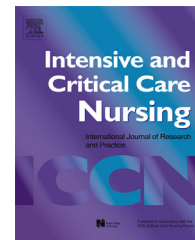




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ORIGINAL ARTICLE

Nursing Activities Score (NAS): 5 Years of experience in the intensive care units of an Italian University hospital^{☆,☆☆}



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KEYWORDS

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Summary

Objective: To retrospectively analyse the application of the Nursing Activities Score (NAS) in an intensive care department from January 2006 to December 2011.

Method: The sample consists of 5856 patients in three intensive care units (GICU: General Intensive Care Unit, NeuroICU: Neurosurgical Intensive Care Unit, CICU: Cardiothoracic Intensive Care Unit) of an Italian University hospital.

The NAS was calculated for each patient every 24 hours. In patients admitted to general ICU, the following scores: SAPS 2 and SAPS 3 (Simplified Acute Physiology Score), RASS (Richmond Agitation Sedation Scale) and Braden were also recorded along with the NAS.

Results: The mean NAS for all patients was 65.97% (Standard Deviation ± 2.53), GICU 72.55% (± 16.28), NeuroICU 59.33% (± 16.54), CICU 63.51% (SD ± 14.69). The average length of hospital stay (LOS) was 4.82 (SD ± 8.68). The NAS was high in patients with increasing LOS ($p < 0.003$) whilst there were no significant differences for age groups except for children 0–10 years ($p < 0.002$). The correlation of NAS and SAPS 2 was $r = 0.24$ ($p = 0.001$), NAS and SAPS 3 $r = -0.26$ ($p = 0.77$), NAS and RASS $r = -0.23$ ($p = 0.001$), NAS and Braden $r = 0.22$ ($p = 0.001$).

Conclusions: This study described the daily use of the NAS for the determination of nursing workload and defines the staff required.

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[☆] The present study was performed at the Emergency Department and Intensive Care, San Gerardo Hospital Via Pergolesi 33 – Monza (MB), Italy.

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Implications for Clinical Practice

- The daily use of the NAS can determine the nursing staff adequacy in every ICU setting.
- Estimation of the nursing care time required enables reorganisation of staff allocation and activities are strictly related to the severity ill case-mix of patients.

Introduction

Over the past 20 years, nursing activity in the intensive care unit (ICU) has undergone significant changes, partly due to the increase in the average patient age (Galzerano et al., 2009; Sprung et al., 2012) but also due to the complexity of illnesses present (Kvale and Flaatten, 2002; Malacarne et al., 2010). Nursing interventions have increased and become more complex giving rise to an increase in nursing workload (Jakob and Rothen, 1997).

With the aim of updating the previous instruments for measuring nursing workload present in literature such as TISS 28 (Therapeutic Intervention Scoring System) (Miranda et al., 1996; Lefering et al., 2000; Padilha et al., 2007) and NEMS (Nine Equivalents of Nursing Manpower Score) (Miranda et al., 1997), the NAS – Nursing Activities Score (Miranda et al., 2003) was developed in 2003. The NAS is a score system expressed as a percentage from 0% to 177%. A score of 100% represents a nurse/patient ratio 1. There are 23 items with variable weights in relation to the activities.

The items examine specific activities: patient monitoring, medication, hygiene procedures, care of drains, patient mobilisation and positioning, admission and discharge procedures, administrative and managerial tasks, research activity and renal, invasive and non invasive ventilation, cardiovascular, metabolic and nutritional support. There is also the possibility to weigh those specific interventions in intensive care which are the exclusive competence of nurses. The authors maintain that the score wholly reflects 81% of nursing time. The remaining 19% comes from nursing activities deriving from medical interventions, related exclusively to the severity of illness of the patient (Miranda et al., 2003).

NAS was created in order to better define nursing activities in relation to continuous patient monitoring, performing hygiene procedures, mobilisation procedures, data handling and caring for relatives. Some authors showed how NAS is more reliable than NEMS in accurately measuring the nursing workload (Bernat Adell et al., 2006; Stafseth et al., 2011).

In many ICUs NAS is used daily to define the workload. Bernat Adell et al. (2005) recorded an average NAS score of 50.20% identifying the patient/nurse ratio as 2.5 in an intensive care unit.

In an Italian study of 550 patients published in 2008, Lucchini et al. (2008) identified a mean NAS score of 76.1% for patients in a General Intensive Care Unit. The study highlighted significant differences between the NAS of medical patients (84.2%) versus surgical patients (79.0%). Stafseth et al. (2011) recorded the mean NAS score in 246 patients of four Norwegian intensive care units and concluded that the nursing staff present during the period investigated was capable of satisfying patient care demands with a NAS between 75 and 90%.

The use of NAS compared to the various nursing workforces has shown how the patient/nurse ratio can vary, identifying situations where there is an overstaffing of personnel (Padilha et al., 2010) compared with situations of understaffing (Ducci and Padilha, 2008; Inoue and Matsuda, 2010).

Inspired by a literature review published in Italian (Guccione et al., 2004), the General Intensive Care (GICU) unit of our institution in 2005 initiated a training period for the use of NAS and began using the scoring system on a daily basis from January 2006. In the following years, after the relevant training period the Neurosurgical Intensive Care Unit (NeuroICU – January 2007) and the Cardiothoracic Intensive Care Unit (CICU – January 2009) also began using NAS on a daily basis.

The three intensive care units belong to the Department of Perioperative Medicine and Intensive Care of Monza Hospital, Italy (University Hospital with 1000 beds).

The organisational features of the three ICUs from a nursing point of view are similar, with a nurse/patient ratio estimated at 0.6. Nurses are allocated regardless of the level for patient severity. Nurses involved in the three ICUs cared of admitted patients and their transportation needs.

The primary objectives of this study were to retrospectively analyse the mean NAS score level of admitted patients and compare the data to the nursing workforce actually present.

The secondary objectives were:

- to highlight any differences in nursing workload among the various types of patients in the various ICUs, and correlate the NAS to the patient's age and the length of stay
- to check the correlation between the NAS and level of sedation as expressed by the RASS-scale Richmond Agitation Sedation Scale (Sessler et al., 2002; Ely et al., 2003), with two indices of clinical severity SAPS 2 (Simplified Acute Physiology Score), as used in the GICU up to December 2010)/SAPS 3 (Le Gall et al., 1993; Markgraf et al., 2000; Perren et al., 2012), as used in the general ICU from January 2011 and the risk of developing pressure ulcers recorded upon ICU admission and expressed with the Braden scale (Bergstrom et al., 1998; Cho and Noh, 2010).

Methods

The study was observational and retrospective. All patients in the GICU (period: July 2006/December 2011), NeuroICU (January 2007–December 2011) and in the CICU (January 2009–December 2011) were included in the study.

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