10II ePOSTERS: Simulation 2
Location: Theatre Room 15, Level 0, MiCo

10II (2020)
Minimum frequency of simulation sessions to acquire cross skills in medical students

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Background: Clinical Simulation has proven to be an indispensable tool in the training of medical students and in skills acquisition. That is why Universidad Andrs Bello School of Medicine has incorporated it into the training of their students through various undergraduate courses.

Summary of Work: Objective: determine the minimum frequency of simulation sessions required to acquire cross skills in handling medical emergencies. Seventeen medical student interns of Universidad Andrs Bello School of Medicine in Viña del Mar, Chile, were faced with seven emergency medical scenarios in a high-fidelity human simulator. They were divided into four groups, receiving the same initial information in each case. At the end of each, a structured debriefing was conducted. The scenarios ran on a computer platform with pre-set responses. Students were evaluated by a common rubric that measured four domains: leadership and teamwork, communication, anticipation of critical events and team clinical reasoning. The maximum possible score was 16 points (100%).

Summary of Results: Achievement average percentage for each scenario (1st to 7th): 46.9 %, 56.3 %, 81.3 %, 75 %, 92.2 %, 93.8 % and 93.8 % respectively.

Discussion and Conclusions: After completing the four scenarios, students perform well (more than 90% non-critical errors) in the management of medical emergencies. Clinical simulation proves to be a significant and objective tool for improving cross skills in medical students.

Take-home messages: Improve the description of the domains of the heading. Form groups of equal size. Rotate the roles in the team.

10II2 (22935)
Does peer-to-peer comparison improve skills acquisition in surgical simulator training?

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Background: Simulation in surgery allows for the safe and efficient acquisition of surgical skills away from patients. This is of particular importance given current strict working-time restrictions and emphasis on improving patient safety. Incentivising and motivating trainees to use simulators presents an important educational challenge. Peer-to-peer performance comparison is an established motivational factor in knowledge acquisition in medical training, but little work has been done on its effectiveness in skills acquisition. This study aims to assess the impact of peer-to-peer comparison on skills acquisition in surgical simulator training.

Summary of Work: Medical students were randomised into two groups and had baseline laparoscopic skills assessed. They were then each given a laparoscopic simulator, including software that generates objective performance scores, to take home and use for two weeks. Group 1 had access to their own performance scores, but not that of peers. Group 2 were asked to submit their scores to the study lead after every practise. These were used to generate a graphical ‘leader-board’ of skills, which was shared peer-to-peer within Group 2 via a private social media page. Both groups returned to have their skills re-assessed at the end of the practise period. Differences in skills acquisition, practise frequency and motivation between groups were assessed.

Summary of Results: Results will be available by April 2014.

Discussion and Conclusions: Conclusions will be available by April 2014.

Take-home messages: Peer-to-peer skills comparison is an exciting concept with multiple applications in medical education and training. This study explores its potential to incentivise and improve skills acquisition in laparoscopic simulator training.
Hypothesis-driven physical examination using a high-fidelity patient simulator in undergraduate medical education in Japan

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Background: Physical examination is one of the most important skills for all clinicians. Although a head-to-toe style comprehensive physical examination is taught to students in many medical schools, it is not suitable for a real clinical situation. Hypothesis-driven physical examination (HDPE) has been proposed as an adequate educational technique for physical examination, and its validity has been verified. In addition, physical findings and status change can be simultaneously programmed into a high-fidelity patient simulator.

Summary of Work: We developed a physical examination session using the simulator for fourth-year students. Students were instructed to perform head-to-toe physical examination in the session from May 2013 to September. Since October 2013, we introduced the HDPE method, in which students were instructed to search for pertinent positive or negative findings of a diagnostic hypothesis. The simulator was programmed to change the status after a certain amount of time had passed. The free description of students for this session was analyzed qualitatively.

Summary of Results: Throughout the program, students felt that the simulator was useful but had difficulty handling the sudden status change. In the subsequent revised program, the use of keywords such as “vital signs,” “differential diagnosis,” and “check the patient carefully” were significantly increased.

Discussion and Conclusions: HDPE using a simulator programmed for a sudden status change has promoted further situational-based learning. There is room for improvement in this model with Team-based learning method.

Take-home messages: Physical examination education applicable to a real clinical situation can be provided using the HDPE method with a high-fidelity patient simulator.

Managing a national training program: Facilitators and barriers

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Presenter: Clare Byrne*, Monash University, Clayton, Australia

Background: Health Workforce Australia (HWA) is coordinating clinical training reform approaches across Australia. As part of its Simulated Learning Environments agenda, HWA has funded the National Health Education and Training in Simulation (NHET-Sim), a large scale national educator training program.

Summary of Work: The NHET-Sim program educates participants on how to deliver teaching using a range of simulation modalities, including manikin, simulated-patient and virtual environments. Participants complete core and elective modules, with some electing purely online pathways, although most attend workshops. The scale of such a broad national approach requires significant educational administration, particularly with respect to workshops.

Summary of Results: Between December 2012 and February 2014, over 2000 educators have completed the NHET-Sim program, with 170 workshops conducted across all Australian states and territories. The facilitating factors to running successful workshops has included: strong local champions, HWA’s support and integration with its other programs, a dedicated administrative team with an understanding of healthcare systems, a train-the-trainer co-teaching approach for local faculty and a multi-pronged approach to marketing. The barriers have included: IT systems which are not designed for workshop administration; short term nature of work contracts; and a reliance on personal networks to gain access to some environments.

Discussion and Conclusions: The local networks formed by NHET-Sim are an integral part of the program; but this type of educational administration can pose challenges for institutional systems generally focussed on awards courses.

Take-home messages: A large scale workshop program requires a dedicated administration team with the flexibility to adapt to local environments.
10115 (21052)
Comparing different types of feedback in scenario based simulation education

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Background: It is well known that scenario based simulation education is one of effective way to learn how to do in the crisis. Usually the feedbacks have been guided by the rich-experienced person. However, the debriefing without instructors which is called “self-debriefing” could be another way to make feedbacks more reinforced. It leads learners to cognize their ability more independently. Our research question was how the result varies between “self-debriefing” and “instructor-debriefing”.

Summary of Work: Study design: prospective, randomized and controlled study. Subjects: the 4th grade medical students and the new PGY1 residents in Hawaii. Method: we set the four different emergency scenarios. The 124 participants were divided into 35 groups (19 experimental groups and 16 control groups). They all worked through scenarios. At the end of the each case, after the brief overview by the instructor, the participants of experimental group did the debriefing by themselves. By contrast, the participants of control group did the debriefing at the bedside with the instructor. The form of the debriefing was global rating score.

Summary of Results: In the experimental group, the sum of the team performance score was improved (first case score=12.64, last case score=15.12, p=<.0001). In the control group, the score was also improved (first case score=12.43, last case score=14.79, p=0.007).

Discussion and Conclusions: This is because as they repeated the case scenario with mannequin, they became capture the situation more clearly, and work through the scenario more specificity even without instructor-guided debriefing.

Take-home messages: We could say that the “self-debriefing” is one of practical assessment process in the scenario based simulation education.

10116 (18778)
Satisfactory professional benefit from simulation-based training in acute medical conditions

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Background: The aim of this study is to investigate the learning outcome of three different setups using the time between simulation-based training for Danish medical interns.

Summary of Work: 57 Danish medical interns underwent two days of simulation-based training in acute medical conditions using the SimMan 3G simulator (Laerdal Denmark, Copenhagen). Between simulations interns participated in a priority exercise challenging their ability to prioritize patients. They also observed other interns simulations at the simulation ward or observed the simulations in the debriefing room. A questionnaire was used to evaluate the self-reported learning outcome.

Summary of Results: To be team-leader at simulations received 5.7 points of 6.0 possible with a significant better learning outcome than any other positions (p<0.001). To assist the team leader received 4.8 points. The priority exercise received 4.6 points with no significant difference between this and assisting the team leader (p=0.15). To observe simulations in the debriefing room or in the simulation ward received 4.2 and 4.1 point respectively, without significant difference between the two functions (p=0.95)

Discussion and Conclusions: A very good self-reported learning outcome are received when participating in simulation based training. The learning outcome can be increased by introducing a priority exercise and reduce the time spends as an observer.

Take-home messages: By reducing the time spent observing other interns performing simulations a higher learning outcome can be achieved.
SIMON goes Tübingen: A student-built ambulance simulator

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Background: Medical errors in emergencies can have serious consequences for patients. Realistic simulations may reduce the incidence of medical errors. In combining modern medical equipment and a limitation of space, a simulation ambulance offers the possibility to create complex training scenarios including the exercise of team and communication skills.

Summary of Work: In a student-run project, an ambulance simulator (“SIMON”) was implemented in the DocLab in Tübingen. Apart from coordinating the project, the students acquired the funds needed.

Summary of Results: The ambulance simulator is designed as an indoor installation and includes state-of-the-art medical equipment. The project was primarily financed by the “Tübinger PROFIL” with additional support from the Department of Anesthesiology and Intensive Care Medicine. Collaboration with industry sponsors allowed the ambulance to be equipped with a respirator, a defibrillator and an ultrasound unit. A lifelike mannequin placed on a stretcher and an in-house programmed video-feedback-system enable the simulation of realistic emergencies and subsequent video debriefing.

Discussion and Conclusions: The student-built ambulance simulator “SIMON” enables the simulation of complex scenarios for medical students in Tübingen. This enhances curricular teaching and allows for innovative teaching formats. For example, realistic emergencies can be broadcasted into lecture theaters or incorporated into interactive teaching sessions like the “Sectio chirurgica”. The new ambulance simulator “SIMON” may improve the medical education of future doctors and can thus provide a better preparation for clinical work.

Take-home messages: The DocLab in Tübingen now has a modern indoor ambulance simulator, a project that was carried out by students.

Hybrid simulation in emergency gynaecological teaching for undergraduate medical students, preparedness for work through synthesis of knowledge and skills

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Background: Medical students are often taught specific clinical skills in isolation. Those skills then need to be synthesized with their knowledge and applied to assess, admit and manage patients as a junior doctor.

Summary of Work: How confident do undergraduate medical students feel performing all the tasks associated with assessing and managing an emergency patient? An unrehearsed hybrid simulated gynaecological emergency clinic utilized a mix of standardized patient scenarios and high fidelity simulators. The tasks required of the student synthesize those skills required to manage a stable patient as a junior doctor. The practical procedures were those specified in the General Medical Council’s Tomorrow’s Doctors document. These practical procedures were integrated into the hybrid simulated scenario. Students had to demonstrate their performance of these procedures. Prior to undertaking the session the students self-assessed their confidence in performing procedures (visual analogue scale). Self-assessment was repeated after the session.

Summary of Results: On average the students felt 18% more confident in their own abilities to perform the range of tasks that were required of them. Increased confidence levels were independent of gender.

Discussion and Conclusions: Using a hybrid simulated scenario uses both practice based learning and experiential learning to improve student’s confidence about their preparedness for working life as a doctor.

Take-home messages: Students need to be able to understand and demonstrate their ability to synthesize the skills and knowledge they have gained as undergraduates in order to work as a doctor. Working as a doctor requires synthesis of knowledge and numerous skills in order to care for patients safely and effectively.
**10l9g (22602)**

**Developing a practical skills curriculum for medical students using a simulator-based medical education center**

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**Background:** The current Romanian medical teaching system confronts with several problems including lack of targeted courses for practical skills development and no links between education and health market needs.

**Summary of Work:** Starting with the academic year 2011-2012 we opened the first simulation center in Romania. Within our curriculum, 2 modules were developed for teaching and assessing practical skills: Basic practical skills (3rd year – the basic module) and Training in the practical skills center ( 6th year – the advanced module). Both modules were mandatory and took a week to complete (2 ECTS credits, 25 hours -5 hours/day). Final aim was to improve medical training in our university and to prepare the future graduates for general practice. Before and post module evaluation forms were used to assess the improvement in practical skill level. Available Simulation Equipment consisted in Improvised Technology, Task Trainers and Low/Mid/High Fidelity Mannequins.

**Summary of Results:** All relevant examinations, maneuvers, medical procedures were registered in a log-book which served also as an assessment tool. Average performance improved significantly in written scores from premodule(64.57%)to postmodule (86.33%, P < .048). The evaluation forms showed that practical skills, teamwork and the multidisciplinary management of acute medical and surgical situations were the main assets our students gained during these 2 modules. Junior students (3rd year) showed the biggest improvement during the module.

**Discussion and Conclusions:** This significant change in medical students training was feasible incorporating modern educational theory (simulation). The development of a new curriculum must take into account introducing an interdisciplinary training and a corresponding practical skills development.

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**10l10 (22716)**

**Reliability, Validity Evidence, and Pass/Fail Scores of the Training and Assessment of Basic Laparoscopic Techniques Technical Test**

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**Background:** Surgical skills should be practiced on simulators to overcome the initial, steep part of the learning curve. However, practical and economical issues counteracts the implementation of simulation-based training and tests. We invented the Training and Assessment of Basic Laparoscopic Techniques (TABLT) which is a high quality training and assessment tool that is inexpensive, easy to set up and based on content relevant for basic laparoscopic skills.

**Summary of Work:** Sixty surgeons and surgical trainees were recruited from departments of gastrointestinal surgery, obstetrics and gynecology and urology. All participants performed the TABLT test twice. The second attempt was rated on-site and afterwards by a blinded rater using video recordings.

**Summary of Results:** The TABLT had a high inter-rater reliability showing a intra class correlation coefficient (ICC) of 0.99 (p<0.001). An ANOVA test showed a significant difference between the groups of different level of experience with a p<0.001. There was a correlation between the laparoscopic experience of the surgeons measured in number of procedures and the surgeons measured in number of procedures and the test score with a Pearson’s r value of 0.73 (p<0.001). A pass/fail level was established using contrasting groups methods.

**Discussion and Conclusions:** The TABLT is a reliable and validated assessment tool for basic laparoscopic skills. The scoring system has a high inter rater reliability.

**Take-home messages:** High quality assessment of laparoscopic skills in low fidelity trainers is now available for novice trainees in all surgical specialties. The TABLT is inexpensive and easy to implement in either a new or an existing course.
A systematic review of cognitive load measures in simulation-based training

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Background: Simulation is increasingly being used to teach complex procedural skills to medical trainees. Whether trainees learn effectively from simulation is thought to relate to how much mental effort, or cognitive load, they experience. Direct application of cognitive load theory in this domain has however met with mixed results. We conducted a systematic literature review to better understand how cognitive load has been measured across simulation contexts.

Summary of Work: We developed a systematic review protocol in accordance with PRISMA quality standards. A total of 5042 unique records were retrieved from 7 databases: MEDLINE, EMBASE, CINAHL, PsycInfo, ERIC, Web of Science, and Scopus. Search terms represented both the phenomenon of interest (e.g., cognitive/mental: load, workload, effort, demand) and the context (e.g., patient simulation, space simulation, computer simulation, computer assisted instruction). Study selection, data extraction, and data synthesis are ongoing.

Summary of Results: Cognitive load has been measured in diverse populations including medical and health professionals, military pilots, and university students. Measurement techniques include literature-based rating scales, physiological measures (e.g., heart rate, pupil dilation), and secondary task performance. Further analyses will examine the relative frequency of the different types of measures along two primary dimensions: self-report versus observed and retrospective versus concurrent. Preliminary analyses suggest that retrospective, self-report measures are the most frequently used across simulation contexts.

Discussion and Conclusions: The measurement of cognitive load has been reliant on retrospective, self-report data. Triangulation with concurrent and observed measures is required to more fully understand how cognitive load influences learning processes. Further research to investigate physiological and secondary task cognitive load measures in simulation-based procedural skills training is warranted.

Take-home messages: Accurate and reliable cognitive load measures are necessary to inform instructional design decisions for simulation-based procedural skills training.