



Evaluation of a filmed clinical scenario as a teaching resource for an introductory pharmacology unit for undergraduate health students: A pilot study



Leah East ^{a,*}, Marie Hutchinson ^b

^a School of Nursing and Midwifery, Deakin University, Geelong, Victoria 3220, Australia

^b School of Health and Human Sciences, Southern Cross University, Lismore, NSW 2480, Australia

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SUMMARY

Background: Simulation is frequently being used as a learning and teaching resource for both undergraduate and postgraduate students, however reporting of the effectiveness of simulation particularly within the pharmacology context is scant.

Objectives: The aim of this pilot study was to evaluate a filmed simulated pharmacological clinical scenario as a teaching resource in an undergraduate pharmacological unit.

Design: Pilot cross-sectional quantitative survey.

Setting: An Australian university.

Participants: 32 undergraduate students completing a healthcare degree including nursing, midwifery, clinical science, health science, naturopathy, and osteopathy.

Methods: As a part of an undergraduate online pharmacology unit, students were required to watch a filmed simulated pharmacological clinical scenario. To evaluate student learning, a measurement instrument developed from Bloom's cognitive domains (knowledge, comprehension, application, analysis, synthesis and evaluation) was employed to assess pharmacological knowledge conceptualisation and knowledge application within the following fields: medication errors; medication adverse effects; medication interactions; and, general pharmacology.

Results: The majority of participants were enrolled in an undergraduate nursing or midwifery programme (72%). Results demonstrated that the majority of nursing and midwifery students (56.52%) found the teaching resource complementary or more useful compared to a lecture although less so compared to a tutorial. Students' self-assessment of learning according to Bloom's cognitive domains indicated that the filmed scenario was a valuable learning tool. Analysis of variance indicated that health science students reported higher levels of learning compared to midwifery and nursing.

Conclusion: Students' self-report of the learning benefits of a filmed simulated clinical scenario as a teaching resource suggest enhanced critical thinking skills and knowledge conceptualisation regarding pharmacology, in addition to being useful and complementary to other teaching and learning methods.

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Introduction

Medication errors are one of the most common errors within healthcare settings and are associated with considerable cost, morbidity and in some instances mortality (Institute of Medicine, 2006). Although errors can occur at any stage of medication management, they occur

most commonly during the prescribing and administration stages (Institute of Medicine, 2006). As healthcare professionals, particularly nurses and midwives are primarily responsible for administering medication (Aspden et al., 2007), it is essential to ensure they are equipped with appropriate pharmacological knowledge and the skills necessary to ensure safe medication administration. Despite medication administration being a fundamental skill, and graduating students are deemed competent to safely manage medication administration, nurses, midwives and other healthcare graduates report feeling ill-equipped and unprepared to prescribe and administer medications to patients in the clinical setting (O'Shaughnessy et al., 2010; Thompson and Bonnel, 2008). One approach to consolidating pharmacological knowledge and enabling its clinical application is through the use of simulation.

* Corresponding author at: Deakin University Locked Bag 200001 Geelong Victoria, 3220, Australia.

E-mail addresses: least@deakin.edu.au (L. East), marie.hutchinson@scu.edu.au (M. Hutchinson).

Background/Literature

The lack of preparedness reported by newly graduated healthcare professionals has been attributed to a number of factors such as: course structure, teaching staff not possessing pharmacological training or adequate knowledge, insufficient assessment of students' ability to safely administer and prescribe medications, lack of supervision in the clinical setting, and the complex pharmacological requirements needed to treat patient conditions (Maxwell, 2012; O'Shaughnessy et al., 2010; Thompson and Bonnel, 2008). Critically, pharmacology may not be taught as an individual unit in some programmes, or if it is, it is often delivered solely as a theoretical unit in the absence of a clinical application component (Thompson and Bonnel, 2008). Delivering a pharmacology unit without embedding the clinical applications risks surface learning, with students failing to interact with the material through considered application to the clinical setting, resulting in a lack of consolidated pharmacological knowledge (Thompson and Bonnel, 2008).

Simulation, the replication of a potential real-life event in a simulated environment that is similar to that in which the event may occur (Hunt et al., 2006), is increasingly being used for teaching and learning purposes in both undergraduate and postgraduate degrees (Yuan et al., 2012). Simulation features strongly in nursing and other health science undergraduate curricula, with the educational benefits of simulation as a teaching tool widely acknowledged (Berragan, 2011). Various forms of simulation have been demonstrated to enhance learning and the conceptualisation of clinical knowledge and skills. Among nursing and medical students, simulation is recognised to improve the application of pharmacological knowledge within the clinical setting (Thompson and Bonnel, 2008; Yuan et al., 2012). However, the evaluation of learner's experiences with simulated clinical skills development is an emerging field (Ricketts, 2011), and the benefits of simulation via filmed clinical scenarios to enhance the clinical application of pharmacological knowledge among healthcare professionals is unclear. This pilot study aimed to evaluate whether a filmed simulated pharmacology scenario enhanced knowledge conceptualisation and knowledge application to the clinical setting among undergraduate Health and Human Science students.

Research Design

This study utilised a cross sectional quantitative survey that had been designed to collect student's perceptions on a filmed simulated clinical scenario. To evaluate the scenario and associated student knowledge, the survey was designed using Bloom's Taxonomy of cognitive processes (Marzano and Kendall, 2007). The survey evaluated whether after viewing the simulated scenario the students learning was enhanced in the areas of medication errors, adverse effects, medication interactions and general pharmacological knowledge. Ethics approval for this study was granted by the relevant University Human Research Ethics Committee. Completion of the survey was considered implied consent.

The study was conducted in 2013 with students (primarily nursing and midwifery students) enrolled in an undergraduate introductory pharmacology unit at an Australian regional University. There were 96 students enrolled in the unit. For the purposes of this preliminary exploratory study a sample of at least 30 was considered sufficient, and is in line with similar nursing research studies (Hertzog, 2008). Initially, students were required to watch a filmed simulated scenario focused on medication administration and the associated pharmacological effects made available to students via an online learning platform. After which several announcements and emails were sent to students enrolled in the unit of study providing the information sheet and inviting them to participate in the study. Due to this research being a part of a fully online unit, administering the survey during class time was not possible, therefore, to

maximise uptake of the survey, a one-off reminder phone contact from a research assistant was made with students.

The scenario was filmed by a professional Educational Multimedia Technologist and involved two academics; one who role played as a nurse, whilst the other was the voice of the SimMan 3G used for this study. The scenario was based on a case study of which an 86 year old man was admitted to hospital for investigation of a febrile illness. During the scenario the patient had the following: (i) an allergic response to a medication administered by the nurse, (ii) experienced hypotension and bradycardia subsequent to further medications, and (iii) experienced drowsiness and a fall. Further, during the administration phase, the nurse made several errors including giving the wrong dose of medications, and administering medications that interacted and or were contraindicated for the patient's deteriorating health, which resulted in the patient requiring urgent medical attention. Once the students had viewed the scenario they were then required to identify the patient's condition and how the pharmacological agents were associated with improvement or deterioration of the patient's symptomology.

Measures

The survey consisted of a mix of fixed response items inclusive of 24 Likert scale items (1 = agree to 5 = strongly disagree) and six open-ended questions. The 24 item Likert scale was divided into four sections that elicited students self-report on the extent to which watching the filmed scenario enhanced their knowledge and skills of: *medication errors, medication adverse effects, medication interactions and general pharmacology knowledge*. Each of these four sections included six items which were developed to assess Bloom's Taxonomy domains of knowledge, comprehension, application, analysis, synthesis and evaluation (Marzano and Kendall, 2007). Fig. 1 provides an example of question types for the section relating to knowledge of medication errors. The remaining questions on the survey focused on demographic details, student perceptions on the comparability of this type of learning when compared to traditional tutorials and lectures (5 = more useful to 1 = less useful), and general open-ended questions asking students' perceptions and thoughts of the scenario.

Analysis

Survey data was downloaded from the Qualtrics® platform and analysed using Statistic Package for Social Sciences (SPSS) version 20. Initially the data was analysed using descriptive statistics to identify logical responses and the extent of missing data. After which analysis to establish the normality of data distribution was undertaken. Sum score variables were created from the items measuring each of the cognitive domains and fields of pharmacology knowledge. Similarly for the variables that provided a rating compared to a lecture or tutorial the categories were condensed (less useful, equally useful, unsure, useful in a different way, more useful) to provide a dichotomous variable (less useful, useful) suited to analysis. To explore statistical relationships between the variables frequency distributions, including mean and standard deviations, Spearman's correlations, Kruskal–Wallis analysis of variance and ANOVA were performed.

Results

Thirty two students completed the survey out of total sample of 96, equating to a response rate of 30.72%, which was deemed adequate for this exploratory pilot study. This is also consistent with literature that asserts low response rates are typical among students, particularly when surveys are administered online compared to in-class time (Dommeyer et al., 2004).

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