Accepted Manuscript

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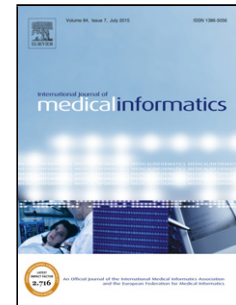Please cite this article as: David Riaño, Francis Real, Jose Ramon Alonso, Improving resident's skills in the management of circulatory shock with a knowledge-based e-learning tool, <![CDATA[*International Journal of Medical Informatics*]]> (2018), https://doi.org/10.1016/j.ijmedinf.2018.02.006

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Improving resident's skills in the management of circulatory shock with a knowledge-based e-learning tool

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Abstract

Background: Correct clinical management of circulatory shock in emergency departments (ER) and intensive care units (ICU) is critical. In this context, the transmission of professional skills by means of the practical supervision of real cases at the point of care entails important issues that can be widely overcome with the use of computer knowledge-based e-learning tools.

Objective: *Shock-Instructor* is a web-based e-learning tool implementing the already tested training program model (TPM) that uses a knowledge base about the evidence found in the clinical practice guidelines about seven types of shock. This tool is expected to reduce the learning times and to improve the skills of hospital residents with regard to both the correct application of the guidelines and patient recovery, suppressing the risks of direct interventions.

Methods: *Shock-Instructor* has been used to train residents in the Emergency Department of the Hospital Clínic de Barcelona (Spain) in order to reduce the learning cycle without affecting quality. A case-base with the description of 51 cases with shock and a knowledge-base with 137 clinical rules about the treatment of shock were incorporated to the Shock-Instructor system. A group of 33 residents was involved in a randomized controlled trial to check whether the use of Shock-Instructor can significantly improve the skills of clinicians after one week of problem-based training.

Results: No significant differences were found in the skill levels of the intervention (IG) and control (CG) groups prior to learning. However, we observed an improvement of the IG clinicians capacity to stabilize patients with shock in better clinical conditions (5% improvement, p=0.004), and to reduce the risk of death in 19.52% (p=0.004), after training. First-year residents in IG enhanced 14.3% their sensitivity in the correct application of guidelines (p=0.01), and 14.9% the mean survival rate of their patients (p=0.01), after being trained with Shock-Instructor for a week. Residents with specialties different from ER and ICU enhanced 16.1% their application of guidelines (p=0.04), and 14.5%

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