Maudsley Learning

Development and evaluation of simulation training for pre-registration pharmacists and pre-registration pharmacy technicians

Project report

Authors

Hannah Iannelli, *Maudsley Learning, South London and the Maudsley NHS Foundation Trust*

Kai-Loke Chan, *Pharmaceutical Sciences Clinical Academic Group, King's Health Partners*

Annabel Lane, *Pharmacy, South London and the Maudsley NHS Foundation Trust*

Aleks Saunders, *Maudsley Learning, South London and the Maudsley NHS Foundation Trust*

Richard Pudney, *Pharmacy, Lewisham and Greenwich NHS Trust*

Completed December: 2021

KING'S HEALTH PARTNERS

Pioneering better health for all

Contents **Page**

Description of organisations	2
Executive Summary	5
Background literature	6
Course design and method	6
Findings	9
Summary	14
References	16
Appendix 1 – Simulation Training Day Schedule	17
Appendix 2 – Summary of Scenarios Used	18
Appendix 3 – Table of Scenarios Used	21
Acknowledgements	22

DESCRIPTION OF ORGANISATIONS

Maudsley Learning- is part of one of the world's most renowned mental healthcare organisations and unifies our education and training offer. Our mission is to enhance the mental health and wellbeing of all through education and training.

We design and deliver courses to meet the continuing professional development needs of individual professionals in the healthcare workforce, but also to many others including colleagues in social services, policing, schools and in the private sector. We deliver the best quality learning experiences in both traditional and innovative educational modalities thanks to our expertise and agility. Our access to a range of subject matter expertise is second to none via the global centres of excellence in South London and Maudsley NHS Foundation Trust (SLaM) and our university partners, the Institute of Psychiatry, Psychology and Neuroscience (IoPPN), King's College London. Furthermore, our agility allows us to respond to the needs of our customers, producing bespoke courses tailored to their unique requirements. We have an excellent record of success delivering commissioned training nationally and are proud to have nurtured Maudsley Simulation into BMJ national Education Team of the Year 2018!

Maudsley Simulation- is the UK's first simulation training centre for mental health, aiming to improve clinical care and services for all who are affected or impacted by mental health issues. Since 2014, working as part of South London and Maudsley NHS Foundation Trust, we have successfully developed over 50 simulation training courses and trained more than 5,000 staff, from undergraduates to senior clinicians to non-healthcare workers. As such we've worked with a range of organisations across the UK and internationally, developing a wealth of experience and expertise in meeting the learning needs of people working with mental health needs

---

Kings Health Partners- "King's Health Partners (KHP) is an Academic Health Science Centre where world-class research, education and clinical practice are brought together for the benefit of patients". KHP is comprised of four partners King's College London, King's College Hospital, Guy's and St Thomas' Hospital/Royal Brompton and Harefield Hospital and South London and Maudsley Hospital.

KHP aims to ensure that learnings from research are implemented in a timely, effective and systematic manner to provide high quality healthcare services for people with physical and mental health care needs. This is achieved through collective effort and a strong working partnership across the four organisations. The Mind and Body Programme is one area of work happening at KHP. Other areas include Clinical Research, Education and Training, Value Based Healthcare, Integrating Care, Public Health, Global Health and Informatics. KHP is organised into Clinical Academic Groups (CAGs), of which the Pharmaceutical Sciences CAG is one.

Pharmaceutical Sciences Clinical Academic Group

The Pharmaceutical Sciences Clinical Academic Group (CAG) is unique as the world's only formal healthcare/academic partnership in pharmaceutical sciences. It brings together almost 2,000 staff and students from each of the partner organisations within King's Health Partners, with the aim of improving practice, research and education in pharmaceutical sciences. It includes a variety of professional groups, including pharmacists, pharmacy technicians, pharmacy assistants, scientists, healthcare professionals, undergraduate and postgraduate students and administrative staff.

Our CAG draws together all aspects of the use of medicines, from drug discovery through first-in-man studies, through to formulation technology and prescribing safety to post marketing pharmacoepidemiology (the study of the uses and effects of drugs in large numbers of people). Our range of services includes pharmacy departments at Guy's and St Thomas', King's College Hospital and South London and Maudsley NHS Foundation Trusts, the Institute of Pharmaceutical Science at King's College London, a pharmaceutical production facility at Guy's Hospital, King's Health Partners Clinical Trials Supplies, the Medicines Information Centre at Maudsley Hospital and the Toxicology Unit at King's College Hospital NHS Foundation Trust.

We work closely with specialist services such as cancer, cardiovascular and emergency services. Working across our acute and community sectors, we are maximising beneficial outcomes for our patients from medicines, through medicines optimisation. This sees our CAG focusing on safety, governance, professional collaboration and patient engagement in the formulation, prescribing and research into medicines.

Our CAG runs several education and training programmes for healthcare professionals and pharmacy and pharmacology students/trainees including: short courses, international internships, undergraduate degrees, postgraduate degrees and research programmes and vocational training programmes.

Lewisham and Greenwich NHS Trust- was formed on 1st October 2013 and is responsible for running two acute hospitals, Queen Elizabeth Hospital and University Hospital Lewisham, in addition to community health services in Lewisham. The pharmacy department works in close collaboration with KHP pharmacy departments on workforce and education initiatives to strengthen services across South East London.

EXECUTIVE SUMMARY

Project Summary:

The funding for this project equipped the project team to:

- Work with Kings Health Partners (KHP) simulation training experts in medical and nursing education to design pharmacy simulation training that can be delivered via an online/virtual platform
- Develop a range of simulation scenarios for pharmacy trainees using 'human factors' as a central theme
- Design in-person simulation training events that involve pre-registration pharmacists (PRPs) and pre-registration pharmacy technicians (PTPTs) as learners
- Organise and lead simulation training events for all PRPs and PTPTs across KHP trusts and Royal Brompton and Harefield NHS Foundation Trust (RBHT) and Lewisham and Greenwich NHS Trust (LGT)
- Work with KHP experts in simulation training and educational research to design, collect and analyse feedback from learners and facilitators

Funding awarded

£30,000 funding was made available through Health Education England. We would like to sincerely thank them for providing this opportunity.

The main outcomes from this project include:

1. Developed a pharmacy simulation training curriculum
2. Established pharmacy simulation faculty to deliver the curriculum
3. Completed evaluation including longitudinal follow up
4. Provided simulation training to 52 PRPs and over 15 PTPTs across KHP trusts (King's, Guy's & St Thomas', South London & the Maudsley) and our partners RBHT and LGT

Main findings

- Human factors skills statistically improved following training
- Empathy in pharmacy professionals increased post training
- There was a statistically significant improvement in pharmacy skills post course
- Simulated scenarios and debriefing were pivotal to learning and facilitating behaviour change in clinical practice
- Participants had increased confidence in managing complex situations
- Participants expressed an improvement in patients experience as a result of their improved communication skills and confidence learnt during the course
- 100% of participants would recommend the course to others

BACKGROUND LITERATURE

The pandemic led to reduced opportunities for some aspects of experiential learning for trainees, e.g. where requirements to reduce footfall in clinical areas have the limited time for trainees to perform certain patient-facing clinical activities such as history taking, patient consultation and team based clinical decision making. Simulation training can be a highly useful tool in preparing trainees for clinical practice, supporting professional development, and improving clinical care provision. The benefits of simulation as an educational intervention have been well described (Cook et al 2011, Zendejas et al 2013). Specific benefits include increased knowledge and confidence, improved efficacy in technical skills, as well as improved non-technical skills, such as: teamwork, communication, and interprofessional collaboration (Cook et al 2011, Miller at al 2012).

COURSE DESIGN AND METHOD

A pharmacy simulation training development group was established. Consisting of the pharmacy education and training leads from the partner trusts, this group developed the learning outcomes and the scenario ideas for the course. To support course delivery and development of the simulation ideas into simulation scenarios, three senior clinical pharmacists (Agenda for Change, Band 7) were seconded on a part-time basis from among KHP and LGT trusts for 6 months. Nine scenarios were developed involving activities such as: history taking, device counselling, consultation (including delivering complex information and exploring medicines taking behaviour, conflict and confrontation, transfers of care, safeguarding, emergency supply, learning disabilities and mental health)- see Appendix 2 for further details and outlined learning objectives. Scenarios were reviewed, tested and refined through rehearsal involving members of the development group, before actual use. Expert patients were also involved in the development and delivery of the learning disabilities scenario. Some scenarios were also adapted so they could be deployed for online virtual simulation training.

The in-person simulation events consisted of five scenarios whereas virtual simulation events consisted of three. Scenarios were chosen to reflect a variety of challenges and practice settings e.g. physical and mental health, primary and secondary care, and to expose trainees to situations they may not have faced in their training, but are likely to post-registration. See Appendix 3 for the selection of scenarios used across the events.

Maudsley Simulation worked with the development group to support course evaluation, designing and creating a pre and post course online survey as well as a longitudinal online survey for learners.

Aim:

To co-design and develop a simulation training course for pharmacy trainees to develop clinical and human factor skills.

This full-day course ran on 7 occasions between May and July 2021. In addition, 2 half day courses were delivered online using Zoom™. Courses were delivered face to face at King's College Hospital, University Hospital Lewisham and Queen Elizabeth Hospital simulation centres. The course used the full simulation suite to run scenarios based on the real-life workplace experiences for pharmacy staff. A course programme outline can be found in Appendix 1.

Sixty-seven trainees attended the simulation training events (fifty-two pre-registration pharmacists and 15 pre-registration trainee pharmacy technicians). Fifty-eight trainees fully completed the pre and post course surveys including the basic demographic information below.

Participant breakdown by profession and demographics (who completed pre and post course surveys)

Profession	
Pre-registration Pharmacist	46
Pre-registration Trainee Pharmacy Technician	12
Gender	
Male	15
Female	43
Age	
20-24 years	41
25-29 years	9
30-34 years	4
35-39 years	4

Participants were invited to complete a consent form and a pre-course questionnaire at the start of the course. They were introduced to the principles of simulation as a training tool via a PowerPoint presentation for 20 minutes, and ground rules were established. A total of 5 scenarios were delivered throughout the day lasting approximately 10-20 minutes. Participants who were invited to partake in scenarios were asked to suspend disbelief and perform as they would as if in a real situation. Participants entered scenarios either individually or in pairs. One scenario called emergency supply (*further details Appendix 2*) was completed as a group. In all scenarios, faculty staff acted as simulated patients, carers or other health care staff. Course attendees who were not taking part in the scenario observed in the debrief room via a video-link. The whole group was then debriefed by trained facilitators using the 'diamond debrief' structure (Jaye et al, 2015) with the 'plus delta' method (Dubé et al, 2019).

Evaluation strategy

Our evaluation methodology follows a pragmatic mixed methods design, drawing on Neilsen and Abildgaard's (2013) Process and Effect Evaluation Framework. The model provides a template for all data collection that informed the outputs of this project. This ensured data is captured relating to both the workforce initiatives (availability, quality, content, design, delivery) and their outcomes (creating an evidence base).

Pre and post evaluation

Overall, three validated scales were included in the pre and post course evaluation, as well as some course specific questions that were directly linked to the learning objectives of the course. A summary of each of the validated scales is described below with examples presented in *table 2*. Specifically, in the post course survey, several evaluation questions including both open and closed responses were included to capture participants overall experience of the training.

Validated scale	Purpose	Example of items
Jefferson Scale of Empathy (JSE) for Healthcare Professionals (Hojat et al, 2001)	To measure empathy in health professionals involved in patient care in a clinical setting.	My patients feel better when I understand their feelings. I try to image myself in my patients' shoes when providing care to them.
Human Factors Skill for Healthcare Instrument (Reedy et al, 2017)	To assess the six human factors skills: situational awareness, communication, teamwork, leadership, decision-making and care.	Prioritising when many things are happening at once Recognising when you should take on a leadership role
Mental Illness: Clinicians' Attitudes Scale (MICA)-4 (Gabbidon et al, 2013)	To assess attitudes about psychiatry and people with mental illness	Working in the mental health field is just as respectable as other fields of health and social care. People with a severe mental illness are dangerous more often than not.
Course specific questionnaire	To assess knowledge and confidence that specifically relates to the learning objectives of the course.	I can confidently obtain an accurate drug history

Table 2: examples of validated scales used in the evaluation surveys

Follow up Data

The follow up survey was issued between 1 to 2 months after the first simulation training via email. Response rates on the survey were unfortunately quite low, so it was decided to continue recruitment to maximise data. Overall, 22 participants completed the survey between 1-6 months post the first simulation training day. The follow up survey included the course specific questions, the MICA-4, the Jefferson Scale of Empathy for Healthcare Professionals, and the Human Factors Skills for Healthcare Instrument. Additional questions were included around what aspect of training was most memorable and thus impacted knowledge/ skill retention. There were also several questions that related to how the simulation course had impacted clinical practice

Faculty feedback

For quality assurance purposes, simulation faculty feedback was captured post course. In total, 9 faculty members completed the survey which included questions capturing their perspective of the course.

Data Analysis

Statistical analyses were conducted using SPSS (IBM, 2020). The pre- and post-data was screened Paired-samples t-tests were conducted to assess for significant changes in HuFSHI, JSE, MICA-4 and CSQ scores pre- and post-course. Thematic Analysis (Braun & Clarke, 2006) was conducted on all qualitative data. The main researcher (HI) familiarised herself with the data. The data was coded, and then grouped into themes and sub themes. Sub themes were then discussed with the second researcher (AS) to ensure triangulation of data. Key themes were then identified and have been described below.

FINDINGS

Faculty feedback

In total, 9 faculty members completed the quality assurance survey post training. Each faculty member mentioned that they had approximately 9/10 participants on the course and were happy with the locations (King's College Hospital, Queen Elizabeth Hospital and University Hospital Lewisham) that they delivered training at. Faculty highlighted that the overall course went well, most mentioned that participants were quiet at the start of the day, however contributed more as the day went on. Overall, most courses had a good mix of participants, 2 courses only had 1 PTPT so these courses were more pharmacist focused. Faculty mentioned that it was particularly useful to have participants from a mixture of different locations/trusts. Faculty members stated they received positive informal feedback from participants throughout the event. Specifically, participants mentioned that they found the training beneficial, engaging, enjoyable and that scenarios were well balanced in terms of skill level and challenge. Most participants would focus on clinical and technical points during debriefing but would rarely focus on communication aspects.

One faculty member mentioned that it might be better to use a different approach to debriefing as the description phase became monotonous. Furthermore, the plus delta approach to debriefing made it harder for participants to go into depth about their underlying values and motivations. In future, facilitators suggested including an activity to make learners feel more at ease, which would hopefully result in them engaging more, earlier in the day. Additionally, using a wider range of scenarios could also be more beneficial to both learners and faculty.

Pre and post course findings

Survey key points

- 100% of participant would recommend this course to other.
- Response rates for the pre course evaluation survey = 67/ 67
- Response rates for the Post course evaluation = 63/ 67
- Response rates for the follow up was 22/67

Key findings for quantitative data were:

A non-significant difference was found between pre- (M = 90.12, SD = 7.28) and post-course (M = 89.46, SD = 8.92) scores in the MICA-4, t(58) = .695, p = .49, 95% CI [-1.24, 2.56].

A significant difference was found between pre- (M = 76.3, SD = 10.5) and post-course (M = 85.7, SD = 8.90) scores in the course specific questionnaire, t(53) = -5.161, p < .001, 95% CI [-13.09, -5.76].

A significant difference was found between pre- (M = 112, SD = 11.0) and post-course (M = 116, SD = 11.8) scores in the Jefferson Scale of Empathy for Healthcare Professionals, t(56) = 2.278, p = .027, 95% CI [0.50, 7.72].

A significant difference was found between pre- (M = 87.6, SD = 15.2) and post-course (M = 99.4, SD = 13.0) scores in the HuFSHI, t(53) = 2.639, p < .001, 95% CI [-17.09, -6.50]

Scale	**Pre-Course**	**Post-Course**
Clinician Mental Health Attitudes (MICA-4)	*90.12*	*89.46*
Pharmacy Skills (course specific questions)	76.3	85.7
Jefferson Scale of Empathy	112	116
Self-efficacy in Human Factors (HuFSHI)	87.6	99.4

Longitudinal data was collected between 1-6 months after completing the course. As this returned only 9 matched eligible responses, it was not possible to meaningfully compare quantitative scores between pre, post, and longitudinal follow up.

Facilitators

From the table below, it is evident that facilitators were rated highly for the delivery of the course.

	Excellent	Good	Satisfactory	Poor	N/A
Encouraging participation, reflection, and learning	87%	11%	2%	-	-
Clearly explaining things	81%	17%	2%	-	-
Providing a safe and constructive learning environment	89%	9%	2%	-	-
Their knowledge of the subject	81%	17%	2%	-	-
Enthusiasm	85%	15%	-	-	-

Several open text questions were included in the post evaluation survey, emphasising that the facilitators played a key role in creating a psychologically safe environment.

> *"Very welcoming and reassured us from the start that there was no judgement"*

> *"They were extremely helpful, and it was very beneficial to have members of staff from different sectors within pharmacy"*

What facilitated this, was the approachableness and friendliness of facilitators. Participants noted that this was pivotal to their learning and experience of simulation training.

Evaluation data

Overall, the table below suggests that the course was a success with most participants rating it excellent and good. The different aspects of the course, including the scenarios, debrief and overall structure of the course, were rated excellent and good suggesting that learners found this course helpful to their clinical practice.

54 participants	Excellent	Good	Satisfactory	Poor	N/A
How well did the course meet its stated aims & objectives?	74%	24%	2%	-	-
How would you rate the timing of the course?	59%	37%	4%	-	-
How well did the course meet your objectives/ expectations?	67%	31%	2%	-	-
How would you rate the quality of the course content	68%	30%	2%	-	-
How would you rate the structure of the course?	65%	31%	2%	2%	-
How would you rate the quality of scenarios?	78%	20%	2%	-	-
How would you rate the relevance of scenarios to your clinical practice?	79%	17%	4%	-	-
How would you rate the quality of debriefs?	67%	31%	2%	-	-
How useful do you think this course will be for your work?	74%	22%	4%	-	-
Overall pace of the course	80%	20%			
Overall experience of the digital platform	60%	40%			
Overall experience of digital simulation training	40%	60%			

All participants agreed that the training was important to their learning, and that specific aspects of it were particularly beneficial. Four percent of participants rated the structure of the course as satisfactory or poor. Suggestions were made in open text questions on how to improve this, including having another group activity, allowing learners to volunteer for a scenario and providing more clear answers to solutions that can be applied to clinical practice.

Eight out of 67 participants made suggestions on what they would have liked to explore more of during simulated scenarios that are applicable to clinical practice including:

- Having more scenarios that involved interprofessional communication, rather than just patient/carer communication
- Having more team-based scenarios rather than solo ones
- Scenarios of drug histories for those with specific needs such as mental health patients, those with HIV and emergency hormonal contraceptives
- Managing confidentiality in difficult situations
- Managing safeguarding procedures and referral organisations

Long term impact of training

Only 10% of participants who completed the course went on to complete the longitudinal follow up survey. Whilst the response rate was low, 9 participants provided detailed feedback, two key themes were identified including improving the patient experience and increased confidence in managing complex situations. Certain aspects of the training including the scenarios and debrief cemented learning and facilitated behaviour change in clinical practice.

Improved patient experience

100% of respondents stated that the course had impacted them personally and in the way they engage with others particularly in terms of communication. Participants highlighted that they are more mindful of nonverbal communication such as body language and eye contact, impacting how they, as healthcare professionals, interact and communicate with patients about their medication.

" Be mindful of language used when counselling patients on new medication"

100% of respondents said that their regular work tasks changed since attending the course. Participants stated increases in confidence when on the ward, and that they now take a more patient-centred care approach such as by making sure the patient is put first in all decisions, and by being more attentive to body language.

"It has encouraged me to really check the drug charts for medications for Parkinson's to ensure they are written correctly in terms of strength, time of day and the right preparation."

Participants explained they have utilised resources such as booklets to explain in detail the benefits of said medication, reducing any anxiety and concerns a patient has and improving their overall experience.

"Making use of available resources in the workplace to benefit me and the patient "

Participants stated that they are more empathetic when working with patients and complex situations, and that their communication skills have improved.

"Definitely made me more aware and empathetic towards patients"

Furthermore, participants highlighted that they improved the structure of consultations with patients by gaining insight on how the patient feels about medication.

Increased confidence in managing complex situations

Participants described feeling more confident in managing complex situations with patients when there is a confidentiality or safeguarding concern. Specifically, participants highlighted that since attending the course they have more confidence in being able to ask family members or carers to leave the room during a consultation to maintain the privacy of the patient.

"I am more confident in terms of facing complex scenario[s] and learn how to respond"

In relation to safeguarding, participants felt more aware of potential safeguarding risks and maintaining the confidentiality of the patient. Participants also felt more confident in their ability to know when it is appropriate to discuss patient information in front of a parent/ partner and when to involve relative or next of kin when managing challenging situations. Additionally, participants described having more awareness of polices that are in place in their clinical environment and how to access safeguarding resources.

How it was learnt

Scenarios

Participants stated that one of the most memorable aspects of the course was the scenarios. Being involved in simulated scenarios (22%), watching others in the scenarios (33%), the realism of the scenarios (33%), and the facilitators (22%) positively impacted their learning. Participants particularly commented on how watching others gave them new perspectives and an opportunity to learn from others. Participants noted that was useful and important to see how situations are managed in different clinical environments even if not completely related to their own clinical practice.

"It was an interesting experience listening to how others perceived things and how things are done differently in different organizations"

This suggests that a better understanding of the functions of different clinical environments was learnt during this course. Participants also commented that the realism of the scenarios made learning easier as it felt natural to them to engage in these scenarios.

"The scenarios were very realistic which made it easier to learn as it was almost like being on a ward."

Some of the scenarios included in the courses, exposed participants to situations that they had not experienced before and enabled them to practice their skills in a safe environment with no impact to patients.

"Provided us with the opportunity to practice in a safe environment what could be a more challenging situation, discussed relevant aspects in debrief and been exposed to scenarios never came across until that point"

The simulations themselves also allowed participants to put theory and what they had learned into practice within a safe environment.

Debriefs

Participants stated that the most memorable aspects of the course were the debriefs following scenarios (44%). Debriefs were noted as being important for gaining insight into the perspectives of their colleagues and learning to be more open-minded.

"The debriefs really helped see others point of views, it has helped me to be more openminded to other ways of thinking"

The debrief also gave participants an opportunity to reflect on their own clinical practice which is often not possible in busy clinical environments.

"Reflecting upon each scenario on what went well and how we could improve"
"I find it helpful that the group would explore what to do differently…"

What was useful to participants was reflecting on what went well in the scenario, exploring different approaches to situations and thinking of multiple solutions to problems.

SUMMARY

In summary, the results suggest that the pilot pharmacy simulation course was a success for pre-registration pharmacists and pre-registration trainee pharmacy technicians. The course significantly impacted human factors skills, empathy in professionals and pharmacy skills. Interestingly, there was no significant difference in attitudes towards mental illness. Key aspects of the course such as simulated scenarios and debriefs facilitated long term behaviour change to clinician practice 1-6 months following training. Specifically, participants felt more confident in managing complex situations in relation to safeguarding and maintaining confidentially. Additionally, through improved confidence and skills in communication participants felt there was an improvement to patients experience and had adopted a more patient centred approach.

Weaknesses

Several limitations to this study should be noted. The response rate to the follow up survey was low as it was completed by only 13% of participants who attended the initial course. Whilst the findings are significant, they should be interpreted with caution. Participants were contacted via email at several time points following the course, however, having a clear communication strategy may

increase response rates. Further, with increased response rates, future research could investigate how changes to clinical practice change over specific time points.

Strengths

This pilot study is one of the first to investigate the use of simulation training for pre-registration pharmacists and pre-registration trainee pharmacy technicians. Although self-reported, the results highlight positive changes to clinical practice both for professionals and patients. Future research is needed to increase generalisability of the findings.

Future considerations

This pilot project provides a foundation of knowledge that can be used to continue developing simulation training programmes in pharmacy. Future work in this area could consider developing and including more multi-learner or team-based scenarios. This will provide more opportunities for team working and team communication challenges to be explored. Although, the existing emergency supply/safeguarding group vignette scenario worked well as a whole group discussion, it could be developed into a role-play/acted scenario like the others to make it a more visceral learning experience. Future work should also include developing scenarios that involve physical assessment so that the simulation training curriculum covers more of the new General Pharmaceutical Council standards for the Initial Education and Training of Pharmacists. Lastly, using an alternative debrief method such as advocacy and inquiry (Rudolph et al, 2006) would potentially enrich the debrief discussions, as they can better help faculty uncover trainees' internal frames and support learners to reframe internal assumptions and feelings in order to take more effective future action.

In conclusion, this pilot study using simulation to train pre-registration pharmacists, pre-registration trainee pharmacy technicians is an effective training modality for improving a variety of clinical skills.

REFERENCES

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. Qualitative research in psychology, 3(2), 77-101.

Cook DA, Hatala R, Brydges R, Zendejas B, Szostek JH, Wang AT, Erwin PJ, Hamstra SJ. Technology-enhanced simulation for health professions education: a systematic review and meta-analysis. *JAMA* 2011;306(9):978-988.

Dubé, M. M., Reid, J., Kaba, A., Cheng, A., Eppich, W., Grant, V., & Stone, K. (2019). PEARLS for systems integration: a modified PEARLS framework for debriefing systems-focused simulations. *Simulation in Healthcare, 14(5), 333-342.*

Fay-Hillier TM, Regan RV, Gordon MG. Communication and patient safety in simulation for mental health nursing education. *Issues in Mental Health Nursing* 2012;33(11):718-726.

Gabbidon J., Clement S., Nieuwenhuizen AV., Kassam A., Brohan E., Norman I., Thornicroft G. (2013). Mental illness: clinicians' attitudes (MICA) scale. Psychometric properties of a version for students and professionals in any healthcare discipline. *Psychiatry Research 206:81-87*

Goldfarb E, Gorrindo T. Simulation in Psychiatry. In: Levine AI, DeMaria Jr S, Schwartz AD, Sim AJ (eds.) *The Comprehensive Textbook of Healthcare Simulation*. New York, NY: Springer; 2005. p511-523.

Hammick, M., Freeth, D., Koppel, I., Reeves, S., & Barr, H. (2007). A best evidence systematic review of interprofessional education: BEME Guide no. 9. *Medical teacher*, *29*(8), 735-751.

Hojat M, Mangione S, Nasca TJ, Cohen MJM, Gonnella JS, Erdmann JB, Veloski J, Magee M. (2001) The Jefferson Scale of Physician Empathy: Development and Preliminary Psychometric Data. *Educational and Psychological Measurement. 2001;61(2):349-365.*

Jaye P, Thomas L, Reedy G. "The Diamond": a structure for simulation debrief. The Clinical Teacher. In press (Accepted April 2014).

Miller D, Crandall C, Washington C, McLaughlin S. Improving teamwork and communication in trauma care through in situ simulations. *Academic Emergency Medicine* 2012;19:608-612.

Naeem A, Gupta B, Rutherford J, Gachen A, Roberts S. The simulation mental health review tribunal – a valuable training tool for senior house officers? *Psychiatric Bulletin* 2007;31(1):29-32.

Reedy, G. B., Lavelle, M., Simpson, T., & Anderson, J. E. (2017). Development of the Human Factors Skills for Healthcare Instrument: a valid and reliable tool for assessing interprofessional learning across healthcare practice settings. *BMJ Simulation & Technology Enhanced Learning, 3(4), 135-141.*

Robertson J, Bandali K. Bridging the gap; enhancing interprofessional education using simulation. *Interprof Care* 2008;22(5):499-508.

Rudolph, J. W., Simon, R., Dufresne, R. L., & Raemer, D. B. (2006). There's no such thing as "nonjudgmental" debriefing: a theory and method for debriefing with good judgment. *Simulation in healthcare, 1(1), 49-55.*

Zendejas B, Brydges R, Wang AT, Cook DA. Patient outcomes in simulation-based medical education: A systematic review. *J General Internal Medicine* 2013;28(8):1078-1089

Appendix 1 – Simuation Training Day Schedule

Simulation Training Day

08:30 – 09:15 – Faculty set up

09:00 – 09:15 – Registration

09:15 – 10:15 – Introduction

10:15 – 11:15 - Scenario 1 and debrief

11:15 – 11:30 – Break

11:30 – 12:30 – Scenario 2 and debrief

12:30 – 13:15 – Lunch

13:15 – 14:15 – Scenario 3 and debrief

14:15 – 15:15 – Scenario 4 and debrief

15:15 – 15:25 – Break

15:25 – 16:25 – Scenario 5 and debrief

16:25 – 17:00 – Feedback and Closure

Appendix 2 – Summary of scenarios

Scenario	*Learning objectives*	*Potential human factors skills*
Patient Consultation - Anticoagulation Initiation ***Outline****:* The learner conducts a patient consultation. The patient is newly diagnosed with atrial fibrillation and initiated on warfarin. He/she has concerns upon hearing about the side effects of warfarin.	1) Apply the MRCF in the context of atrial fibrillation. 2) Evaluate medicines adherence. 3) Formulate an individualised approach to supporting adherence. 4) Identify personal biases and challenges to effective patient communication 5) Recognise limitations and escalate when necessary	- Communication - Situational awareness - Ability to analyse information provided.
Prescription Error and Patient Education - Asthma ***Outline:*** The learner instructs a patient on inhaler device use. The medical team are changing the inhaler as the patient had difficulty with the current one. The prescriber inadvertently prescribes the same inhaler as before.	1) Apply the MRCF in the context of asthma. 2) Evaluate medicines adherence. 3) Formulate an individualised approach to supporting adherence. 4) Identify personal biases and challenges to effective patient communication. 5) Provide holistic inhaler device counselling 6) Develop the skill of negotiating a shared agenda	- Communication - Situational awareness - Ability to analyse information provided
Confidentiality – Drug History ***Outline:*** The learner takes a drug history from a 17-year-old patient whose father is present. The patient is uncomfortable disclosing her medication history with her father present.	1) Reflect on environment and take steps to maintain the person's privacy and confidentiality. 2) Respect and observe confidentiality 3) Obtain an accurate drug history 4) Elicit all relevant information by the use of appropriate questions 5) Behave in a manner which instils confidence	- Situational awareness - Communication - Problem-solving skills

Controlled drug ***Outline***: The learner investigates concerns from nursing staff that a patient is covertly taking their own supply of medication and is reluctant to tell nurses what she is taking. The patient is post orthopaedic surgery and has had negative previous experiences pain management in hospital with her own medication supplies being lost.	1) Apply principles of safe Controlled Drug storage 2) Elicit all relevant information by the use of appropriate questions 3) Provide information and advice appropriate to the needs of the recipient(s) 4) Identify personal biases and challenges to effective patient communication 5) Show empathy for people 6) Develop the skill of negotiating a shared agenda	- Situational awareness - Communication - Problem-solving skills
Critical Medicines - Parkinson's ***Outline:*** One learner (PTPT) obtains a drug history from the patient and their carer at the bedside and provides a handover to the other learner (PRP) who completes the medicines reconciliation process. Doses of critical medicines have been omitted and the carer is very upset.	1) Identify human factors that influence individual and team performance 2) Recognise personal and professional limitations and work with others to respond to urgent requests 3) Organise and prioritise workload 4) Combine clinical and pharmaceutical knowledge together with effective listening and questioning skills to respond appropriately to clinical queries 5) Apply knowledge of critical medicines to assist with prioritisation of pharmaceutical issues 6) Identify cognitive impairment and account for this in drug history taking	- Communication - Situational awareness - Ability to analyse information provided
Patient consultation – mental health setting – lithium initiation ***Outline***: The learner conducts a patient consultation with a patient in an acute psychiatric ward setting. The patient has a diagnosis of bipolar disorder and is initiated on lithium.	1) Apply the MRCF in the context of bipolar affective disorder 2) Evaluate medicines adherence 3) Formulate an individualised approach to supporting adherence 4) Identify personal biases and challenges to effective patient communication	- Verbal communication - Non-verbal communication - Appreciation of the person

Learning Disabilities – community pharmacy setting ***Outline***: The learner responds to a parent/carer's concerns that the dispensed medicines he has come to collect are incomplete, as well as some being either an unfamiliar formulation or labelled incorrectly. The patient is a child with profound and multiple learning disabilities. The parent/carer is very tired, stressed and upset that the medicines are incorrect.	1) Identify human factors that influence communication and patient experience. 2) Show empathy for people 3) Acknowledge when a person is an expert, listen to them and try to understand their point of view. 4) Verbal and non-verbal communication 5) Apply knowledge of critical medication to improve patient experience and offer appropriate knowledge 6) Recognise personal and professional limitations and act appropriately	- Verbal communication - Nonverbal communication - Appreciation of person - Decision making
Community Pharmacy Conflict ***Outline:*** Two learners work together to dispense, check and hand out a methadone prescription to one patient and a fexofenadine prescription to another patient, who also wants advice on an OTC purchase. A conflict arises between the two patients.	1) Identify human factors that influence individual and team performance 2) Recognise personal and professional limitations and work with others to respond to conflict and clinical requests 3) Organise and prioritise workload 4) Combine clinical and pharmaceutical knowledge together with effective listening and questioning skills to respond appropriately to clinical queries	- Communication - Problem solving - Conflict resolution
Emergency supply and Safeguarding – Group Vignette ***Outline***: The whole group are presented a scenario through a series of vignettes with discussion points at set points. The scenario involves a young mother collecting a diazepam prescription for herself and making an emergency supply request for her her 8-year-old son. She appears stressed and seems to be hiding potential signs of physical abuse.	1) Recognise 'red flags' for safeguarding concerns 2) recognise professional responsibilities of a pharmacist and pharmacy technician in safeguarding situations 3) refer appropriately and document concerns 4) identify personal biases towards patients with mental illness 5) handle emergency supply requests appropriately 6) evaluate medicines adherence	- Verbal communication - Nonverbal communication - Appreciation of the person - Decision making

Appendix 3 – Table of Scenarios Used

The table shows the selection of scenarios used on the different simulation training dates. F2F = face to face events.

	F2F 20/4/21	F2F 27/4/21	F2F 7/5/21	F2F 11/5/21	F2F 13/5/21	F2F 21/6/21	F2F 25/6/21	Virtual 7/7/21	Virtual 14/7/21
Patient Consultation - Anticoagulation Initiation	X						X	X	X
Prescription Error and Patient Education - Asthma	X		X	X		X			
Confidentiality – Drug History		X		X	X		X		
Controlled drug	X	X	X	X	X	X	X	X	X
Critical Medicines - Parkinson's		X	X		X				
Patient consultation – mental health setting – lithium initiation	X	X	X	X	X				
Learning Disabilities – community pharmacy setting						X	X		
Community Pharmacy Conflict						X			
Emergency supply and Safeguarding – Group Vignette	X	X	X	X	X	X	X	X	X

Acknowledgements

Our thanks go to all the contributing members of the project.

Kai-Loke – Education and Training Lead – Pharmaceutical Sciences Clinical Academic Group, Kings Health Partners (Project Lead)

Richard Pudney – Principal Pharmacist Education and Training – Lewisham and Greenwich NHS Trust (Project Lead)

Radha Shah - Simulation Fellow, Lewisham and Greenwich NHS Trust

Annabel Lane – Simulation Fellow, South London and Maudsley NHS Foundation Trust

Ghislane Edwin - Simulation Fellow, Royal Brompton and Harefield NHS Foundation Trust

Kate Pine – Principal Pharmacist Education and Training, Kings College Hospital NHS Foundation Trust

Loren Bailey – Lead Pharmacist Bethlem Royal Hospital and Ladywell, South London and Maudsley NHS Foundation Trust

Wendy Cossey – Associate Chief Pharmacist, Workforce Development, Royal Brompton and Harefield NHS Foundation Trust

Steven Giddings – Lead Pharmacist Education and Training, Royal Brompton and Harefield NHS Foundation Trust

Colin Rook – Chief Pharmacy Technician Education Training and Development, Guy's and St Thomas' NHS Foundation Trust

Chris Eaton – Highly Specialist Pharmacist, Guy's and St Thomas' NHS Foundation Trust

Jane Deane – Medicines Management Nurse, Lewisham and Greenwich NHS Trust

Vicky Richmond – Senior Clinical Pharmacist, South London and Maudsley NHS Foundation Trust

Shivani Patel – Prescribing Mentor, Kings College Hospital NHS Foundation Trust