85.2% were admitted within the first 24 hours of life, 7.4% between 2 and 9 days of life and 7.4% with more than 10 days of life. Regarding gender, there was no significant difference, being 57.7% male and 42.3% female.

As for gestational age, 52.3% were born with less than 37 weeks of gestation, thus characterizing premature newborns, and 57% with less than 2500g - low birth weight newborns (LBWN).

NAS, an instrument used to measure the nursing workload, was applied 2,036 times, with a mean score of 56.7%.

From the frequency of the instrument's items, it was possible to identify the care profile provided to newborns in the NICU.

The care profile through the NAS score in the newborns admitted to the NICU is described in Table 1.

Table 1- Distribution of the NAS scores and frequency for newborns admitted to the NICU, from October 2018 to March 2019, Botucatu, SP, Brazil.

NAS	Score	%
BASIC ACTIVITIES		
1. Monitoring and controls.		
1a- Hourly vital signs, calculation and regular recording of water balance.	4.5	68.9
1b- Bedside presence and continuous observation or activity for 2 hours or more on a shift for safety, severity or therapy reasons, such as: non-invasive mechanical ventilation, weaning, agitation, mental confusion, prone position, preparation and administration of fluids or medication, assistance in specific procedures.	12.1	29.0
1c- Bedside presence and continuous observation or activity for 4 hours or more on a shift for safety, severity or therapy reasons, such as the examples above.	19.6	2.1
2. Laboratory investigations - Biochemical and microbiological examinations/ Hemoglucotest (HGT)/ Neonatal heel prick.	4.3	47.0
3. Medication - except vasoactive drugs.	5.6	83.1
4. Hygiene procedures.		
4a- Accomplishment of hygiene procedures, such as dressing of skin lesions, surgi-	4.1	84.0

cal incision, dressing of catheters (PICC, Intracath, UVC, PVA) once a day, care of stomas, change of bedding (incubator, crib, bilitron® bed), change of diapers, change of clothes, immersion bath, patient's bodily hygiene in special situations (incontinence, vomiting, diarrhea, bleeding, burns, leaking wounds, complex surgical dressing with irrigation. Care with perineal ecchymoses and hyperemias, which either continuously or in combination last less than 2 hours.		
4b- Accomplishment of hygiene procedures, frequently, 3 to 4 times, which either continuously or in combination last less than 2 hours on a shift.	16.5	15.1
4c- Accomplishment of hygiene procedures, frequently, more than 4 times, which either continuously or in total last more than 4 hours on a shift.	20	0,9
5. Drain care - All, except gastric tube.	1.8	4,0
6. Mobilization and positioning.		
6a- Accomplishment of the procedure(s) up to 3 to 6 times by 1 professional in 24 hours, including procedures such as change of position, patient mobilization; bed transfer, transport, mobilization to calm the NB or to improve the breathing pattern.	5.5	45.2
6b- Accomplishment of the procedure(s) more than 6 times in 24 hours or by 2 professionals at any frequency.	12.4	54.2
6c- Accomplishment of the procedure(s) with 3 or more professionals at any frequency.	17	0.6
7. Support and care for patients and their relatives.		
7a- Support and care for patients and relatives 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, including procedures such as phone calls, interviews and counseling.	4	98.9
7b- Support and care for patients and relatives who require exclusive dedication for 3 hours or more on a shift, in person or by phone, such as death, laborious circumstances (e.g., large number of relatives, language problems, hostile relatives).	32	1.1
8. Administrative and managerial tasks.		
8a- Accomplishment of routine tasks that last up to an hour, continuous or fractioned, such as processing clinical data, requesting tests, exchanging professional information (e.g., shift change, clinical visits), applying and documenting nursing process, preparing and monitoring professionals or students.	4.2	93.5

8b- Accomplishment of administrative and managerial tasks that require full dedication for about 2 hours on a shift, such as research activities, application of protocols, admission and discharge procedures, preparation procedures, monitoring and transfer of NB, elaboration of reports, notifications, implementation of research protocols.	23.2	6.4
8c- Accomplishment of 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 subjects.	30	0.1

VENTILATORY SUPPORT

9. Presence of 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 (e.g., CPAP or BiPAP, Halo, continuous nebulization, nebulization of diets, nasal catheter), with or without endotracheal tube; supplemental oxygen by any method.	1.4	67.8
10. Artificial airway care - Yes. Nasal hygiene, crust removal. Endotracheal tube or tracheostomy (positioning, dressing change/fixation), once or more in 24 hours.	1.8	87.6
11. Treatment to improve lung function - Chest physiotherapy and/or inhalation therapy and/or endotracheal aspiration once or more in 24 hours.	4.4	71.8

CARDIOVASCULAR SUPPORT

12. Vasoactive medication	1.2	11.3
13. Intravenous replacement of large fluids, regardless of the type of fluid administered (serum therapy, blood and blood products).	2.5	41.0
14. Monitoring of the left atrium. Pulmonary artery catheterization with or without cardiac output measurement (Does not apply to neonatology).	1.7	0.4
15. Cardiopulmonary resuscitation - Yes.	7.1	0.9

RENAL SUPPORT

16. Hemofiltration. Hemodialysis/Dialysis, with any duration	7.7	0.3
17. Quantitative measurement of urinary output, with any duration or frequency, whether by urinary catheterization delay (UCD), diaper weight, collection bag and/or any other method to control diuresis.	7	100.0

NEUROLOGICAL SUPPORT

18. Intracranial pressure measurement/external ventricular shunt or peripheral ventricular shunt care.	1.6	1.3
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METABOLIC SUPPORT		
19. Treatment of complicated metabolic acidosis/alkalosis.	1.3	1.2
20. Intravenous hyperalimentation of any duration: use of PPN.	2.8	35.4
21. Enteral nutrition of any duration through gastric tube or gastrointestinal tract.	1.3	84.8
SPECIFIC INTERVENTIONS		
22. Specific interventions in the Intensive Care Unit - Endotracheal intubation, cardioversion, endoscopy, emergency surgery, gastric lavage, exchange transfusion. Routine interventions without direct consequences for the patient's clinical conditions, such as X-ray, ultrasound scan, electrocardiogram, dressing, or insertion of venous or arterial catheters are not included. Specific procedures performed in the unit and that require active intervention by the team such as procedures exclusively performed by nurses, such as passage of gastric or bladder tubes, PICC, installation of intra-abdominal pressure, among others, which can be particularly complex and also require more time from the nursing team for their accomplishment.	2.8	82.3
23. Specific interventions outside the Intensive Care Unit. Diagnostic or surgical procedures (preparation). Monitoring and transfer of NB to another unit or another institution; accomplishment of exams and procedures in another unit or in another institution monitored by the nursing team.	1.9	4.6

In view of the data presented, it is clear that there is a predominance of activities related to the recording of vital signs, timetables and calculation and regular notes of water balance; 83.1% receive non-vasoactive medications, regardless of the route; and hygiene procedures are characterized by lasting less than 2 hours, continuous or added (84%). The support and care for patients and their relatives, who require exclusive dedication, for about 1 hour on a shift (98.9%), should be highlighted.

As for administrative activities, the accomplishment of routine tasks, such as processing clinical data, requesting exams and exchanging professional information was found in 93.5% of the investigated data. It is also noteworthy that 87.6% of newborns need care with artificial airways, once or more in 24 hours; 100% need quantitative measurement of urinary output; 84.8% receive enteral nutrition through a gastric tube or gastrointestinal route; and 82.3% undergo specific interventions in the unit.

No item/sub-item failed to be scored, although some scores were minimal, such as items 1C - 2.1%; 4C - 0.9%; 6C- 0.6%; 8C - 0.1%; and 16 - 0.3%.

The study also allowed the listing of the distribution of the nursing workload on the days of the week (Table 1).

Table 2. Distribution of the days of the week and mean NAS score, Botucatu (SP), Brazil, 2019.

Days of the week	Mean NAS
Monday	56.0%
Tuesday	57.3%
Wednesday	56.4%
Thursday	56.7%
Friday	57.8%
Saturday	57.2%
Sunday	55.7%

There was variation among the days, where the lowest score was 55.7 on Sunday and the highest score was 57.8 on Friday.

DISCUSSION

It is necessary for the NICU nurse to know the care profile through a nursing workload score to assess the main characteristics of care in this unit, in order to characterize the patients individually and/or collectively.

A study conducted in a NICU at HCFMUSP¹⁰ showed that the application of NAS was able to identify variations in the frequencies of nursing interventions/activities, also being appropriate to measure the workload of the nursing team in the neonatal area. In this NICU, the obtained mean NAS was 91.1%, in contrast to the mean NAS value of the study, where the value obtained was 56.7%.

The obtained value contradicts the expectations of a high value due to the physiological and physical complexities of these patients, but it can be explained by the fact that the institution adopts the minimum handling for these newborns in the first 72 hours of life.

Another possibility would be the fact that, despite the nurses having been trained to fill out the NAS instrument, most of them are nurses with little time working in the studied unit, listing a workload score lower than what is actually expected, due to the fact there are gaps in knowledge regarding the systematization of nursing care in the NICU setting, the management and the actual clinical status, as well as demands of hospitalized newborns.

In this way, nursing must expand its systematization in practice, so that it produces results that can be measured, allowing expansion of knowledge and improvement in the quality of nursing care and in the recording of nursing information.¹²

In this study, most of the babies were premature. Studies show that prematurity, respiratory disorders and low weight are the most recurrent reasons for hospitalization of newborns in NICUs. These factors entail physiological or hemodynamic instability, requiring special care. Moreover, these factors are related to high morbidity and mortality rates.

The data from the population of this study show that 52.3% were premature and 57% with low weight, corresponding to the studies characterizing newborns admitted to NICUs. It is also known that prematurity, in most cases, determines low weight and respiratory disorders due to physiological immaturity.¹³

Corroborating the literature data, this study showed that 87.6% of newborns need artificial airway care once or more in 24 hours. Mechanical ventilation is commonly used in NICUs, as it is part of the treatment of most respiratory diseases and, consequently, requires procedures such as endotracheal suction, adjustment of ventilatory parameters and repositioning of NB, among other care procedures that can increase the workload.¹⁴

Studies show that most newborns admitted to NICUs have a diagnosis of respiratory diseases, highlighting that prematurity and low weight are among the main predictors for admission.^{13,15}

In the research unit, changes in the positioning of the newborns were higher when performed simultaneously by two professionals (54.2%) instead of one (45.2%). This is justified by the fact that the professionals in this unit perform the position changes and other care together, characterizing the four-handed care technique, aiming to reduce the time of stimulation to the newborn and provide safer and more humanized care.

The correct positioning of the newborn is routinely performed in the NICU setting, in order to provide the well-being and the safety of the patient, as it interferes with the maintenance of respiratory and cardiac function, favoring the spontaneous and functional motor activity of the premature newborn, and prevents accidents such as sudden death and gastroesophageal reflux, in addition to directly influencing the neuropsychomotor development of neonates.¹⁶⁻¹⁸

The four-hand technique, performed by two health professionals with slow, smooth and modulated movements, keeping the newborn's extremities flexed and held, enables greater safety in nursing care, aiming at adequate support for the musculoskeletal development of premature newborns. In addition to the fact that prolonged or repeated manipulation increases stress, alters the sleep cycle, interferes with weight gain and, consequently, can lead to significant neurological changes.¹⁸

Laboratory investigations obtained a result of 47% of the activities performed by the nursing team. It is a low value, if compared, for example, to the same category in the NAS instrument of an adult ICU, where the value reaches 83%.⁸ The justification for this data is given by the exam collection routine adopted by the studied NICU, which advocates less manipulation of newborns, avoiding unnecessary exam collection and taking advantage of an appropriate and opportune time to collect all exams at once.

A premature baby, when subjected to procedures such as exam collection, may react negatively for several minutes, during and after the procedure, until it becomes exhausted. This generates unnecessary energy expenditure that can, even after the procedure is over, result in signs of suffering, pain, and/or instability that can manifest physiologically (bradycardia, tachycardia, drop in oxygen saturation, and apnea) or behaviorally (flaccidity, fatigue, and difficulty sleeping).¹⁸⁻¹⁹

Item 7 of the instrument regarding support and care of patients and relatives and its sub-items scored highly (98.9%), indicating that the nurse offered support and care to patients and relatives who require exclusive dedication, for about 1 hour, on a shift.

The welcoming of family members is part of the humanization process that is so important in the NICU context so that parents do not feel powerless in the face of their children's condition, but are able to feel part of the care process as partners of the team.¹⁹⁻²⁰

In order to make this partnership possible, the nursing team should overcome the barriers of knowledge and invite parents to be active in the care process of their children, in an oriented and safe way.²⁰

The nursing team should also encourage skin-to-skin contact through the kangaroo method, as well as the mother's presence in the NICU setting. Considering the mental, emotional, physical, and structural factors that her presence may have to face, one should reinforce the numerous benefits that this practice can provide to the newborn and to the mother-child bond.²¹

A study showed that mothers with children admitted to a NICU experience several feelings, such as fear, insecurity and anxiety. Those who have not yet breastfed their children in the NICU setting see milking as an exhausting but satisfactory process, so they feel more present in their child's care and more secure. In this sense, the nursing professional has a key role in helping to establish the bond between mother and newborn.²²

Data regarding the days of the week with higher NAS scores suggest that the highest workloads occurred on Fridays. This is probably justified by the occurrence of cardiac surgeries in the studied institution on Thursdays, characterizing the higher score on the following day, scored by a higher number of procedures and higher professional demand in postoperative care.

The care profile highlighted by the nursing workload allowed the characterization of the main care demands in the NICU, which are mainly provided to premature and low birth weight newborns, a characteristic of most NICUs.

The high demand for drug interventions, the hygiene care time longer than 2 hours and the mobilization of four hands should be highlighted, which require greater attention and availability of the team. The importance of caring for family members for at least 1 hour per shift and the specific interventions related to care of artificial airways, control of urine output, enteral nutrition through gastric tube or gastrointestinal tract, as well as the high number of specific interventions performed in the unit, should also be highlighted.

The identification of the NICU care profile should be used as a subsidy to better implement the nursing process and also to improve the techniques, procedures and devices used during care procedures.

As a limiting factor, this study has the subjectivity in the accomplishment of NAS, since the nursing teams in our country suffer a high turnover of professionals, which, even after team training, may have hindered the uniformity of data, because they are retrospective data. Thus, prospective studies are suggested in order to remedy this limitation.

CONCLUSION

NAS defined the mean workload as 56.7%, contrary to expectations that because it is a differentiated clientele with both physical and physiological vulnerabilities, this value could be higher.

From the frequency of the items contained in the NAS instrument, it was observed which items scored highest, among them hygiene measures for the newborn, specific interventions and an extensive workload dedicated to family support, as well as managerial issues, describing the care profile.

In this study, the identification of the days of the week with the highest workload, such as Friday, allows nurses to systematically adjust monthly schedules and the number of necessary staff.

The data significantly contribute to care planning, since, in the daily routine, the nursing team members, based on the NAS score and assessment of the care profile of their unit, can identify patients or days of the week with the highest demand of care time, which allows the adequacy of daily and monthly schedules.

It is estimated that the knowledge about the care profile, according to the workload of the nursing team, is capable of providing quality and safety in the care of newborns and better working conditions for the nursing team members.

CONTRIBUTIONS

It is estimated that the knowledge about the care profile, according to the workload of the nursing team, is capable of providing quality and safety in the care of newborns and better working conditions for the nursing team members.

CONFLICTING INTERESTS

Nothing to declare.

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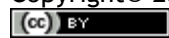
Correspondence address

Clarita Terra Rodrigues Serafim
E-mail: clarita.terra@unesp.br

Submissão: 07/12/2020

Aceito: 05/27/2020

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