



Simulation and education

A multi-professional full-scale simulation course in the recognition and management of deteriorating hospital patients[☆]Lone Fuhrmann^{a,b,*}, Doris Østergaard^{a,b}, Anne Lippert^{a,b}, Anders Perner^c^a Danish Institute for Medical Simulation, Herlev Hospital, Capital Region of Copenhagen, Herlev Ringvej 75, 2730 Herlev, Copenhagen, Denmark^b University of Copenhagen, Copenhagen, Denmark^c Department of Intensive Care, Rigshospitalet, Denmark

ARTICLE INFO

Article history:

Received 19 November 2008

Received in revised form 7 March 2009

Accepted 16 March 2009

Keywords:

Education

Patient Simulation

Training

Professional Education

ABSTRACT

Introduction: Recognition and management of deteriorating patients is often suboptimal, resulting in adverse events that may be avoided if a unified understanding of the signs and needs of deteriorating patients is secured through the education of staff. This paper describes the planning and evaluation of a multi-professional, full-scale simulation-based course for hospital professionals.

Methods: A systematic approach to course development was used and the programme was introduced on four general wards in a university hospital. Experts from the wards were trained as educators and participated in the course development. A needs assessment consisting of an observational study, questionnaires and interviews resulted in the creation of learning objectives to provide the road map for content and teaching methods. A 1-day multi-professional ward-specific educational programme with full-scale simulations, mini-lectures, case discussions and practical training was planned. Course material, a manual for educators and questionnaires for evaluation of the course were developed.

Results: A 1-day full-scale simulation-based educational programme was developed and 50% of the medical staff and 70% of the nursing staff on four wards were trained in a 5-month period. The course was highly rated in terms of content and teaching methods.

Discussion: The systematic approach for developing the course resulted in a relevant, highly rated course, deeply rooted in the wards, implying the opportunity to facilitate local improvements and adjust the content to local needs.

Conclusion: The use of a systematic approach was successful in the development of this multi-professional full-scale simulation-based educational programme, which has proven to be easily applicable and usable.

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1. Introduction

The early recognition and timely treatment of a deteriorating patient may improve outcome, but several studies have shown that the quality of recognition and treatment often is suboptimal, resulting in adverse events.^{1–6} The importance of training ward staff to recognise deterioration is increasingly addressed and it may be that educational programmes on the wards will result in a unified understanding of the signs and needs of a deteriorating patient and improve recognition and management of deterioration.^{7–10}

Educational programmes for medical and nursing staff have traditionally focused on the individual rather than on the multi-professional team or the organisation. This separate and individual training does not address the education of the multi-professional team on the ward or the strategy for implementation of new knowledge.¹¹ In planning staff education, it is often the experts, the leader or specific groups of staff members, who dictate what has to be learned, and formal needs assessments resulting in the formulation of specific learning objectives are seldom performed. Furthermore, the educators are often experts with different professional backgrounds and they may not know the characteristics of the adult learners' incentives to learn and change, which often are driven by an experienced need. The risk is that the needs of the learner and the needs identified by the educator do not align.¹¹ To ensure that educational efforts address all relevant topics and make use of the best available methods for teaching, a systematic process of course development must be performed.

This paper describes the planning process in designing a multi-professional full-scale simulation-based course for medical and

[☆] A Spanish translated version of the summary of this article appears as Appendix in the final online version at doi:10.1016/j.resuscitation.2009.03.013.

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nursing staff, the resulting course and the results of an immediate evaluation and a 6-month follow-up evaluation of the course.

2. Methods

A multi-professional educational programme with the aim of improving the recognition and management of deteriorating patients was developed in cooperation with experts from four general wards at Herlev Hospital, University of Copenhagen, Denmark. The systematic approach to course development described by Harden was used^{11,12} (see Table 1). Anonymous questionnaires were used for immediate and 6-month follow-up evaluations of the course.

2.1. The needs assessment

A needs assessment focusing on barriers preventing recognition and management of deteriorating patients was conducted on the participating wards. The needs assessment included semi-structured interviews with members of nursing staff sampled purposefully by the researcher, in cooperation with leaders from the wards, to represent different professions and different levels of experience among nursing staff, questionnaires distributed among all medical and nursing staff on the wards, observational studies on the wards performed by independent study personnel and ward-expert opinions. The needs assessment indicated suboptimal structure in observational practice and measurement of vital signs, insufficient measurement and documentation of vital signs, insufficient knowledge of signs of deterioration, lack of analytic tools and guidelines in decision making about deteriorating patients and, finally, suboptimal structure for communication amongst the ward teams.⁶

2.2. Learning objectives

An outcome-based approach to education was used, where expected post-course competencies were described in learning objectives prior to course planning. The needs assessment resulted in the description of the learning objectives, providing a road map for the content of the educational programme. The learning objectives are listed in Table 2. To ensure a high degree of consensus regarding terminology and management of the deteriorating patient, close attention was paid to the A–B–C–D–E (airway–breathing–circulation–disability–environment/exposure) principles for management of critically ill patients and to the communication tools developed by the Institute of Health Improvement.^{13–15}

2.3. Course content

A 1-day programme was planned. It consisted of 'building blocks' to equip participants with the skills and knowledge needed to tackle increasingly difficult situations presented during the

Table 2

The learning objectives included in the course addressing teamwork skills and the recognition and management of deteriorating patients.

Recognition of deterioration
• A–B–C (airway–breathing–circulation)
• Clinical signs
• Vital signs
• Criteria for deterioration—when to act
Management of deterioration
• Impaired respiration
• Impaired circulation
• Disordered consciousness
• Signs of sepsis
Teamwork and communication
• SBAR (situation–background–assessment–recommendation) ¹⁴
• Closed loops
• Evaluation and re-evaluation spoken out loud by the team leader

course. The content helped participants to develop critical thinking and reflection and aided their understanding of how to implement what they have learned on the wards. The content was made immediately applicable and relevant in a multi-professional environment. Furthermore, the aim was to address the adult learners' need for experiential learning, with a high degree of activity and self-directed learning.¹¹

2.4. Organisation of the content

Topics were presented in a condensed form in the morning and revisited during the day with increasing levels of difficulty, aiming to raise participants' competencies during the day. Transparent logic behind the presentation order of the learning objectives was planned to enable the participants to appreciate the relevance of each particular learning objective.¹¹

2.5. Educational strategies to be adopted

The educational strategy was based on the FAIR criteria (feedback, activities, individualisation and relevance).¹⁶ This strategy encourages self-directed interactive learning with critical thinking and feedback, which motivates and addresses the needs of the learner.

2.6. Teaching methods

The methods used in this educational programme included interactive lectures and ward-specific case discussions, skills training and full-scale simulation, including debriefing. The training was performed by two educators from the same ward as the participants. Course participants were comprised of a team of one or two doctors and four or five members of the nursing staff.

The interactive mini-lectures focused on the learning objectives and specially designed slide shows and a DVD were shown. The ward-specific case discussion was based on examples from the clinical setting and addressed the learning objectives. The ward-specific skills stations included topics, such as, airway management, including bag-mask ventilation, humidifier assembly (nursing staff) and interpretation of arterial blood gases, including acid–base balance. The ward-specific full-scale simulations consisted of a realistic scenario followed by a debriefing session in which reflection and learning with respect to the learning objectives took place. The scenario was recorded (on DVD) and selected portions of the recording were used in the debriefing to focus discussions and facilitate reflection. The team was debriefed as a group and the focus for the debriefing was the performance of each individual as well as the performance of the team. The structure included a description phase, an analytic phase and an application phase.¹⁷ A simulator

Table 1

Harden's 'ten steps' principle for planning curriculum.^{11,12}

What are the needs in relation to the product of the training programme
What are the aims and objectives
What content should be included
How should the content be organised
What educational strategies should be adopted
What teaching methods should be used
How should assessment be carried out
How should details of the curriculum be communicated
What educational environment or climate should be fostered
How should the process be managed

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