

SHORT REPORT

A new age approach to an age old problem: using simulation to teach geriatric medicine to medical students

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Abstract

Background: simulation-based teaching is increasingly used in medical education, but no studies have evaluated its impact on learning in geriatric medicine. We developed and delivered a simulation teaching session on delirium, falls, elder abuse and breaking bad news. Simulation mannequins, professional role-players and simulated clinical documentation were all incorporated into scenarios. We evaluated the effect of this intervention on student learning and on students' attitudes towards geriatric medicine.

Methods: third year Newcastle University MBBS students at Northumbria base unit received the simulation-based teaching session. Students' knowledge was assessed using a three question test mapped to learning outcomes for the elder abuse, delirium and falls stations. Each student undertook the test on three occasions: the day before the teaching session, immediately after the session and ~1 month later, allowing evaluation of learning over time. Test scores were also compared with those achieved by another cohort of third year MBBS students at a different base unit, who received traditional ward-based and didactic teaching but no simulation teaching.

Results: student knowledge improved significantly after the simulation session and this was maintained when reassessed a month later. Students who received the simulation-based training outperformed those who received usual teaching. Student feedback was overwhelmingly positive and the vast majority of students agreed that the session had a positive impact on their perceptions of geriatric medicine.

Discussion: our findings demonstrate the efficacy of simulation-based teaching in undergraduate geriatric medicine, its acceptability to students and its positive influence on students' perceptions of the specialty.

Keywords: delirium, education, elder abuse, older people, simulation, undergraduate

Introduction

The population of the UK is ageing. The percentage of people aged 65 and over increased from 15% in 1985 to 17% in 2010 and is projected to reach 23% by 2035 [1]. Estimates suggest that two-thirds of acute hospital inpatients in England and Wales are aged 65 or over [2]. The British Geriatrics Society have argued that greater emphasis should be placed on undergraduate geriatric medicine education [3] yet a 2006 survey [4] demonstrated that only 12% of UK medical schools were teaching geriatric medicine as a separate entity.

There is also evidence that some medical students, early in their training, possess negative attitudes towards elderly patients [5] and perceive the specialty to lack prestige and earning potential [6].

Blundell *et al.* [7] surveyed UK medical schools looking for examples of innovative teaching practices used to teach geriatric medicine. Two different technology-based teaching interventions were reported: 'age simulation suits'; outfits worn to enable life to be experienced from an older person's perspective [8] and computer-aided learning packages [9]. Simulation mannequins for medical education were first used in the 1960s. Over the following years

technological development has produced a variety of different mannequins of increasing fidelity [10] and their use in medical education has gained acceptance. Despite simulation-based teaching being increasingly used in medical education [11] there were no reports of such teaching in Blundell's work. There is a lack of published work evaluating the impact of simulation on learning in geriatric medicine. Two groups have piloted simulation-based training sessions for geriatric medicine trainees [12, 13] but in both cases small group sizes precluded any meaningful evaluation of learning.

Simulation may involve the use of actors as simulated patients or computer-enhanced mannequin simulators [14]. Such teaching provides students with clinical experiences in a controlled, safe manner and has been shown to improve knowledge, skills and attitudes [15]. Critical to this learning is provision of opportunities to discuss performance during post-simulation debriefing; which encourages learners to make sense of the events experienced [16].

In this paper, we describe an innovative geriatric medicine simulation-based teaching session that we designed and delivered to medical students. We aimed to establish the effect of this intervention on student learning and on students' attitudes towards geriatric medicine.

Methods

A new teaching session was developed and delivered to medical students undergoing the chronic illness, disability and rehabilitation (CIDR) module during year three of Newcastle University's MBBS course at the Northumbria base unit. Learning outcomes were derived from the CIDR curriculum. The session consisted of four, 45 min simulation stations with a tutor assigned to each. The content of each station is described below:

Delirium. Students were required to assess a delirious in-patient played by a professional actor (from a medical role-play agency). Supplementary information pertaining to the patient was available, including: medical notes, medication list, observation chart and stool chart. Props were provided as part of delirium management and included the patient's hearing aid and glasses, a clock and a newspaper.

Falls. Students were required to assess an in-patient, represented by a low-fidelity simulation mannequin, who had fallen. Supplementary information was provided, including: medical notes, medication list, observation chart and an electrocardiograph.

Elder abuse. Students were required to assess an elderly patient with dementia who had been admitted from a care facility having been found on the floor. The patient was represented by a high-fidelity simulation mannequin. Supplementary information included a GP referral letter and photographs of suspicious injuries that were given to students when the relevant area of the mannequin was inspected.

Breaking bad news. Students were required to explain a diagnosis of cancer to a patient (a professional actor). Simulated medical notes were available.

Students' knowledge was assessed using a three question test (Supplementary data available in *Age and Ageing* online, Appendix S1), mapped to learning outcomes for the elder abuse, delirium and falls stations. Breaking bad news was not assessed. The elder abuse question had two parts (each marked out of five) and asked students to recall types of elder abuse and how suspected elder abuse should be managed. The mark scheme was developed from the Department of Health document 'No secrets' [17]. The delirium question was marked out of 16 and asked students to recall how delirium should be managed. The mark scheme was developed from NICE Guidelines for Delirium [18]. The falls question was marked out of 16 and asked students to recall how a fallen patient should be assessed. The mark scheme was developed from Northumbria Healthcare NHS Foundation Trust's 'Medical Report Following a Fall' document. Each student undertook the test on three different occasions; the first on the day preceding the teaching session, the second immediately after and the third ~1 month after (in the module's final week). Students were unaware that the initial test had any link to the upcoming teaching session. All tests were marked by the same person (J.M.F). Students also provided feedback on the teaching session via a 5-point Likert-style questionnaire (Supplementary data available in *Age and Ageing* online, Appendix S2).

Another group of CIDR students, undertaking the module at a different base unit, completed the same test once, in the final week of the module. This group had been taught the same learning outcomes from the same curriculum, but via traditional ward-based and didactic teaching; this group received no simulation-based teaching.

The paired *t*-test was used to examine for differences in test scores among the simulation cohort after repeat assessments. The independent *t*-test was used to examine for differences between simulation and control cohorts' scores in the final assessment. All reported *P*-values are two-tailed.

Results

The teaching session ran six times during the academic year. Seventy-four students attended; all completed the test on the three occasions described. The mean test scores (%) for the simulation cohort at each assessment are displayed in Figure 1. For all questions a statistically significant increase was seen between pre- and post-teaching test scores ($P < 0.001$). Comparison of prolonged post- and pre-teaching scores revealed a statistically significant difference ($P < 0.001$) with the increase in scores from baseline preserved.

Figure 2 displays the mean test scores (%) for each question for both simulation and control groups, when knowledge was assessed in the final week of the CIDR rotation. For each question a statistically significant difference was

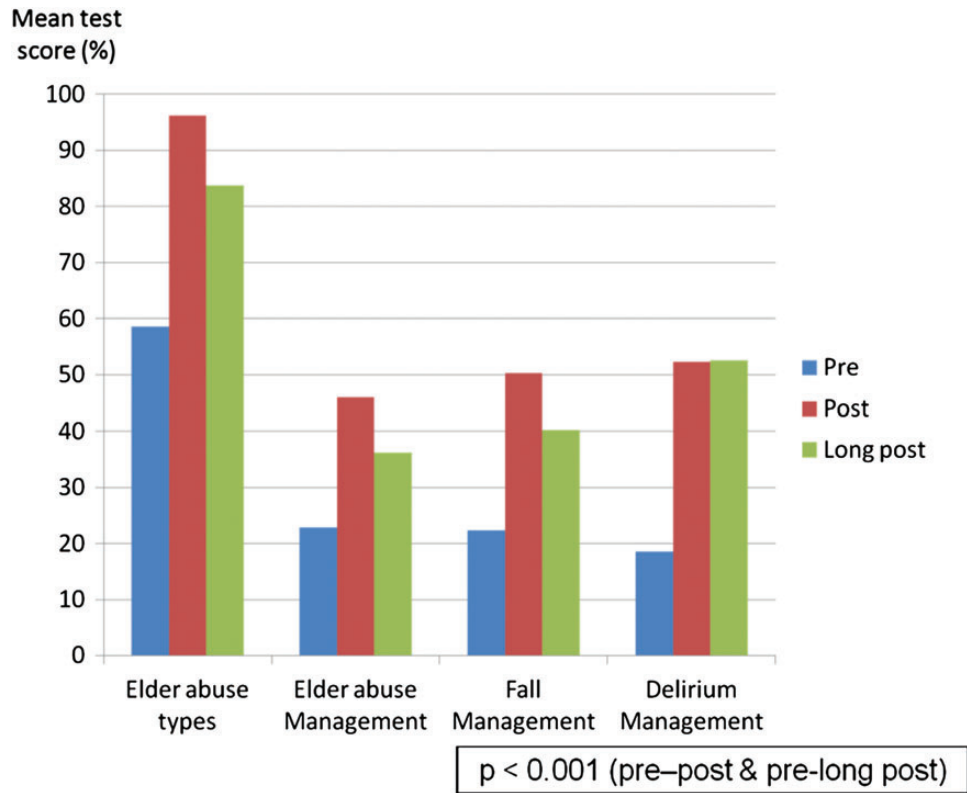


Figure 1. The mean test scores by question (%) at the three points of assessment for the simulation cohort.

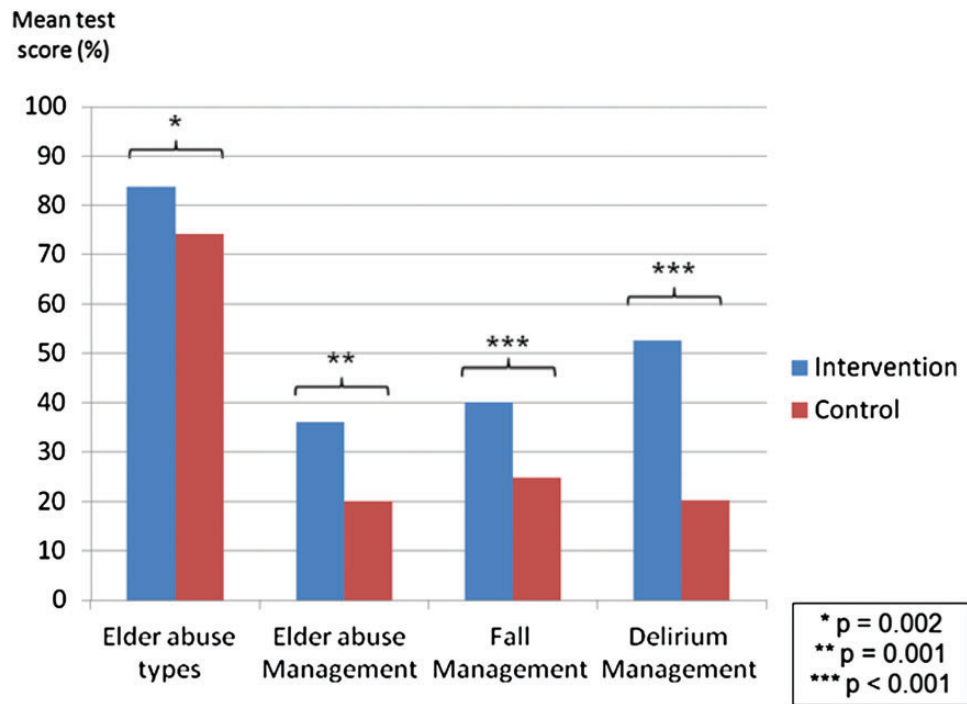


Figure 2. The mean test scores for each question (%) on assessment during the final week of the CIDR module for both simulation and control groups.

seen between mean test scores, in all cases favouring the group who had received simulation-based teaching.

Seventy-one (95.9%) provided feedback. Every respondent indicated that the teaching was of a high standard.

All students agreed that the cases were realistic, that the role-players' acting was of a high standard and that simulation activities had provided valuable learning opportunities. Sixty-eight (95.8%) felt that the day had had a positive

impact on how they thought about geriatric medicine. All students reported feeling better equipped to deal with a patient in whom they suspected elder abuse. Seventy (98.6%) felt better equipped to deal with a delirious patient and 69 (97.2%) felt better equipped to deal with both breaking bad news and the fallen patient.

Discussion

To the best of our knowledge, this is the first study that demonstrates the efficacy of geriatric medicine simulation teaching for medical undergraduates. Student knowledge improved significantly after the session and this was maintained when reassessed a month later. Students who received the simulation-based training outperformed those who received usual teaching.

Student feedback was overwhelmingly positive, suggesting that they felt better equipped to deal with the clinical scenarios encountered. It is important to acknowledge that confidence does not necessarily imply competence among medical students [19]. The vast majority of students reported that the session had a positive impact on how they thought about geriatric medicine, although the limitations of Likert-style questions are acknowledged. Qualitative methodology, perhaps semi-structured interviews, may have provided more definitive evidence of attitudinal change.

The authors are unaware of any previous published work describing elder abuse teaching using simulation. During this particular session, several student groups failed to identify elder abuse; this was addressed during debriefing and generated some powerful learning. In 2010 Gordon *et al.* [20] published the results of a UK-wide survey of undergraduate geriatric teaching. This work demonstrated that while many of the so-called 'geriatrics giants' [21] (including falls and delirium) were widely taught, elder abuse was only taught in 8/17 responding schools. Current UK estimates suggest that 500,000 older people may be being abused [22] and many of these victims will present to the emergency department in the 5 years preceding the identification of abuse [23]. The doctors of tomorrow must receive adequate training in the identification and management of elder abuse if such patients are to be safeguarded. This work has demonstrated that teaching elder abuse using simulation resulted in greater knowledge acquisition compared with traditional teaching methods.

Administration of the pre-teaching test may have resulted in students revising the test's topic areas. While the possibility that this could have inflated performance on the post-session test cannot be excluded, it is important to reiterate that students were unaware of any link between the initial test and the teaching session. We recognise that simulation-based teaching requires more teachers, time and space than traditional teaching. Furthermore, simulation mannequins and professional role-players can be costly. We believe that these factors are more than offset by the benefits described above.

To conclude, Blundell *et al.* [7] stressed the need for geriatric medicine educators to innovate while emphasising the

importance of research to evaluate the application of new technologies. Our findings demonstrate the efficacy of simulation-based teaching in undergraduate geriatric medicine, its acceptability to students and its positive impact on students' perceptions of the specialty.

Key points

- Simulation can be an effective teaching method in geriatric medicine.
 - Elder abuse can be taught using simulation.
 - Simulation can have positive effects on students' perceptions of geriatric medicine.
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Conflicts of interest

None declared.

Ethical approval

Ethical approval for research relating to this session was sought. Newcastle and North Tyneside Research Ethics Committee stated that this project did not require review by an NHS Research Ethics Committee.

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Supplementary data

Supplementary data mentioned in the text is available to subscribers in *Age and Ageing* online.

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