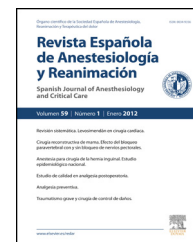




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## ORIGINAL ARTICLE

### High fidelity simulation in Spain: From dreams to reality<sup>☆</sup>

M.J. Durá<sup>a</sup>, F. Merino<sup>a</sup>, R. Abajas<sup>a</sup>, A. Meneses<sup>b</sup>, A. Quesada<sup>c</sup>, A.M. González<sup>d,\*</sup>

<sup>a</sup> Escuela de Enfermería, Universidad de Cantabria, Santander, Spain

<sup>b</sup> Escuela de Enfermería, Universidad Complutense de Madrid, Madrid, Spain

<sup>c</sup> Unidad de Docencia Médica, Hospital Universitario Marqués de Valdecilla, Santander, Spain

<sup>d</sup> Servicio de Anestesiología y Reanimación, Hospital Universitario Marqués de Valdecilla, Santander, Spain

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#### KEYWORDS

Simulation;  
High fidelity simulation;  
Clinical simulation;  
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Postgraduate education

**Abstract** Clinical simulation has emerged as a powerful new tool for the learning and assessment of different skills and attitudes in patient care, by using innovative technology such as high fidelity simulators (HFS).

**Objective:** To describe the current state of high fidelity clinical simulation in Spain and its principal characteristics.

**Methods:** Descriptive observational study that analyzes information on the clinical centres that have HFS in our country.

**Results:** There are currently a total of 80 centres with HFS in our country, mainly distributed in university centres (43), hospital and emergency centres (27), simulation centres and institutes of simulation (5), and the rest (5) associated to entities of diverse ownership. The temporal development of HFS has been slowly progressive, with a significant growth in the last 6 years. The majority (74%) have specific facilities, auxiliary equipment (60%), and professionals with a shared commitment (80%). It is already integrated into the training programmes in 56% of university centres with HFS.

**Conclusions:** The development of HFS has been remarkable in our country, and is mainly related to university undergraduate and postgraduate clinical medical education. It would be useful to design a network of simulation training centres of Health Sciences in Spain, which would be operational, sustainable and recognised, to optimise the use of these facilities.

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\* Corresponding author.

E-mail address: [anrgga@humv.es](mailto:anrgga@humv.es) (A.M. González).

**PALABRAS CLAVE**

Simulación;  
 Simuladores de alta fidelidad;  
 Simulación clínica;  
 Formación pregrado;  
 Formación posgrado

**Simulación de alta fidelidad en España: de la ensoñación a la realidad**

**Resumen** La simulación clínica ha surgido como una potente herramienta para el aprendizaje y evaluación de las diferentes capacidades y actitudes en el ámbito de las Ciencias de la Salud, mediante el uso de tecnologías innovadoras, como los simuladores de alta fidelidad (HFS).

**Objetivo:** Describir el estado actual de la dotación de equipos de simulación clínica de alta fidelidad en nuestro país e identificar sus características principales.

**Método:** Estudio observacional descriptivo que analiza la información sobre los centros que poseen HSF en nuestro país.

**Resultados:** Existen actualmente un total de 80 centros dotados de HFS en nuestro país, distribuidos principalmente en centros universitarios (43), centros hospitalarios y de urgencias (27), e institutos o centros de simulación (5), estando el resto (5) asociado a entidades de diversa titularidad. El desarrollo temporal de los HFS ha sido lentamente progresivo, experimentando un importante crecimiento en el último sexenio. En su mayoría (74%) cuentan con instalaciones específicas, equipos auxiliares (60%) y profesionales con dedicación compartida (80%). Está integrada ya en los programas de formación del 56% de los centros universitarios dotados de HFS.

**Conclusiones:** Disponemos actualmente de un notable desarrollo de HFS en nuestro país, principalmente relacionados con la docencia médica pregrado universitaria y posgrado hospitalaria. Sería de utilidad diseñar una red de centros de formación en simulación de Ciencias de la Salud en España, que sea operativa, sostenible y reconocida, que permita optimizar la utilización de estos centros.

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**Introduction**

The exponential growth of simulation techniques in clinical training in recent years has been documented in numerous articles and reviews that track the history of simulation,<sup>1</sup> the evolution of the technique as a *continuum* from low fidelity to high fidelity simulators (HFS),<sup>2</sup> and confirm its effectiveness as an educational tool.<sup>3,4</sup>

Conceptually, simulation is a technique, not a technology, which has been widely used in teaching methodology.<sup>5</sup> Simulation is a powerful, safe and controlled teaching method that gives students the kind of experience they would obtain from professional practice. By recreating a wide range of settings and scenarios,<sup>10</sup> it develops not only their intellectual, psychomotor, and technical skills,<sup>6,7</sup> but also non-technical elements such as decision-making, planning, communication, leadership and teamwork.<sup>8,9</sup> Using these new techniques in training courses will give a more uniform, standardised and comprehensive education.<sup>11,12</sup>

Changes in the concept of healthcare and increasing pressure on healthcare personnel make it harder to provide adequate supervision during clinical training and can place patients at undue risk. The traditional "learning by doing" approach is no longer feasible; specific programmes are needed to enable healthcare professionals to acquire certain skills without infringing on patients' rights. In this context, simulation can be a safer alternative to traditional learning, and allow practitioners to learn from their mistakes.<sup>13</sup>

All too often, the concept of "simulation" is confused or used indistinctly with "simulator"; while the former is a teaching technique, the latter is simply a device used for the purpose of teaching. Although many different classifications

can be made,<sup>14</sup> simulators can be roughly divided into two groups: low fidelity simulators, which include screen-based simulators and part-task trainers, and HFS, which would include computer-based models, haptic systems and virtual simulators. While the first group focuses mainly on the acquisition of intellectual knowledge and technical skills, the second goes one step further by adding attitudes or non-technical elements. Studies made in the aeronautical or nuclear industry have shown that critical mistakes and incidents are mainly due to human error derived from the failure of non-technical elements. This has also been shown to be true<sup>15</sup> in the field of healthcare, suggesting that these skills should be taught in both undergraduate and postgraduate clinical training programmes.<sup>16</sup>

Healthcare systems, being service enterprises, required highly qualified human resources. The quality of these services depends on the skill of the medical practitioner. Therefore, both under- and postgraduate programmes must include innovative training strategies in which simulation can play a key role, adapting the simulator-based system to each clinical procedure based on the specific learning targets and level of training.

We believe that well-organised, sustainable, high-profile network of simulation-based clinical training centres should be set up in Spain as a joint effort involving universities, public authorities, professional and scientific associations, healthcare providers and technology companies. In this study we take the first step towards this goal by determining the progress made in simulation techniques in Spain by gathering basic data such as the number of simulators installed, where they are located, how many hospitals are equipped with simulators, how many universities have these

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