

Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.iccn.2018.11.002>.

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Response from Authors

Nursing activity measurement for intensive care unit patients with specific conditions – An area of further investigation



Dear Editor

We have much appreciated the letter we received regarding our work and strongly support their analysis and interesting suggestions, that may lead to future research work.

An Intensive Care Unit (ICU) is among the most resource-heavy facilities in a modern hospital. One of the greatest determinants of an ICU spending is nursing workload. In fact, the advancement of therapies, ever growing age and comorbidities call for more comprehensive and longer treatments (Reardon et al., 2018). Cutting resources to the care of patients is not only ethically questionable but also counterproductive. There are evidences that link enhanced nursing care to a better patient outcome with lower complications, which in turn translates to reduced costs (McHugh et al., 2016; Lee et al., 2017).

The challenge is, therefore, allocating resources in a smart way, to adequately meet the needs of patients. A dynamic resource allocation model based on the intensity of care is already been adopted by several institutions with interesting results. One of the key aspects of this approach is the ability to correctly measure the nursing workload required during a specific shift in an ICU in order to modulate the staffing accordingly.

There are several tools to measure nursing workload in an ICU, such as TISS-28, NAS and NEMS, that take into account several activities nurses perform during a shift. They are standards to assess the adequacy of the resources allocated for the needs of the patients, but they were developed in a radically different ICU environment, as pointed out by the authors of the letter. The performance of these scores is influenced by how fitting target activities are with the case mix of a specific ICU. In a previous study we observed that there are factors, not currently measured, that correlate with higher nursing

workload burden, such as patient body weight and the infectious status (Giuliani et al., 2018). The growing prevalence of these conditions calls for a re-thinking of nursing workload measurement tools to better encompass a changing ICU population.

Our work is an initial step towards the analysis of nursing activities in modern ICUs and patient weight or infection status may not be the best performing determinants of the actual workload. We think that there may be more significance in the combination of activities that taken into account alone do not have enough impact to affect daily routine. The combination of factors as highlighted in our paper may have a synergistic effect on the increase of workload burden.

The path that lies ahead is twofold: on one side there is the research into the existing scores to calibrate them on specific ICU populations and on the other side there is the adoption of these scores in the daily routine of ICU management. Scientific Societies have the skills and capabilities of identifying the main issues that may influence nursing workload in an ICU, providing guidelines for researchers globally to investigate specific factors. Infectious status was correlated with increased nursing workload in our study, but it would be necessary to evaluate the impact of protective gear and patient isolation in case of critical infection to more accurately allocate resources. Digital technology could facilitate the adoption rate of nursing workload measurement tools integrating them in a more intuitive framework, such as an application, that has the immediacy of allowing user to record the tasks they have performed during a shift on a patient. Data generated could lead to the creation of larger databases, that serve several hospitals at a national or international level, providing an even more accurate calibration of the scores.

In conclusion, resource optimisation is fundamental in modern ICU management to ensure the highest achievable quality in patient care and cost containment. Staffing is one of the determinants of ICU spending and a critical element of the clinical outcome. A sensible resource allocation is possible through the

measurement of nursing workload in a intensive care setting with existing tools, which could be calibrated on several items, such as infection status and patient weight, to be more fitting in with the characteristics of specific ICU populations.

The ability to measure a phenomenon generates quantitative data, that can more efficiently generate knowledge.

Our work should be considered a call to action for other research groups to join forces and set up a multicenter trial to better investigate factors, body weight and infection status are just candidates, that affect the nursing workload burden in an ICU and have an impact on resource allocation.

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Supplementary data to this article can be found online at <https://doi.org/10.1016/j.iccn.2018.11.003>.

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