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Scoring System for Neonatal Therapeutic Intervention: a Descriptive Study

Gabriela Ramos Ferreira Curan[1], Edilaine Giovanini Rossetto[1]

1 State University of Londrina

ABSTRACT

The Neonatal Therapeutic Intervention Scoring System (NTISS) is a tool that estimates the disease severity of patients, measuring the assistance technologies. **Aim:** To analyze the application of the NTISS in the neonatal unit of a university hospital. **Method:** This was a prospective, descriptive and observational study. The NTISS was applied for 228 days, from admission to discharge of each patient. **Results:** Of the 81 monitored neonates, 58.5% were male, 91.35% were premature and 87.65% were of low birth weight, and there was an average hospital stay of 16 days. The NTISS score average was 23 at death, 17.2 at admission, 14.5 during hospitalization, and 10.5 in hospital discharge on different occasions. The dimension "monitoring" was the highest average score on admission, followed by "medicines". "Transfusion" got the lowest average. **Conclusion:** The easy application scoring system was an important tool for planning the allocation of human and material resources for revealing a situational analysis of the context during assistance.

Descriptors: Intensive Care; Neonatal Nursing; Personnel Downsizing; Workload.

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INTRODUCTION

The assistance provided in neonatal intensive care units (NICU) has been significantly modified, particularly by the use of new technologies, which have contributed to the increased survival of premature newborns (NB), which are increasingly smaller in relation to the gestational age and birth weight. We may associate the increase in neonatal survival rates with the provision of more structured and quality care, which is an encouragement to prioritize more investments in this area[1].

Preterm NBs are the most common population within the NICU. It is common for these patients to have sicknesses with varying clinical severity and have high physical vulnerability, due to their poor immune defenses and the mucocutaneous barrier; often with an insufficient body weight. They often also are more exposed to invasive and potentially harmful procedures. These features generate increased demand for medical care, nursing, equipment, materials and modern therapies.

The World Health Organization (WHO) defines premature babies as all NBs of less than 37 weeks of gestation[2]. However, the difference in the degree of severity of the condition of the NBs admitted to the NICU requires an evaluation of their clinical condition and measurement of the technologies and interventions adopted during their stay. This knowledge can support the estimation of the prognosis for each NB, including the planning of nursing care (the staff dimension and workload of the nursing team), acquisition of equipment, drugs and materials, with an aim to improve the allocation of resources before operating costs[3, 4, 5, 6].

From this need, systems with the aim of measuring the gravity of patients and prognostic methods for specific application in an ICU were developed. In 2005, UK researchers presented a review of existing methods of measurement of disease severity in NBs. Of the twelve methods mentioned, the system that has evaluated the largest number of variables was the Neonatal Therapeutic Intervention Scoring System (NTISS)[5].

The NTISS resulted from an adaptation of the Therapeutic Intervention Scoring System (TISS), which is a system of measurement of the severity of conditions of adult patients admitted to the ICU and the nursing workload.

For the development of the NTISS, the TISS was modified in two stages by Gray and Richardson[7]; the analysis made by the group of experts led to the decision to withdraw 42 of the 76 original items of TISS and add 28 new ones. Thus, the NTISS was developed, with 62 elected items belonging to these dimensions: respiratory, cardiovascular, drug, monitoring, metabolic/nutritional, transfusion, procedures and vascular access. The calculation of the severity of patient conditions is given by the sum of the points they receive in each item of the eight dimensions, in which case one (1) is the lowest value and four (4) is the maximum value of each item observed[7].

For validation, we applied the NTISS in 1643 NBs admitted to three North American NICUs for 11 months. The authors concluded that the NTISS is a direct measure of resource utilization, it has the capacity to provide a clinical prognosis and can identify the factors that influence the length of hospital stay in newborns and the variations in care practices related to the use of human and therapeutic resources[7].

The NTISS was considered a disease severity score of good accuracy and prognostic value, since statistical tests showed significance regarding the correlation between the NTISS score and disease severity markers, including mortality risk estimates by assistant neonatal physicians ($p<0.0001$) and hospital mortality rates ($p<0.05$)[7].

Researchers[3] observed 96 NBs in two NICUs, one public and one private, in Rio de Janeiro, and NOTED the daily use of technologies that applied the NTISS and checked the disease severity of patients at admission by applying the Score for Neonatal Acute Physiology, Perinatal Extension, Version II (SNAPPE-II). The regular monitoring of the use of the technology index allows the detection of variations in care practices that can reflect operating costs and can guide the allocation of neonatal intensive care resources.

The complexity observed in patients treated at the Neonatal ICU of the University Hospital of Londrina (PR), is compared with the lack of knowledge in terms of the purpose of the use of assistive technologies during their hospitalization. There is a need to use specific tools for the design of both the disease severity profile and the use of assistive technologies, aiming to meet the demand for care of this reality. The use of such tools can provide support for the organizational planning of the mentioned unit, in order to optimize material and human resources and consequently the improvement of care.

Thus, this study aimed to describe the degree of disease severity of NBs in a NICU through the use of NTISS, according to the profile of these patients, severity scores and technologies used.

METHOD

This was a prospective observational study whose subjects were the NBs hospitalized in the Neonatal Intensive Care Unit (NICU) at the University Hospital of Londrina (HUL), PR. The HUL is a public tertiary hospital with 316 beds exclusively aimed at the Unified Health System (UHS). The maternity ward of HUL is a referral center for the care of high-risk pregnancies and is the origin of the vast majority of babies in the NICU. The NICU owns seven beds and their average occupancy is 115%, according to the Statistical Medical File System (SMFS) of the hospital. This indicates the frequent allocation of extra beds for the service.

Data collection occurred from December 2011 to July 2012, totaling 228 days and the first two weeks were used as a pilot test. The inclusion criterion was staying in the NICU for at least three days before discharge to the rooming-in, or staying for at least one day before discharge to the Intermediate Care Unit (NICU). The study included all patients born between December 15, 2011 and June 30, 2012 admitted to the NICU who were followed until the outcome of their hospitalization or discharge, death or sector transfer. During this period, 84 NBs were admitted to the NICU and three of these were excluded because they were discharged to the rooming-in early, resulting in a sample of 81 NBs.

The NTISS was applied daily for each patient hospitalized since the first day of admission until the moment of discharge from the NICU, or death. We considered all therapies used within 24 hours of each day to record the highest score of the therapy used in each modality on that day.

The NTISS is composed of eight care modality dimensions: respiratory, monitoring, cardiovascular, medicines, metabolic/nutrition, transfusions, procedures and vascular access. Each dimension has items that represent the use of therapeutics in the NICU and the number of items among the dimensions is varied. Items are rated with sub scores that can vary from 1 to 4, in which case 1 is the value attributed to the less invasive therapy, and 4 to the most invasive therapy. A zero value is attributed when the item is not used in the patient during that period.

In the calculation of the overall NTISS between similar items, such as the use of nasal Continuous Positive Airway Pressure (CPAP) and the use of mechanical ventilation, we took into account the value for the item that reflected

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greater technological complexity. That is, we always considered the less invasive therapy to be used with the patient on each day. The total score ranged from zero to 99, considering all therapies computed by the scoring system that were liable for concomitant use. Although the scores indicating prognosis have not been validated, it is known that the higher the score, the higher the disease severity of the patient and, consequently, the worse the prognosis.

In the respiratory dimension, we considered supplemental oxygen, helmet use, nasal catheter, oxygen in the incubator and proximal nebulization with oxygen. In the item "others" in the medicine dimension, the use of aminophylline, caffeine, ferrous sulfate, multivitamins, dexamethasone, midazolam, fentanyl citrate and calcium gluconate were investigated.

A journal to record the researcher's perceptions upon their use and possible inadequacies observed was used simultaneously to the application of NITSS.

The data were entered into the EpiInfo program - version 3.2.2, which was also used for descriptive analysis.

The mask developed in the EpiInfo program included all the NTISS dimensions, as shown in Table 1, besides the data for the characterization of patients: record number in the research, medical record number, sex, mother's initials, collection date, birth date, twin pregnancy, weight and gestational age at birth.

As these are considered secondary data, there was no need to obtain the free and individual informed consent because the work was performed after the approval of the superintendent of the institution, unit leadership and approved by the Research Ethics Committee under Opinion No ° 157/2011 with CAAE 0127.0.268.000-11.

The Mann-Whitney non-parametric statistical test was used to assess the equality of medians between two unpaired groups and these included independent samples without normal distribution.

RESULTS

Eighty-one NBs were followed; of these 58.5 percent were male, the average weight was 1,405g, the minimum weight was 575g and the maximum weight was 4,120g. The average gestational age was 29.3 weeks, in which case the minimum age was 23 weeks and maximum age was 40 weeks. Most of the population (91.4%) were premature NBs, and 50.6% of the total had a gestational age lower than 32 weeks; 87.7% had a low birth weight, 42.7% of the total had a birth weight smaller than 1,500g, and 28.0% were less than 1,000g, however, these weight categories were not exclusive. The incidence of multiple births was 12.2% and the average hospital stay was 16 days. The shortest hospitalization lasted one day and the longest, 68 days.

Regarding the outcome of the hospitalization, 56 patients (69.1%) were discharged to the Neonatal Intermediate Care Unit (NICU), seven (8.6%) were readmitted to the NICU at some point; 16 (19.8%) died, one patient (1.2%) was transferred to the pediatric unit and another continued to be hospitalized in the NICU at the end of data collection.

Some items listed in the NTISS were not used in any of the patients followed during the study period, such as: high frequency intermittent mandatory ventilation, tracheostomy placement and care, extracorporeal membrane oxygenation, invasive blood pressure monitoring, pacemaker use, pacemaker on standby, potassium exchange resin, gamma globulin, intravenous leukocytes and pericardiocentesis.

Table 1 shows the average, minimum and maximum scores of the study population during

Picture 1 - Dimensions evaluated by the NTISS, their items and their corresponding sub scores.

Items	Sub-scores	Items	Sub-scores
Respiratory		**Metabolic / Nutrition**	
O2 Supplementary	1(a)	Gavage	1
CPAP	2(a)	Phototherapy	1
IMV	3(a)	Lipid EV	1
IMV + relaxing	4(a)	Amino acid EV	1
IMV high frequency	4(a)	Insulin	2
Surfactant	1	Potassium Infusion	3
Intubation	2	**Transfusions**	
Tracheostomy care	1(b)	Gammaglobulin EV	1
Tracheostomy placement	1(b)	Total Exsanguination	3
Extracorporeal oxygenation	4	Partial Exsanguination	2
Monitoring		Erythrocytes ≤ 15 ml / kg	2(g)
Vital signs	1	Erythrocytes> 15 ml / kg	3(g)
Phlebotomy (5/10)	1(c)	Platelets	3
Phlebotomy (> 10)	2(c)	Leukocytes	3
Cardio Respiratory Monitoring	1	**Procedures**	
"Thermo-regulated Environment O2 Noninvasive Monitoring"	1	Transportation	2
PA Monitoring	1	Dialysis	4
PA Invasive Monitoring	1	Simple Thoracic Drain	2(h)
Vesical catheter	1	Multiple Drain Thoracic	3(h)
Water Balance	1	Thoracentesis	3
Cardio-Vascular	1	Pericardial Drain	4(i)
indomethacin		Pericardiocentesis	4(i)
Expander ≤ 15 ml / kg	1	Small Surgery	2(j)
Expander> 15 ml / kg	1(d)	Major Surgery	4(j)
Vasopressor (1)	3(d)	**Medicines**	
Vasopressor (2)	2(e)	Antibiotics ≤ 2	1(k)
Resuscitation	3(e)	Antibiotics> 2	2(k)
Standby Pacemaker	4	Diuretic VO	1(l)
Pacemaker Use	3(f)	Diuretic EV	2(l)
Vascular access	4(f)	Anticonvulsant	1
Peripheral		Aminophylline	1
Arterial Catheter	1	Corticoid	1
Central Venous Catheter	2	K exchange resin	3
	2	NaHCO3	3
		Other drugs	1
		NTISS TOTAL = _____	

** The letters in parenthesis represent the variables among which only the highest scores were computed[7].*
Source: Authors' elaboration.

the study period, as well as weight and gestational age according to gender. The weight limit at birth and gestational age adopted for data analysis were defined due to the characteristics of the aforementioned study population, that is, an average weight of 1,405g and an average gestational age of 29.3 weeks. Thus, we compared babies born with less than 32 gestational weeks with the others, and those born with very low birth weight with the others.

The average score of the NTISS obtained on a daily basis during the data collection period was 14.5; where six was the minimum score and 37 was the maximum. The average scores obtained by the NTISS, in terms of male patients with

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gestational age at birth lower than 32 weeks and very low birth weight, were significantly higher than other patients, according to the Mann-Whitney test applied for the statistical analysis.

Table 1 - Average punctuation of NTISS score by gender, gestational age and weight. London, 2012.

Variable	Média	Average	Standard Deviation	p Value (Mann-Whitney)
Gender				0,003*
male	14,8	7 a 37	4,62	
female	14,2	6 a 33	4,65	
Gestational age				0,002*
≥32 without	14,1	7 a 37	4,87	
<32 without	14,7	6 a 34	4,54	
Birth weight (g)				0,006*
≥1500g	14,2	6 a 37	4,92	
<1500g	14,7	7 a 34	4,47	

Source: Authors elaboration

Considering the score of each patient at the moment of admission to the NICU, we obtained the data presented in Table 2. The average admission scores were higher than the average hospitalization scores.

Table 2 - Scores on admission to the NICU by gender, weight and gestational age at birth. London, 2012.

Population / Score	n	Average	Median	Variation	p Value (Mann-Whitney)
Gender					0,67
male	48	17,4	17	09 a 35	
female	33	16,9	15	11 a 30	
Birth weight (g)					0,09
≥1500g	35	16,5	15	09 a 35	
<1500g	46	18,1	18	12 a 30	
Gestational age					0,02*
≥32 without	40	16,2	15	09 a 35	
<32 without	41	18,1	18	12 a 30	

Considering the partial scores of the dimensions at the time of admission to the NICU, during the course of hospitalization and in occasions of hospital discharge or death, we obtained the data presented in Table 3

Table 3 - Scores by dimensions: in admissions, during hospitalization in hospital discharges and deaths. London, 2012.

Scoring average achieved for each dimension					
	Maximum score	On admission	During hospitalization	At hospital discharge	In death
Dimensions					
Vascular access	5	1,3	1,6	1,2	1,9
Monitoring	9	5,5	5,7	5,2	6,1
Metabolic / Nutrition	9	3,2	2,3	1,6	1,9
Respiratory	13	2,5	0,9	0,5	0,9
Transfusions	13	0,2	0,3	0,1	1,2
Medicines	14	2,3	2,6	1,5	6,6
Cardiovascular	15	1,4	0,6	0,1	3,3
Procedures	24	0,6	0,3	0,3	0,2
TOTAL	102	17,2	14,5	10,5	23

There was a variation in the specific scores of the NTISS dimensions at different times, with an emphasis on death and admission. The proportions presented in parentheses refer to the score achieved in relation to the maximum score for each dimension, presented in the first column.

The record of the perceptions of the researcher in the diary research revealed the existence of variables not covered by the NTISS, as the use of albumin, BiPAP and two vascular accesses, in addition to the inadequacy of the gravity score for patients receiving enteral feeding by gava-

ge in a service that promotes breastfeeding, avoiding the use of glasses for the provision of the diet.

DISCUSSION

The knowledge in terms of the profile and the disease severity of patients in a NICU can be used as an important tool of health management, both on a local and broader perspective. The measurement of the technologies used in patients can direct the planning of acquisition and allocation of human and material resources, as well as general assistance. In addition, from the profile of the knowledge of patients and the most employed therapies, the neonatal units of different scenarios could be compared and analyzed in order to understand the determinants of different assistance and realities.

The authors of a cohort study developed in a NICU[8] stated that the score obtained by the NTISS is easily extracted from the medical records and features high internal consistency and generates information beyond that available in traditional determinants of risk for being associated with procedures.

The researchers who developed a similar methodology study[9] also pointed out other features of the NTISS score:

"One of the advantages of NTISS is precisely the possibility of retrospective data collection. Although this score has a decreased accuracy in relation to those using physiological data to predict deaths, it is a good marker of severity and it is associated with the occurrence of hospital infection."

The NTISS was considered one of the five most used risk determinants to assess the severity of disease in NBs of very low birth weight, along with the Clinical Risk Index for Babies (CRIB), the Score for Neonatal Acute (SNAP), the Score for Neonatal Acute Physiology Perinatal Extension (SNAP-PE) and the Berliner score [10]. Both can be applied for different purposes, such as to predict risk of mortality and severe morbidity, to ensure a more accurate assessment of the results between different NICUs and to establish a reliable basis for randomization of patients in multicenter longitudinal studies[10].

The NTISS differs from other indexes for quantifying only therapeutics and procedures to estimate the severity of disease in patients, while not considering their clinical and physiological variables[10-11]. Nevertheless, the NTISS uses a great number of variables, as sixty-two items are regarded as possible interventions.

What also differentiates the NTISS from most of the other neonatal severity score systems is that it enables the longitudinal assessment of disease severity and the use of the assistive technologies employed. The use of the NTISS enables the panorama analysis of a NICU progressively (this was not the object of study in this article), and the disease severity of each patient throughout his/her hospitalization, and it is able to point out which technologies are more implemented at different times: hospitalization, at discharge and in death, for example. It also provides a diagnosis of the unit, allowing the visualization of its performance from the desired period (monthly, semi-annual or annual).

It was evident that there are types of therapies that are more intensely implemented on admission, as well as others whose use is intensified during hospitalization, and there are also interventions that are especially applied in moments of death. By identifying the care demand peaks in a NICU and measuring them, we can perceive the need for a reorganization of the work process, which must be done through the dimension of human resources, especially in nursing.

These differences detected at specific moments can be managed with the education and

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the training provided by specialized care teams, such as a patient admission team and care teams for patients who present scores that indicate risk of death. The standardization of the assistance provided by members of these teams would contribute to an optimization of the work process and the quality of care provided at critical moments in the NICU. This issue was well explored in another study derived from this one, which showed that the nursing staff from the neonatal unit studied had qualified training, which can determine a differentiated assistance, but it does not meet the standards for professional capacity advocated for assistance in these units[12].

It was observed that the therapeutic dimensions of the NTISS were scored in distinctive ways, in the different stages of hospitalized patients in NICUs (admission to the unit, hospital stay and moment of discharge or death), that is, the dimensions that scored higher on admission were not necessarily those that scored higher in death, as featured in Table 3. The differences between the therapeutic dimensions can be analyzed both by observing their average scores as the percentage of the maximal score reached by each.

The size of the monitoring score remained the highest at four different times analyzed in this study. This is explained by the characteristics of the study site, which was an intensive care unit, a space where all patients were intensively monitored throughout their period of detention. Monitoring therapeutics were also the most scored in populations of two descriptive observational studies[3, 13], having the NTISS applied to 22 NBs[13] in one study and 96 to the other[3].

The dimension of the respiratory factor, which had the fourth highest percentage achieved in the admission score, was the least affected in death (eighth). This difference is explained by the fact that some of the interventions related to the respiratory score occurred more commonly on admission, as the intubation and the administration of surfactant, for example, while the patient in the process of death, precisely due to its clinical severity, is in most cases, already intubated and suffers mainly drug and cardiovascular interventions. This fact is exemplified when analyzing the medicine score, which is fourth at the moment of admission, but the second in death, only smaller than the monitoring score.

Therefore, the demands of care and technologies are different in the course of patient care in a NICU, and these peculiarities should be considered in the personnel allocation plan and acquisition and replacement of materials. This may suggest routines and/or the formation of specific care teams for certain situations and can justify the drug-dispensing deployment per unit dose, which would result in the dimensioning of costs, staffing and quality of care.

In this study, the average score reported by patients during hospitalization was 14.5, a higher score than the average score of 12.3 reported in a similar study which was described previously [13]. We also found an average score (17.2) on admission that was higher than the average obtained in the two units assessed in a study conducted in Rio de Janeiro, which was 15.2 in the public unit and 13.2 in private[3]. These differences can be explained by the different profiles of the four units, noting that the comparative studies[3,13] presented data related to the patient's admission score in the unit only[3] and the average score of the hospital stay of patients[13]. The scenario of this study was the NICU; while in the Colombia study [13] both the NICU patients as the Intermediate Care Unit (NICU), participated. This certainly contributed to the reduction in the average severity score. The author[13] also states that the institution followed adopts a minimal invasiveness policy on assistance to newborns. Compared to the two institutions in the study of Rio de Janeiro[3], although they were referen-

ced units for the training of professionals in the medical field, they were not part of a university hospital, as the unit of this research. Although we did not find studies exploring the influence of the institutional characteristics of the NICU on the use of therapeutics, it was inferred that limiting care interventions is more challenging in the context of a university hospital, due to its characteristic as a professional training camp school for many areas of health.

In a similar study[3], the item '*others*' in the medications dimension, we observed to be the use of caffeine and fentanyl citrate, was also perceived in this analysis, as well as erythropoietin and marrow immune stimulators, which are substances that were not used in this service. Thus, the item '*others*' was more likely to be reported during the administration of the score to compare study patients than in this research, contributing to an increase of that score in relation to this.

In another study[13], the second most scored dimension in the scale was "vascular access", whose average score was only the fourth most scored during hospitalization for this research. In both units accompanied by researchers from Rio de Janeiro[3], the second most scored dimension in the admission score was the respiratory score, which ranked third between the score averages at admission in this study, with a much lower score. Possibly, the low score in the respiratory dimension presented by this study is related to the practice of early nasal CPAP use, to the detriment of intubation, according to international recommendations [14,15], in view of the little value given in the score by using nasal CPAP (2 points), rather than the use of invasive ventilation (3 points). Moreover, as a non-invasive respiratory embodiment, the CPAP does not require endotracheal intubation, which in itself assigns two more points to the score.

In addition to the assessments in different units and on different occasions of hospitalization, the NTISS can also be analyzed in different populations according to birth weight, for example. A study conducted in Turkey has recently evaluated the predictive power of gravity of the NTISS in a very low birth weight population (VLBW) and those with extremely low birth weight (ELW)[16]. It was found that the use of the NTISS, with all its parameters, appears to be less predictive in infants with extremely low birth weight, probably due to the use of certain interventions. The authors suggested that the NTISS can be modified to be better adapted to the different populations according to birth weight.

This study also pointed out some considerations related to the content of the instrument. In the dimension 'medicines', we can highlight the absence of the option albumin, whose use may not be rare and was not scored in severity scores.

In the dimension 'venous access', the "two central vascular accesses" would be useful, as the option "multiple thoracic drains" in the procedures dimension, since the need to maintain more than one central vascular access indicates increased use of infusions and consequently disease severity in the patient, as well as greater vulnerability to infection.

In the "respiratory" dimension, the inexistence of the Bilevel Positive Airway Pressure option (BiPAP)) was a failure that we found, since the patients using BiPAP are more dependent on mechanical ventilators than those using CPAP, but only the latter is available in the score as a noninvasive ventilation option with positive pressure. Thus, patients on CPAP or BiPAP improperly received the same score in the respiratory score, as in the present study, the use of BiPAP was scored as the use of CPAP.

In the "metabolic/nutrition" dimension, the administration of enteral feeding by gavage implies punctuation in the score, indicating disease severity, but the "fasting" option does

not exist, nor the "pump diet". In data collection, diets that were being administered by infusion pumps were simply considered as gavage, and the case of fasting did not fit in any item, and thus was not scored. Thus, patients requiring slow infusion of the diet by means of infusion pumps had the same points on their nutritional score when compared to a patient who normally received enteral feeding by gavage, and those patients in a more aggravated condition who started fasting improperly obtained lower score because fasting is not scored in the NTISS. It is an inadequacy both from the point of view of measurement of the severity of the patient's condition, considering that requiring slower infusion or requiring fasting is a severity indicator, and for personal dimensioning effect, since the administration of enteral gavage occurs due to the gravity of patients and the installation of the diet infusion pumps requires more time and demands special care.

It is noteworthy that the diet offered by gavage does not always indicate aggravation. In the unit where we performed the current study, aiming to promote breastfeeding among preterm infants, we prioritized the probe feeding transition directly to the breast, without the use of nozzles or cups[17], which implies tube use and diet administration by means of a gavage for virtually all patients admitted to the NICU until their discharge to the NICU. The observation that giving the diet by means of a gavage could not be a good predictor of disease severity in the newborns in the NICU was also highlighted in another study[15].

Although the use of one-way valved drainage for the treatment of hydrocephalus has relatively high incidence in neonatology[18,19] and refers to a greater clinical severity, it is not addressed in the NTISS. The options "external ventricular derivation" and "peritoneal ventricular drainage" could be presented in the "other procedures" dimension. The event occurred with a patient during the period of this study, but it was not scored in his score.

CONCLUSION

The average required by the NTISS disease severity score differed according to sex profiles, gestational age and weight. Overall, the most severe cases were male patients with lower weight and gestational age at birth, especially those under 1,000g and 32 weeks.

Changes in the average of the NTISS dimensions at the moment of hospitalization in the NICU - admission, hospitalization duration, discharge and on death occasions - point to a need for reorganization of human and material resources, directed to specific moments of hospitalization, representing care demand peaks.

The NTISS is an easy application scoring system, which can be used both prospectively and retrospectively. It allows the establishment of a complete situational diagnosis of neonatal units, considering both the profile of disease severity of patients as the variation of care practices and therapies over time and hospitalization moments - admission, hospitalization, discharge or death.

Its use in neonatal units allows, not only a longitudinal monitoring of severity of patients and therapies used, but also an equal comparison between different services in different contexts.

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