

RATING TWO SCALES MEASURING WORKLOADS BY NURSES

AVALIAÇÃO DE DUAS ESCALAS DE MEDIÇÃO DE CARGAS DE TRABALHO
PELOS ENFERMEIROSVALORACIÓN DE DOS ESCALAS DE MEDICIÓN DE CARGAS DE TRABAJO
POR PROFESIONALES DE ENFERMERÍA

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Abstract

Objective: To determine the association between sociodemographic and labor variables of the nursing staff, and the level of satisfaction in the use of NEMS and NAS scales in an ICU. Determine what is most appropriate. **Method:** Descriptive, incidental, quantitative and concurrent study. Rating NAS and NEMS scales by nurses / as ICU through a questionnaire designed and validated for a sample. Descriptive analysis, and association of sociodemographic and labor variables with each question in the questionnaire. Statistical analysis using SPSS version V.18.0. **Results:** The NAS gets better overall assessment scale (7.20 points) and all items (from 5.66 to 7.36 points), the NEMS (3.93 points) scale. **Conclusion:** Older professionals in the hospital better value NEMS scale, and the oldest in UCI considered the most appropriate NAS workloads to measure for the unit, patients and professionals, compared with NEMS.

Keywords: Workload; Nursing; Intensive Care Units.

Resumo

Objetivo: Determinar a associação entre variáveis sociodemográficas e de trabalho da equipe de enfermagem, e o nível de satisfação no uso das escalas NEMS e NAS em uma UTI, observando qual a mais adequada. **Método:** Estudo descritivo, incidental, quantitativo e concorrente. Avaliação das escalas NAS e NEMS por enfermeiros/as de UTI através de um questionário elaborado e validado para uma amostra. Análise descritiva e associação das variáveis sociodemográficas e de trabalho com cada pergunta do questionário. Análise estatística usando SPSS versão V.18.0. **Resultados:** A escala NAS obteve melhor avaliação global (7,20 pontos), e em todos os itens (de 5,66 a 7,36 pontos), que a escala NEMS (3,93 pontos). **Conclusão:** Profissionais mais

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antigos no hospital avaliam melhor a escala NEMS, e os mais antigo na UTI consideram a NAS mais apropriada para medir cargas de trabalho para a unidade, pacientes e profissionais, em comparação com NEMS.

Descritores: Carga de Trabalho; Enfermagem; Unidades de Terapia Intensiva.

Resumen

Objetivo: Conocer la asociación entre las variables sociodemográficas y laborales del personal de enfermería, y el nivel de satisfacción en la utilización de las escalas NEMS y NAS en una UCI. Determinar cuál es más adecuada. **Método:** Estudio descriptivo, incidental, cuantitativo y concurrente. Valoración de las escalas NAS y NEMS por los enfermeros/as de la UCI mediante un cuestionario diseñado y validado para una muestra. Análisis descriptivo, y asociación de las variables sociodemográficas y laborales con cada pregunta del cuestionario. Análisis estadístico mediante SPSS versión V.18.0. **Resultados:** La escala NAS obtiene mejor valoración general (7,20 puntos) y de todos los ítems (5,66-7,36 puntos), que la escala NEMS (3,93 puntos). **Conclusión:** Profesionales más antiguos en el hospital valoran mejor la escala NEMS, y los más antiguos en UCI consideran la NAS más adecuada para medir cargas de trabajo para la unidad, pacientes y profesionales, en comparación con la NEMS.

Descriptor: Carga de Trabajo; Enfermería; Unidades de Cuidados Intensivos.

Introduction

At present, different variables converge when we speak about nursing care. On the one hand, there is the evolution of the nursing discipline, characterized by the adoption of its own methodology, the Nursing Process. This process is a systematic method organized to offer effective and efficient care oriented to the achievement of goals. Together with the application of its own taxonomies, it brings a more independent character to the nursing area, resulting in an increase of nursing activities, which needs to be integrated, in the daily practice, with those delegated by other disciplines. This fact influences the substantial improvement of the nursing care provided

to patients, however, at the same time, it contributes to increase the workload.

On the other hand, we have those characteristics, which are essential to the care activity, not limited to those related to the patients, but including those related to the evolution of the health care, marked by an increase of new health care technologies, the increasing interest in care quality and the maintenance of the human character in the nurse-patient relationship. All this happens in a context of economic crisis, characterized by presupposed adjustments and expenditure reduction, in which nursing represents the most affected collective, being the most numerous considering any health institution.¹⁻³

This situation expresses the importance to determine, as precisely as possible, the needs of the nursing staff, especially in highly specialized services such as Intensive Care Unit (ICUs). In this way, it is possible to ensure the quality of the nursing care, increasing patient safety and avoiding complications and adverse events related to health care,⁴ such as nosocomial infections,⁵ postoperative complications,⁶⁻⁷ pressure ulcers,⁸ and, overall, increased morbidity and mortality.⁹⁻¹⁰

To this consequences involving hospitalized patients, it is necessary to add those which produce inadequate work load management to the nursing staff, creating situations of stress and Burnout, with work overload, patient death and suffering.¹¹ In addition, the scarce legality on which the nurse-patient ratio is based, calculated in services or units according to experience, tradition or other reasons hardly scientifically validated.

In this scenario, studies on work load appear as the most appropriate and objective method. In such studies, scales of work load measurement are usually used, allowing patients classification according to their care needs, favoring quality control and comparison between units with similar characteristics. By objectively knowing the work load and the specific personnel needs required by the

unit, it becomes possible to optimize the nursing human resources in order to achieve proportionality between health expenditure and the real needs involving patients care.¹²

Over the last years, several tools have been developed to measure nursing work loads, such as NEMS and NAS scales. These systems are divided into two broad groups, which comprise instruments based on direct measurements and those based on indirect measurements. The direct measurement instruments measure time consumed in patients care, and those indirect measurement instruments measure the variables that allow time estimation of care indicators.

Traditionally, workload studies have been carried out in ICUs because such units are the ones admitting patients with greater demands for care, due to their critical situation, and the consequences that derive from it, whether economic (costs of material and human resources), whether related to staff specialization, degree and characteristics of the attention and care demanded, etc. In order to do so, scales for workload measurement specifically designed to ICUs have been created, and they cover the most usual nursing activities, such as the ones for indirect measurements: SAF, NISS, Omega, Crew System and NCR or the ones for direct

measurements: GRASP, TOSS and NAS.¹³

For this work we focus on NEMS and NAS scales, since they are the first for habitual use in ICUs, object of study since 1997, without any repercussion in the level of human resources management, and also for proposing NAS scale as an alternative scale (the one created most recently).

The NEMS scale is characterized by measuring once a day the nursing care activity during the 24 hours prior to registration, in a simple way, with 9 variables. Since it is based on measurement scales at a therapeutic level, with medical criteria, it does not cover all activities performed by nurses, what makes this scale less representative of the nursing work. Furthermore, it does not determine neither the workload per shift, nor the overall workload of the unit, it also does not allow managing human resources at any time and it does not allow establishing the nurse-patient ratio, basing itself on actual workloads.

NAS scale is designed from the identification of those nursing activities that best reflect the workload in ICUs and also from the assignment to them of a specific score, based on the nursing time spent in its accomplishment,¹⁴ and not on the basis of therapeutic interventions. Therefore, it can assess not only the nurses' interventions related to the severity

of the patient and the therapeutic interventions applied to him, but also those activities properly derived from the nursing care, regardless of the severity of the patient.

The scale contains 23 items and each activity is scored based on the proportion it represents, with respect to the total nursing time in 24 hours. This way, the score that each item receives should be understood as a time percentage, calculating the total time of the patient based on the sum of all the registered items. From this sum, calculation of the needed model is immediate, since a nurse is needed in every 100 marks.¹³ Recently, a cross-cultural adaptation of the NAS scale to Castilian and to shift work¹⁵ was carried out, taking into consideration the author's recommendations.

With the application of validated workload measurement scales, in the first phase of our investigation we identified the adequacy and use of two scales, considering the data related to the most frequent nursing activity at the ICU under study. According to the score system and the analysis proposed by each scale, the aim of this study was to evaluate the nursing workload and the nurse-patient ratio, among other useful data related to health management. However, in order to decide which scale is the most adequate for this ICU, it is essential to complement such

data with the satisfaction degree of the nursing staff who used them.

Methodology

After a brief and updated documentary review on the nursing workload, in general and in the Intensive Care Unit particularly, a descriptive, incidental, quantitative and concurrent study was designed regarding temporality in data compilation. For this, the variables of a questionnaire previously designed and validated in an initial sample and answered by nursing professionals of the ICU under study were analysed to know their opinion-satisfaction regarding the two used scales and the process of measuring the workloads of their unit.

The scope of this study focus on the ICU at the General Hospital of H.C.U.V. Arrixaca, unit of reference for the Murcia-West health area and for the Murcia Region in some pathologies. It has a capacity of 32 beds and a hemodynamic, distributed in four differentiated zones, for admitting patients in the following cases: polytraumatized, cardiac, transplanted, postoperative of cardiopulmonary bypass, large burnings, cerebral accidents or ischemia, multiple organ failure, etc.

The whole sample universe was considered, that is, all the nursing staff working at this ICU. In addition to this inclusion criteria, it was required that all

professionals approached had used both workload measurement instruments. Then, it would be possible to complete the questionnaire based on their personal experience with such instruments. The survey was developed over a period of time free of holiday, so that it was the same personnel engaged in the application of the scales, excluding the substitute personnel.

Initially, a pilot study was performed applying the questionnaire to 20 nurses of the unit for its validation, and later, after elaborating the definitive questionnaire, the total number of nurses was admitted - 85 professionals.

The questionnaire consists of a series of items, which were defined taking into account the data and conclusions obtained from the bibliographic review, in addition to the consensus among professionals involved. It consists of some independent sociodemographic and labor variables, besides other dependents related to those of the measurement instruments.

Regarding the questions and the general research, they were intended to be brief, complete (including both scales), unambiguous, reality-related, with closed, mutually exclusive responses, and in an appropriate format to assess subjective satisfaction supported by pictograms for a better understanding.

The questionnaire consists of 6 questions distributed in 5 blocks. It begins by outlining the objectives of the study and the corresponding instructions for its correct completion, continuing with some questions to know the sociodemographic dimension of the interviewees (age, sex, year of completion of nursing studies, time of activity at the hospital, time of activity at the ICU and type of contract).

The central questions of the questionnaire are divided into three distinct blocks. The initial block, in which general questions are asked regarding workload measurements, evaluates the importance/need of measuring nursing workloads in the ICU and what their (nurses) personal evaluation of the current measurement method is. There is another block bringing an opinion research on the different aspects of the NEMS scale (structure, adequacy to the characteristics of the ICU and its patients, record of the nursing activities that includes accomplishment, frequency, utility, if it is considered representative and its degree of satisfaction). In a last block, the same items about NAS scales are asked. All questions are to be scored from 0 to 10, 0 being the minimum value and 10 the maximum. In order to complete the questionnaire, an open-ended question is asked, and suggestions and inputs can be included regarding both the used

measurement instrument and the process of workload measurement in general.

In the pre-test, by means of which we will prove that it is appropriate for the sample, a series of questions are formulated at the end to prove the degree of understanding, writing and difficulty of the questions. The two scales, as they were used, are added to the questionnaire to facilitate its filing.

Data analysis was performed using Microsoft Excel 2010. For the pre-test, only a descriptive analysis of the quantitative data was performed, and the corresponding to the validation of the pre-test. For the definitive questionnaire, a descriptive analysis was performed for numerical variables, calculating the mean and standard deviation, and for qualitative variables, frequencies and percentages were calculated. Subsequently, the association between sociodemographic variables and each item/question of the questionnaire was performed. For statistical analysis of the results, the SPSS computer program version V.18.0. was used, and for the contrasts of hypotheses, after confirming the normality in the variables distribution, the Anova and T-Student parametric tests were used. All results were considered significant at a level of $p \leq 0,05$.

Results

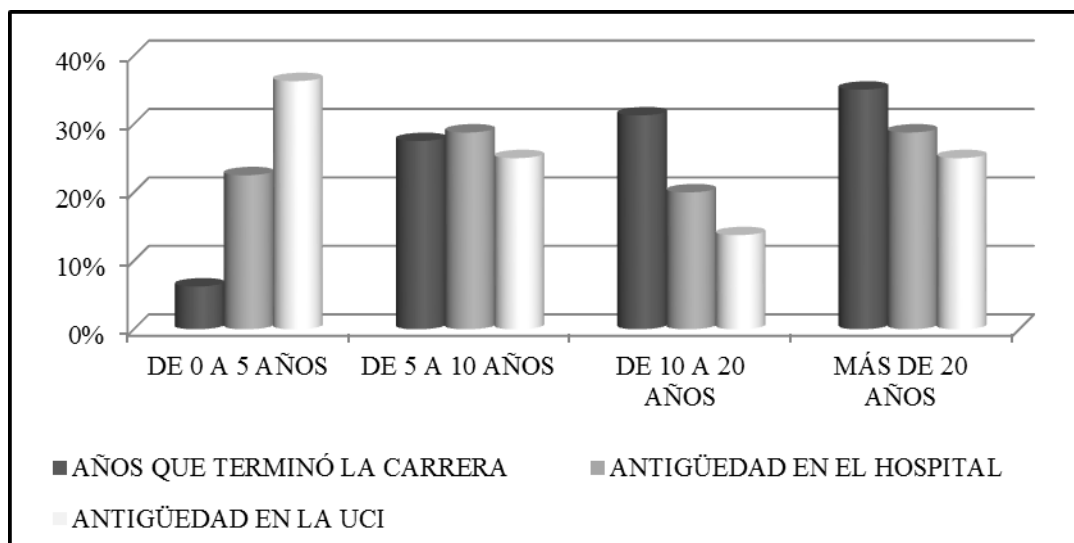
In the initial results of the pre-tests, most of the professionals surveyed, with hospital experience ranging from 5 to 10 years, mean time equal to the time of studies conclusion and who work at the ICU from 0 to 5 years scored 9 the need to measure workload.

The evaluation of the NEMS scale was 4,05. Its items were scored between 2,9 and 6,55. The best scores were given for the “simplicity and speed of its completion”. The general evaluation of the NAS scale was 7,8, and the scores of its

items ranged from 5,20 to 7,75. The best valued aspect was that “it covers all nursing activities carried out at the ICU”.

The descriptive results of the definitive questionnaire in 80 completed surveys (94,11%) - where the profile of the interviewed professional was comprised mostly of women (71,25), with average age of 40 years old, permanent staff (56,25%) and ICU activity time ranging from 0 to 5 years (36,25%) (Figure 1) - coincided with the pilot results, with the need to measure workloads also scoring 9.

Figure 1. Results of the labor variables of NAS and NEMS scales satisfaction questionnaire for nursing professionals. Murcia Spain 2014



The score for NEMS was 3,93, and the score corresponding to its items ranged from 3 to 5,74. The NAS scale got 7,20 in

the general assessment, and its items were scored from 5,66 to 7,36 (Table 1 and Figure 2).

Figure 2. Comparison of the professionals' evaluation of the NAS and NEMS scales Murcia Spain 2014

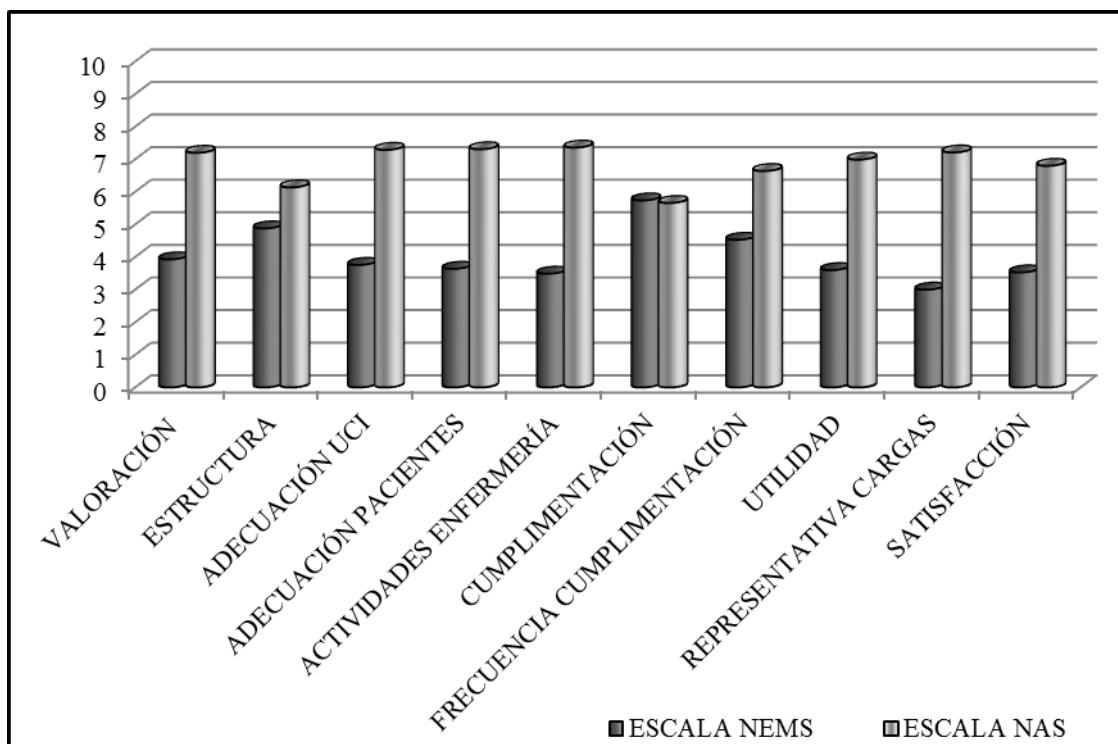


Table 1 Average score of NAS and NEMS satisfaction questionnaire questions for nursing professionals. Murcia Spain 2014

Questionnaire question	Average rating
Importance/need to measure workload	9,05
Personal evaluation of NEMS scale	3,93
Structure/presentation of NEMS scale	4,88
Adequacy of the NEMS scale to the ICU	3,76
Adequacy of the NEMS scale to patients	3,64
Record of nursing activities with NEMS scale	3,49
Completion of the NEMS scale	5,74
Frequency of completion of the NEMS scale	4,53
Utility/improvement of management with the NEMS scale	3,60
NEMS scale representative of workloads	3
Perception/satisfaction of the NEMS scale	3,53

Personal evaluation of the NAS scale	7,20
Structure/presentation of the NAS scale	6,14
Adequacy of the NAS scale to the ICU	7,29
Adequacy of the NAS scale to patients	7,31
Record of nursing activities with NAS scale	7,36
Completion of the NAS scale	5,66
Frequency of completion of the NAS scale	6,64
Utility/improvement of management with the NAS scale	6,99
NAS scale representative of workloads	7,21
Perception/satisfaction of the NAS scale	6,80

When crossing the sociodemographic and labor variables with the rest, we obtained statistical significance ($p < 0,001$) in the evaluation given to the NEMS scale, the consideration of its adequacy to the ICU and to the patients, the assessment of nursing activities and its utility, which differs according to the professional's time in the hospital. There is also some influence in considering NEMS as a scale that adequately represents nursing workloads ($p < 0,005$), and staff satisfaction with it ($p < 0,004$).

Regarding ICU activity time, we found statistical significance in the evaluation of the NEMS scale structure ($p < 0,043$). As for the NAS scale, we found its adequacy to ICU ($p < 0,015$) and to patients ($p < 0,007$), its representativeness

of nursing activity ($p < 0,047$) and regarding staff satisfaction ($p < 0,042$).

Regarding the qualitative evaluation of the scales by the professionals, NEMS scale was considered insufficient and little representative of the nursing workloads in the Intensive Care Units, unlike NAS scale, which was valued as more adequate and representative, although more extensive and complex. As suggestions provided through the questionnaire, we emphasize the need to fill in the scales each shift, computerically, and it is requested to participate in the entire process, being informed about the results derived from them and the possible repercussions in the human resources management.

Discussion

The professionals surveyed expressed their concern and need to adapt the nursing worksheets to the care demands in order to improve not only the quality of patients care, but also the labor quality of the professionals. They also expressed their willingness to collaborate for improving the current measurement process, either changing the scale or changing the procedure in general.

This study coincides with others¹⁶⁻¹⁷ that measured the correlation between the two scales, as individual evaluation of each to determine which of the two is the most adequate, resulting in a positive assessment with respect to the NAS scale, as opposed to the NEMS, which tends to receive a more negative opinion among the nursing professionals of the Intensive Care Units.

As we can see in the results obtained, the valuation of the two scales by the professionals is very different concerning global valuations of each one and of the items concretely. NAS received a very good evaluation, despite it was new for almost all surveyed personnel, given its first application at this ICU. On the other hand, NEMS was considered very deficient, although it has been used at this unit for many years and is well known among the staff.

This reality confirms the urgent need to change the nursing workload

measurement instrument, as well as the need to adapt and modify the measurement process that had been carried out for that purpose. This research also coincides with the results obtained in other studies,¹⁷⁻¹⁹ which also analyzed the evaluation of these two scales among the nursing staff of ICUs. According to the nurses opinion, 94,7% of them considered that NAS reflects better the activities performed by a nurse in the ICU, and it is more useful in the calculation of spreadsheets. 89% of them felt better represented by this scale.

It could be observed that NAS presented better adaptation than NEMS in relation to actual workloads of patients admitted in the ICU. It was also observed the non-possible correlation between the values of both systems. At the same time, they highlight the difficulty presented by the NEMS scale for the calculation of spreadsheets due to a design that is not oriented towards nursing.¹⁹⁻²⁰

Concerning NAS, they affirm¹⁸ that it is well adapted, with no periodic update requirements, to the real nursing work in ICUs. Its design is oriented to this, regardless of the pathology that justifies the patient's admission into this unit, being useful to properly evaluate the nursing worksheet. Therefore, we can say that our results coincide with other studies¹⁷ that demonstrated the best fit of the NAS scale

versus the NEMS scale, as a system for nursing workload measurement in the ICU.

Conclusions

With regards to the NEMS scale, the workload measurement process currently used in the ICU under study is considered inadequate from the point of view of professionals.

The professionals' time of activity in the ICU is related to the adequacy of the NAS scale to the unit and to its patients. That is mainly due to their negative experience with completing the NEMS scale. Although this scale has been used for a longer time, it does not provide satisfactory results that could bring management improvements for the unit. "Finding oneself more satisfied" and "cataloging it as more complete", 'adequate to the unit' and 'representative of their work' all motivate the good reception that NAS scale had in the unit, despite the novelty it represents and the traditional reluctance that is often associated with older professionals.

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Acknowledgement

We would like to thank the participation of all the nurses from the ICU, guided by the supervisor, the responsible for the equipments and the computer program, as well as the Direction of the Ward, who allowed us to perform the field work at their hospital, as well the patients hospitalized in the ICU during the days of our work, not forgetting those in a deep sleep, who have also collaborated to this study.

RECEIVED: 13/08/2016
APPROVED: 04/04/2017
PUBLISHED: 31/07/2017