Article published in :
British Journal of Resuscitation
Volume 4 No 3
Spring 2006
pp. 10-11

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Practicalities of the adoption of simulation training in a curriculum

Introduction

Over the years, the advancement of technology has enabled the commercialisation of ever more sophisticated and realistic training tools which can play a very important role in the acquisition of cognitive and practical skills. Early simulation developments started with cardiopulmonary resuscitation using the Laerdal Resusci-Ann mannequins (Lind, 1961) and the first full-scale patient simulators in the 1960s (Abrahamson & Wallace 1980). Although valuable a training tool, sophisticated mannequins come at a price that is not affordable by all institutions; however there are often ways of overcoming such obstacles.

Background information on the technology available

The acquisition of important life-saving skills, based on the fundamentals of a range of key physiological, biological, and pharmacological principles is paramount to healthcare education. It can be acquired in the classroom as well as in clinical practice, but more and more commonly in teaching laboratories. The range of training tools and teaching methods available has greatly improved since the use of oranges to teach cannulation. Students can now use sophisticated self-directed learning systems such as the Laerdal Virtual Intra Venous trainer which uses a mixture of screen-based interactive simulator with a haptic device to simulate the insertion of a cannula into a human hand or arm (Bowyer et al 2005). Another increasingly popular way of teaching involves the use of full scale simulation which allows for contextual inter-professional teamwork training through the exposure to realistic clinical scenarios (Beaubien & Baker 2004). Patient simulators are usually setup in simulated operating theatres if it is for operating team training (Aggarwal et al 2004, Holzman et al 1995), in simulated Intensive Care Units (Hegarty & Bloch 2002, Alinier et al 2004), or even in immobilised ambulances for emergency medical staff or paramedic training. Although they appear to have only recently become available on the market such mannequins were first developed in the late 60s with “SimOne”, created by a team of engineers and scientists from California (Hoffman & Abrahamson 1975). Recently more affordable computer-controlled mannequins have been commercialised. They are partly interactive and offer an interesting range of training capabilities which suit most healthcare professionals’ training needs (Airway features, spontaneous breathing, voice, auscultation sounds, ECG output, palpable pulses, blood pressure, venous system…). They allow for realistic interprofessional scenario-based sessions where students can be exposed to patients with almost any medical condition within one afternoon. The technology makes that students’ actions do not need to be triggered by verbal cues, but instead by them performing a correct patient assessment as they would have to do with real patients (Alinier 2006).

Investment towards increased patient safety

The acquisition of expensive simulators is often not affordable by less economically fortunate countries. Sometimes the only option is to carry on using traditional teaching and learning methods to help students acquire the skills they need. It often excludes the use of any sophisticated training models and calls upon the use of patients volunteering or being used without consent in teaching hospitals (Coldicott et al 2003). For ethical reasons such an approach, possibly dangerous, has now been banned in many countries. In an attempt to increase patient safety and comply with ethical issues significant investments have been made by the health education sector. It has often enabled the provision of better training facilities and teaching tools. There are currently over 1500 adult and paediatric patient simulators spread over approximately 40 countries across the world (BMSC 2005) with the majority in the United States and approximately 240 in the United Kingdom. Patient simulators can be very expensive and often require specialist skills to be properly operated and maintained, yet their number has grown at an unprecedented rate over the last 5 years which shows that they are recognised as valuable teaching tools. Several studies have been conducted to evaluate the benefits of different simulators or part-task trainers in the acquisition of a range of skills (St Clair et al 1992, Roberts et al 1997, Owen & Plummer 2002). The majority of these studies partly demonstrated the value of such training methods and provide positive feedback from students, however we should recognise that students' perception is directly influenced by the way sessions are conducted and how they have been introduced to the concept of simulation. It is fairly well recognised that "practice makes perfect", so there is certainly no harm in exposing students to simulated critical incidents and getting them to respond to them, hence when it happens for real they should be more prepared. The actual transferability of skills acquired by candidates to real practice is unfortunately often only supported by anecdotal evidences and might be biased by their enthusiasm and excitement for using modern technology.

How to make it a successful training method?

The two main issues are the initial acquisition and setup, and then the actual use of simulation technology so that it provides a beneficial learning experience to students. Adoption of simulation can represent an important financial commitment, and for it to be worthwhile, it should be used as effectively as possible. "*The environment in which the patient simulator is setup, along with the medical equipment surrounding it, is also a key element in the delivery of realistic simulation training sessions, and can incur major additional costs. However we believe that even with a limited budget it is possible to create and acquire the resources needed to expose students in an effective way to simulation training. Working towards the development of a sophisticated and specialised training laboratory at low cost requires the use and development of in-house resources in all possible aspects.*" (Alinier et al 2004, p161). Collaboration of a group of institutions or centres can be particularly useful in terms of costs sharing, especially in the initial stages of development and acquisition of expertise in simulation-based education. Teaching using realistic simulation requires an approach different to any other traditional teaching methods and may require specific training to appropriately control a patient simulator and conduct the session. Tutors need to understand the philosophy of simulation training and learn how to prepare scenarios taking into consideration trainees' knowledge and level of experience. Tutors should become facilitators interacting with trainees only during the briefing and debriefing phases, leaving them in charge of the care of the patient simulator during the scenarios. Hence students can safely learn from their mistakes as no life is endangered. If advice is required it can often be obtained from one of the national or international societies dedicated to simulation in healthcare such as "SESAM" (Society in Europe for Simulation Applied to Medicine), "SMS" (Society for Medical Simulation), or "NAMS UK" (National Association for Medical Simulation UK) to only site a few.

Conclusion

Developing a simulation facility can be a lengthy process but it is eventually rewarding. The most important point to take away is that investing in training tools such as patient simulators is very valuable as long as it is appropriately and intensively used. It enables the exposure of trainees from different disciplines to specific patient cases in controlled and safe environment where we can assess their knowledge, and their teamwork and communication abilities. It

requires the adoption of a different teaching approach from basic clinical skills or Advanced Life Support training to obtain the best results. This means that tutors need to be trained accordingly and interact with the wider simulation community to benefit from the experience of others. It is through the training of a dedicated team of tutors and their accumulated experience of conducting simulation sessions that their expertise will increase to the benefit of the students. With time and dedication, all institutions should eventually adopt simulation as a conventional way of learning for their students. Overall, key to the success of an effective and sustainable implementation of simulation training is a mix of skills and attributes which include dedication, enthusiasm, collaboration, and networking.

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