Using simulation to facilitate understanding of medicines

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ABSTRACT Over the course of the last few years, clinical pharmacists and scientists at the University of Brighton have developed a learning activity that uses a state-of-the-art patient manikin to demonstrate how an understanding of the scientific process can aid patient care. Using this approach, student pharmacists are able to identify problems related to patients' medicines and propose appropriate interventions.

At the University of Brighton, we are extremely fortunate to possess a state-of-the-art manikin called SimMan® that we use as a 'replica' patient in exercises to demonstrate how patients respond to medicines. These manikins have several basic functions that the lecturer can program to give the impression that it has a particular disease. We can also program SimMan so that he responds appropriately to medicines. There are various manikins on the market that behave, and can be

Figure 1 Students being instructed in the use of SimMan®

programmed, in a similar way to SimMan but it is the way that we use it in our school to educate our pharmacy students that is unique.

One interpretation of science is that it is a process of observation, theory generation and experimental testing, with the aim of identifying new knowledge. This process is of course iterative – and arguably the most successful scientists are those who are always doubtful and dubious, and itching to do more tests to validate their theory. We adopt a loose interpretation of this definition when we educate our pharmacy students in patient care, and we use SimMan as a tool to help demonstrate this.

The way that learning occurs in this context is that students have a series of lectures on pathology, physiology, pharmacology and therapeutics followed by a workshop using SimMan. In these SimMan workshops, we program our manikin to show the signs and symptoms of disease, for example epilepsy – a condition where the electrical activity of the brain temporarily becomes disjointed, resulting in a seizure and, in some cases, in convulsions. We begin the scenario in a room that is decorated in the style of a hospital side bay, with SimMan lying on a bed unconscious and convulsing. We then leave our students with only the patient's notes, a cabinet of medicines, some diagnostic equipment and monitors, and ask them to treat the patient.

During this process, they must demonstrate scientific reasoning and logic in order to treat the patient successfully. They must first observe what is going on around them, for example the patient's vital signs and their medical and medication history. Then they must form a theory about what is wrong with the patient and identify an appropriate medicine or intervention (e.g. adjust a dose, or stop a drug) to treat the condition. This becomes their hypothesis, which they then test by monitoring the patient to see whether they respond positively to the drug or the intervention that has been administered.

After the students select and administer the correct medicine, the patient begins to improve and the students celebrate the successful treatment of their patient. But then we do something a little nasty. We program the manikin to deteriorate suddenly and become increasingly unwell. This causes the alarms on the patient monitors to bleep with an urgency that sends a look of panic across the faces of the students involved. However, in virtually all cases, our students respond quickly and professionally, and begin again to use their scientific skills of observation, hypothesis generation and testing to identify the cause of the problem and make an appropriate intervention that stabilises the patient. Sometimes, however, our students make the wrong choices, which leads to a worsening of the patient's condition. But, in this safe environment this becomes an excellent opportunity for student learning. Having made the wrong choice, they can now examine their decisions and rationale, and identify the gaps in their knowledge and go on to address these to become better student pharmacists. It is arguably an advantage to get things wrong in this safe, simulated scenario, rather than on a real ward.

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