Constructing one day simulation, providing three level benefits. Is it possible?

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ABSTRACT

Background: Simulation is becoming more commonly used for initial training purposes and for continuing professional development. The literature studies classification of simulation techniques, students and tutors satisfaction with simulation day and its outcomes. However, there is no comprehensive approach for constructing simulation day with multiple level benefits.

Summary of Work: We developed simulation day with three level benefit during genecology clerkship, providing: 1. Macro feedback at the department level by valid and reliable tutors questionnaire. 2. Tutors skills development by direct observation and feedback given by professional medical educator. 3. Students clinical skills development by simulation day, including multiple simulation experience, professional medical educator and tutors feedback. Simulation day development was based on John Kotter approach. Simulation day influence and effectiveness was measured at all intervention levels by multiple valid and reliable tools at the end of the simulation day and at the end of the clerkship. 1. Students satisfaction and skill development was measured by Likert scale and open ended students questionnaires, combined with focus group interviews. 2. Tutors satisfaction and skills development was measured by Likert scale and open ended questionnaire, combined with open interviews. 3. Department influence was measured by curriculum text analyses, interviews with head of the clerkship and heads of clinical departments.

Summary of Results: Simulation day had significant influence at three levels. 1. Students reported high satisfaction, developed clinical approach and physical examination skills. These results deepened at the end of the clerkship. 2. Tutors reported high satisfaction with the simulation day, developed tutors skills, especially in providing feedback and conducted significant changes during remaining weeks of clerkship after simulation day. 3. At the department level changes were introduced into curriculum at the end of each year.

Discussion and Conclusions: Constructing simulation day with multiple level benefit achieves multiple outcomes at students, tutors and department levels. Thus, the approach is worth applying for simulation day at different clerkships.

Take-home Messages: Constructing simulation day with multiple level benefits may reduce human and financial resources invested in simulation development, however further research is needed.
Innovate, Integrate, Simulate! An innovative approach in cross-speciality simulation: results from an experimental teaching programme on psychiatric emergencies

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ABSTRACT

Background: Use of simulation is well-established in teaching practice across a range of medical specialties. However, to date, simulation has not been fully integrated into teaching of psychiatry. With a growing call for parity of esteem between mental and physical health, the importance of training medics to provide holistic, integrated, high quality care has never been greater.

Summary of Work: We created an innovative and unique simulation teaching programme for Bristol medical students on psychiatric emergencies. Between August 2017 and January 2019, a three hour, one-off high fidelity simulation session was offered to undergraduate medical students on their Psychiatry placements in Bristol, Bath, Yeovil and Gloucester. Over sixty students attended sessions run by psychiatric trainees over an 18-month period. In-depth written feedback was gathered and results were analysed.

Summary of Results: Quantitative analysis showed that 100% of the students reported an increase in confidence in recognition and management of psychiatric emergencies following the sessions. Analysis of free-text comments showed two main themes, which were consistent across location, group size and facilitator. Firstly relating to the importance and relevance of ‘psychiatry knowledge’ across all settings, including acute medical settings such as A+E. Secondly the appreciation for the overlap between psychiatry and physical health, and the need to have a thorough understanding of how to manage a deteriorating patient, regardless of place of work.

Discussion and Conclusions: These results show the benefits of using simulation to teach psychiatry, not only in improving students’ knowledge of psychiatric topics, but also in improving students’ ability to integrate care between different specialties. This is important in developing students as well-rounded professionals with adaptable clinical skills, and develops students’ abilities to take a person-centred and holistic approach towards patients.

Take-home Messages: 1. High fidelity simulation used in psychiatry is innovative but currently underused, despite our results showing excellent outcomes. 2. Simulation teaching improved undergraduate students’ self-reported confidence in recognition and management of psychiatric emergencies. 3. Use of ‘cross-speciality’ simulation is well received by students and promotes integration of physical and mental health, as well as raising awareness amongst undergraduates about the need for psychiatry knowledge in acute settings.
Material Concepts: Integrating theory and practice during simulation-based training to support procedural skills retention and transfer

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ABSTRACT

Background: Instruction that encourages trainees to integrate conceptual 'why' and procedural 'how' knowledge improves their transfer of procedural skills. For training away from the bedside and direct supervision, questions remain on how to represent the causal relationship between clinical concepts and procedural actions (e.g., how patient anatomy relates to inserting a needle). We varied the modality and level of interactivity when presenting these causal relationships during simulation-based lumbar puncture (LP) training and measured impacts on participants’ retention and transfer.

Summary of Work: During a 1-hour session, we randomized 66 medical students to one of three instructional interventions: i) procedural-only video-based instruction, ii) integrated video-based instruction, and iii) integrated simulation-based instruction. One week later, we tested participants’ LP skill retention and transfer, and their conceptual knowledge on a written test.

Summary of Results: Simple mediation regression analyses revealed that participants receiving integrated instruction had superior LP retention and transfer skills via gains in conceptual knowledge (all p<0.01). We found no significant performance differences between the integrated groups (p>0.01). Participants receiving procedural-only instruction practiced significantly more LPs during training (M=2.36) than participants receiving integrated video-based (M=1.82) and simulation-based instruction (M=1.50), p<0.05.

Discussion and Conclusions: Trainees’ ability to create cognitive connections between conceptual and procedural knowledge appears to improve when they interact with instructional materials highlighting the causal relationships between these knowledge types. Simulation experiences can be designed to make abstract clinical concepts visible using hands-on, interactive modules, which enhances trainees’ conceptual knowledge, as well as, their skill retention and transfer. However, integrated instruction reduced participants’ time to practice LP scenarios, which may have reduced the effectiveness of our efforts to promote such 'cognitive integration'. We suggest that more advanced trainees with baseline procedural proficiency may experience greater benefits from such integrated instruction.

Take-home Messages: Simulation presents a unique education modality for delivering instruction that helps trainees build cognitive connections between the theoretical concepts and procedural actions of clinical skills. Integrated instruction improved trainees’ skill retention and transfer, despite reducing how many LPs they could practice. Simulation-based instructional approaches that facilitate cognitive integration may reduce the need for high-tech and high-cost simulations.
Teaching old dogs new tricks: Is simulation-based medical education only for novices?

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ABSTRACT

Background: The majority of studies on simulation-based medical education (SBME) involve novice learners. Experienced clinicians may benefit from SBME, as numerous studies demonstrate inconsistent correlations between competence and clinical experience. Yet, according to expertise-reversal effect theory the structured format of SBME may have negative effects due to interaction with clinicians’ prior knowledge. Moreover, experienced clinicians may perform too well for SBME to offer meaningful advancements in their clinical performance. We examined the effect of SBME and its interaction with learners’ prior clinical experience on transfer of skills using ultrasonic fetal weight estimation.

Summary of Work: Medical doctors from Obstetric departments with different levels of clinical experience were randomized 1:1 to intervention or no training (controls). Participants estimated fetal weight by ultrasound in two pregnant women at term. Birth weights were compared to the estimated fetal weight. The intervention group trained using the virtual reality ultrasound simulator ‘Scantrainer’ from Medaphor (Cardiff, UK) in addition to their clinical training. The control group continued their clinical work as normal. All participants performed another two fetal weight scans after approximately 2.5 months. Participants in the intervention group were surveyed on their’ reactions toward the usability of the training format as well as metacognitive aspects of learning through simulation.

Summary of Results: The intervention group (n=36) reduced their diagnostic error by 31.9% (95% CI 6.9-50.1) (p=0.02), whereas the control group (n=34) did not (13.1% (95% CI, -17.9 “ 55.9), p=0.45). This difference was significant (p=0.02). There was no effect of clinical experience (p=0.54) on the effect of the intervention. Experienced participants rated the usability of SMBE significantly lower than the inexperienced participants (p=0.014) and found that SMBE did not improve their conceptual understanding of ultrasound (p=0.001).

Discussion and Conclusions: SBME improved diagnostic accuracy of ultrasonic fetal weight estimation in at-term pregnancies. The amount of clinical experience had no influence on the effect of SBME in our study context. Even experienced clinicians, who demonstrated high initial diagnostic accuracy, were able to demonstrate clinically significant improvements.

Take-home Messages: Experienced clinicians can benefit from SMBE in spite of self-perceived lack of benefit.
Does one-on-one medication administration simulation improves nursing students’ competencies in the clinical setting?

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ABSTRACT

Background: One of the biggest faculty challenges in medication administration (MA) education and practice is to increase student competencies in the clinical setting. One-on-one simulation for MA may increase student involvement in each stage of the MA process and to better prepare him/her for MA in the clinical setting. The aim of this study was to examine the influence of one-on-one vs. grouped MA simulation on clinical setting MA.

Summary of Work: A quasi-experimental comparative study was performed with undergraduate nursing students from two subsequent academic years. Self-reported questionnaires estimated students preparedness to MA before and after the simulation. A faculty member assessed students performance during the simulation and in the clinical setting with a tool designed to evaluate MA. Pearson correlation and multivariate linear regression analyses were used to identify predictors of clinical setting MA.

Summary of Results: Among students that practice simulation alone (i.e. one-on-one simulation), clinical setting MA was significantly associated with students preparedness ($r = 0.36, p < 0.01$), faculty assessment of performance in the simulation ($r = 0.30, p < 0.01$), and previous experience with MA ($r = 0.22, p = 0.05$). In a multivariate linear regression model, post-simulation preparedness and MA performance during simulation were associated with higher MA performance in the clinical setting ($\beta = 0.24, p = 0.04, \beta = 0.21, p = 0.07$, respectively). No significant associations were found among students that practice simulation in groups.

Discussion and Conclusions: One-on-one MA simulation is associated with increased students preparedness to administer medication, and improves performance in the clinical setting. Therefore it should be considered in future curricula for undergraduate nursing students. Further study should be designed to examine the long term impact of one-on-one MA simulation on MA in the clinical setting, e.g. reduction of errors.

Take-home Messages: A simulation that resembles MA in the clinical setting (i.e. one-on-one simulation) enables better MA performance of the student.
Improving awareness of medication errors and prevention in nursing students

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ABSTRACT

Background: Medication errors is common and preventable in health care setting. Nurses play an important role in correcting any potential errors by practicing six rights of medication administration. However safe medication administering often becomes challenge in real clinical scenario. The objective of this study is to evaluate the awareness and barrier of safe medication administration in nursing students.

Summary of Work: This study enrolled 93 nursing students of a four-year university in Taipei, Taiwan. A clinical simulation scenarios consisted of nine medication errors including wrong patient, wrong drugs, wrong dose, drug compatibility, and allergy related error was developed and carried out before and after safe medication administration class. Participants were expected to identify any errors by using the six right practice. A structured medication administration checklist was used by trained rater to assess student's medication administration skills. Students completed their reflection on barriers of medication administration after the clinical simulation class. Descriptive statistics and frequency analysis was conducted.

Summary of Results: The majority of students (93.9%) identified patients correctly using patient identifiers. The correct rate of error identification in dose, medication, allergies, drug compatibility were low (less than 40%) at baseline. After the class, scores of medication errors identification were significantly improved (p<0.01). Students are aware that carefully reading of the drug labelling, speaking-up in any medication errors, further clarifying the drug dose with physicians or pharmacists are of importance to prevent medication error, instead of administering medication without clinical reasoning. Barriers of correctly identification of potential medication errors included wrong belief of 100% error-free prescribing or dispensing system, insufficient clinical experiences, and pressure of fast-paced work environment.

Discussion and Conclusions: Clinical simulation training is effective on improving awareness of safe medication administration in nursing students. Students tend to overlook the carefulness and clinical reasoning required for medication administration. Further simulation training addressing safe medication administration in real clinical situation like heavy workload is warranted.

Take-home Messages: Enhancing awareness of medication administration errors using clinical simulation scenarios is a helpful education strategy for optimal medication safety.