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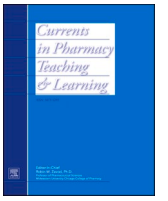

A medicines information department simulation for final year MPharm undergraduates

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ABSTRACT

Background: Final year pharmacy students in the UK need to demonstrate competence in a range of learning outcomes including working in partnership, communication skills, working collaboratively, appraising the evidence base, critically evaluating guidelines, effective leadership, and responding to complaints. Medicines Information (MI) departments in the UK provide support for all aspects of medication related queries and working in MI requires these skills to ensure the safe and effective use of medicines.

Educational activity: An MI themed simulation was developed for final year MPharm students at the University of East Anglia as an opportunity for them to develop in a range of skills and utilise previously taught clinical knowledge. Students were divided into two teams of five students, each tasked with managing their own MI department. During the four-hour simulation each team received a total of 12 telephone enquiries from a variety of simulated health professionals and simulated patients.

Evaluation findings: All 10 students participated in a focus group exploring their experience of the simulation. A thematic analysis identified three themes; realism, management and teamwork, and preparation for practice.

Analysis of educational activity: Students felt the simulation was realistic and challenging. They did not see management skills as integral to the task at the outset, however there was evidence of a change in approach as the simulation progressed. The session supported development of research and communication skills and was an opportunity for students to apply clinical knowledge. As such, an MI department simulation activity may be a useful addition to pharmacy curricula.

Background

Final year pharmacy students in the UK need to demonstrate a range of learning outcomes at the 'shows how' or 'does' level of Millers Triangle[1] including those that require working in partnership, demonstrating effective communication, adapting communication dependant on different settings, working collaboratively, appraising the evidence base, critically evaluating guidelines and evidence, demonstrating effective leadership, and responding to complaints.[2] Experience of a Medicines Information (MI) department was identified by pharmacy practice staff at the University of East Anglia as a potential vehicle for students to develop the skills needed to meet these outcomes whilst also providing opportunities for them to revisit and utilise previously taught clinical knowledge and skills.

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MI departments in the UK provide support for all aspects of medication related queries to healthcare professionals and the general public, and have been demonstrated to have a positive influence on patient care.[3] Working in MI requires effective clinical decision making, communication, teamworking, leadership and management skills in order to provide timely evidence-based advice to ensure the safe and effective use of medicines.[4]

Limited resources for experiential learning coupled with an ongoing pharmacist workforce crisis within the NHS[5] necessitated staff to consider simulation-based education (SBE) as the method for delivery.

SBE is an established teaching approach in healthcare professional training that facilitates opportunities for students to be exposed to a variety of clinical scenarios within a controlled setting.[6–8] Furthermore, SBE has previously been used to provide opportunities for the development of leadership and communication skills.[9]

Advantages over experiential learning include exposure to situations which may not be commonly experienced in real world activities[10] and the absence of risk to patient safety.[11] However, considerable resource may be required for designing and running the simulation, including writing scenarios and human resource (staff time and standardised patients).[6]

In this example, additional benefits included the ability to standardise the experience and ensure the scenarios encountered by students were relevant to their stage of learning.

Educational activity

An MI department simulation was developed for final year MPharm students as part of their Pharmacy Practice module to provide an opportunity for them to develop their communication, leadership, teamworking and critical appraisal skills.

The learning objectives for students participating in the simulation were to:

- Identify and elicit necessary information from an enquirer
- Accurately record information necessary to respond to a query
- Negotiate an acceptable timeframe for response to a query
- Record a clinical enquiry and identify the extra information required to answer it
- Demonstrate information retrieval skills by searching for information in a logical manner from a variety of sources and to document the findings
- Construct evidence-based answers to clinical questions

ENQUIRY FORM		
Enquirers Full Name:		
Job Title:		
Department:	Tel. no.	
Email:	Bleep no.	
Contact for reply (who and how):		
Reply required by (date and time):		
Question		
Patient's Details		
Patient Name:		
Gender:	Age or DOB:	NHS / Hospital no.
Weight:	Blood tests:	
Height:		
Answer:		

Fig. 1. Medicines information enquiry form.

- Communicate answers to clinical questions in a clear and coherent manner
- Recognise the importance of creating and maintaining an effective team
- Demonstrate the ability to manage time effectively by prioritising tasks and workload so that all tasks are completed on time and to the expected standard
- Contribute effectively to a team so that outputs are maximised
- Consider how workload is distributed amongst team members

Students were divided into two teams of 5 and were advised in advance that they would be tasked with managing an MI department during the simulation. The two MI departments were named Peterborough and Ipswich after neighbouring localities. The learning objectives were shared with them together with the following description:

"You will be responsible for managing a Medicines Information Department. Within your team you will be responsible for providing a full range of advice to healthcare professionals working in both primary and secondary care and members of the public.

Enquirer name									
Summary of enquiry									
Your enquiry									
I was able to contact the medicines information department easily									
Strongly Disagree		Disagree		Neutral		Agree		Strongly Agree	
The staff were professional									
Strongly Disagree		Disagree		Neutral		Agree		Strongly Agree	
The staff appropriately interpreted my needs									
Strongly Disagree		Disagree		Neutral		Agree		Strongly Agree	
An appropriate deadline was agreed for a reply?						Yes			
						No			
Our response									
I received the answer by the agreed time?						Yes			
						No			
Did our response answer your question?						Yes			
						No			
Were you offered practical advice where appropriate?						Yes			
						No			
						N/A			
Did we give you enough detail in the answer?						Yes			
						Not enough			
						Too much			
Were you confident in the answer given?						Yes			
						No			
Overall									
Would you use the service again?						Yes			
						No			
Overall what is your opinion of the Medicines Information Service?									
Poor		Average		Good		Very Good		Excellent	
What could we do to improve the Medicines Information service? Please give any comments below									

Fig. 2. Medicines information user satisfaction survey.

This will include providing an enquiry answering and advisory service on all aspects of medicine use including:

- Adverse drug reactions
- Compatibilities of parental drugs
- Dosing information
- Drug interactions
- Safety of drugs in impaired renal/hepatic function
- Safety of drugs in pregnancy and lactation"

Students were prompted to consider how they would organise their team, distribute individual roles and responsibilities, including nominating a team leader, and manage rest breaks. A MI enquiry form template (Fig. 1) was also provided to students in advance.

During the four-hour simulation each team received a total of 12 enquiries from a variety of simulated health professionals and simulated patients. Staff role-played the enquirers and corresponded by telephone. For each enquiry, staff completed a satisfaction survey (Fig. 2), and live updates on the satisfaction scores of the two teams were provided to them during the simulation to introduce a competitive element and as a feedback mechanism. Satisfaction scores were based on how the team managed the enquiry and communicated their response; clinical accuracy of response was not included as a marker of satisfaction.

The simulation was designed by a full-time academic member of staff (JS) and a teacher practitioner (GK). Teacher practitioners are employed in practice (in this case as a hospital pharmacist) but are released to spend a proportion of their working week supporting teaching in the university.

Preparatory work for students was hosted on the course module's VLE (Blackboard) and paper copies were printed for each student. Copies of the MI enquiry form (Fig. 1) were provided for students' use during the simulation.

Five academic staff were involved in running the simulation. JS and GK supervised the session while three additional staff role-played the different scenarios. Guidance was provided to staff in advance of the simulation and included a complete set of scenarios including actor briefing notes, details of which scenarios were allocated to each staff member, a schedule outlining when each scenario should be undertaken and which included an expected response time from the MI department, and copies of the satisfaction survey form (Fig. 2). It should be noted that both groups received the same queries over the course of the simulation, however the timeline varied between groups, and they were not necessarily conducted in the same order.

Staff role-players completed the satisfaction survey form immediately after completing each scenario and returned it to a facilitator who input the scores onto an Excel spreadsheet created for this specific purpose which was linked to a PowerPoint presentation in order that the latest results could be displayed in class.

The classroom space was divided in half using screens so that each team could work independently and without overhearing the scenarios and responses given by the other team. Each team had two telephone lines installed within their 'MI department' and were provided with copies of resources to support answering MI enquiries including the British National Formulary,[12] British National Formulary for Children,[13] Drugs in Pregnancy and Lactation,[14] Martindale,[15] Electronic Medicines Compendium,[16] NEWT guidelines,[17] Renal Drug Handbook,[18] Stockley's Drug Interactions[19] and example hospital guidelines for gentamicin and vancomycin monitoring.

Scenarios were developed by GK, who utilised experiences from their practice workplace to draw on real-life examples which covered a range of enquiry types appropriate for the cohort. In addition to including a range of clinical areas, the scenarios were also designed such that they included a variety of enquirers and timeframes for response. Example scenarios have been included in Table 1. Table 2 provides a summary of the scenarios used and distribution amongst staff role-players.

The simulation contained no new clinical content and was presented as an opportunity for students to practice previously taught skills and utilise existing knowledge. Therefore, no formal assessment was included, however in the context of the overall module the simulation was designed to support preparation for the final year clinical assessments. In addition, students could use the experience as evidence of their development within their Professional and Personal Development Portfolio.

A separate session was held with students the following week to debrief on the experience and review the content, including model clinical answers and rationale, and share reflections on the approach taken to managing the MI department.

Evaluation findings

The simulation was piloted with final year students undertaking the MPharm with Placement version of the degree. This version of the degree was essentially the same as the regular four-year MPharm degree except that it incorporated two six-month placements in

Table 1
Example medicines information enquiries.

Enquirer	Enquiry	Urgency
Nurse	Reconstitution of cefuroxime injection	Will wait as patient needs medication
Patient	Complaint: given an antibiotic that they are allergic to	Demands an immediate response
General Practitioner	Conversion of oral morphine to a patch	Within 30 minutes so that they can get a prescription to the pharmacy before closing time

Table 2
Summary of the scenarios used and their distribution amongst staff role-players.

Scenario number	Scenario theme	Staff role-player allocation
1	Pregnancy	Staff member A
2	Angry patient: adverse drug reaction	Staff member B
3	Paediatrics	Staff member B
4	Interactions 1	Staff member C
5	Interpretation of blood levels	Staff member B
6	Interactions 2	Staff member A
7	Renal dose modification	Staff member C
8	Administration advice	Staff member C
9	Opioid dose conversion	Staff member C
10	Enteral tube administration	Staff member B
11	Hepatic impairment	Staff member A
12	Administration error	Staff member B

the final two years of the course, resulting in an overall five-year program. A small cohort of 10 students undertook this version of the degree lending itself to a pilot within the core program. An evaluation was planned and ethical approval granted by the Faculty of Medicines and Health Ethics Committee, University of East Anglia, for this evaluation (Reference: 2017/18 32SE).

All students that participated in the workshop were invited to a focus group of up to one hour duration to take place one week following the simulation during regular teaching hours. The intention was to explore students' experience of participating in the simulation and seek their views on what worked well, how it could be improved and the impact on their learning. As responses could be not predetermined a qualitative approach was deemed the most appropriate.[20] Focus groups were chosen for theoretical reasons, as the group dynamic could stimulate discussion of the shared team-based experience, and pragmatic reasons relating to time and cost constraints.[21,22]

The focus group was facilitated by JS using a pre-prepared topic guide. This topic guide included a set of key questions, written as open questions and designed to address the evaluation objectives. These included feelings about the workshop, what was learned, how it will improve practice, and how the session could be improved. Suggested prompts were included to direct participants to discuss areas of interest if they had not been answered in response to open questions, and probes to explore initial responses in further depth or to seek clarification.[21]

The focus group was recorded using two Olympus® WS-750M digital voice recorders (one as the primary recorder and the other as an insurance policy against equipment malfunction) and transcribed verbatim by an external agency and checked for accuracy by JS. The transcript was analysed using thematic analysis.[23] Themes were derived from the data using an inductive approach to allow a broad analysis of participants' perspectives.[24] JS undertook the initial coding and categorisation of the data. Regular discussion took place with GK during this process and agreement was reached that the final themes accurately represented student views.

All 10 students consented to participate in the focus group which was completed in 31 minutes. Participants P1 to P5 were in the Peterborough team and I6 to I10 in the Ipswich team.

Three themes were identified; realism, management and teamwork, and preparation for practice.

Realism

Students described a number of aspects that contributed to the simulation feeling realistic to them. This included the seemingly random timing and spacing of the MI enquiries they received, as described by P1:

> "it's like a real-life situation because you won't know when people are calling. So for example, we can have like sudden calls at the same time, like two or three calls, and then we have nothing and then suddenly at the last minute somebody can still call us and we still need to answer the query."

I10 explained how the variety of enquiries also felt realistic, "because you have some more complicated ones and some easier ones that you can look up very quickly."

Furthermore, the real-time interactions with enquirers added to the realism and challenge, as explained by P2:

> "It's quite challenging when we have to understand what the patient or the other person on the other end, what they want and what their enquiry is, but at the same time we need to jot down and think of what questions we need to ask. So I think it's quite challenging."

Suggestions for further enhancing the fidelity of the simulation included adding in email and face-to-face enquiries.

Management and teamwork

Management and organization were not seen as integral to the task at the outset and there was a reluctance to take on leadership roles.

As I7 described:

> "Our aim is to complete the task, it's not about the management, how we do it; it's to answer the questions. We don't think taking a break is necessary for us. So, it's not like a requirement to tick the box for getting a high mark,"

I10 agreed, but also reflected that it may have been better to appoint a team leader:

> "the preparation sheet, it recommended us to get a…department manager, but it's not a must, so in the end none of us really wanted to step up to be the manager but I think it would be kind of helpful to have one just to look around and manage staff and manage breaks as well. But…not one of us wanted to really step up to take that place."

These differing views on breaks reflected the wider group of participants with some stating breaks were not necessary whilst others felt it would have been helpful to have planned this in advance, as when they tried to take a break another enquiry would come in and they were then reluctant to leave their teammates.

I6 admitted that "we didn't really plan beforehand how we were going to structure it" and also commented that "we didn't really know what to expect during the workshop as well, so I guess we went with the flow."

There was evidence of a more organised approach in the Ipswich MI department as the session progressed. I10 explained how, "we just naturally fell into it because they [pointing at a couple of fellow team members] had the big enquiry, the complex one, so…we [remaining team members] offered to do a couple of the calls at that time. So we just adjusted our work distribution as it goes."

This sentiment was reflective of the wider teamworking approach taken:

> "it's most like involving knowledge sharing, because some others here haven't done it then you think ah, I will do it this way and then I would do it and show other people" [I7].

P5 explained how some enquiries were researched by the sub-sets of team members as an example of efficient teamworking, and the benefits of working collaboratively were also recognised. As P3 explained, it was helpful "just knowing we can lean on someone."

There was a consensus that more information in advance, for example about the resources available to them in the room (including having two telephone lines) and the unpredictable nature and timing of the enquiries would have helped them plan their time better.

Preparation for practice

Students described how the simulation supported development of their research and communication skills and provided opportunities for them to apply their clinical knowledge in a safe environment.

Students described how the simulation provided opportunities to practise and develop their questioning technique in order to obtain a full set of relevant data at the time of the initial enquiry, and gave examples of where they had not necessarily achieved this during the simulation:

> "the preparation is good because when we're looking back… you think 'oh, I missed something' and then [have to] phone them [the enquirer] back…[we] have had a taste of different enquires to take and also…because it's not real patients, you can't really harm them." I7.

They also explained how they similarly enhanced their use of the various clinical resources provided to develop their responses through exposure to the variety of scenarios.

I6 explained how it helped develop their communication skills:

> "…learning to talk to different types of people as well, different professions and also patients and also like tailor the language when you speak to them in terms of patients, not to really use jargon or anything too complicated, to explain things clearly. Whereas with a doctor or a nurse or a pharmacist we could probably go into more detail, more depth with our answers."

The feedback session was also helpful "because not everyone will be involved in every single MI enquiry". [I7].

Analysis of educational activity

Students liked the variety of problems and the randomness of their timing which they felt was realistic and challenging. It was felt that the session supported developing of research and communication skills and was an opportunity to apply clinical knowledge. Students suggested that additional enquiry types could enhance the simulation further.

They did not see leadership and management as integral to the task at the outset, although there was evidence of a change in approach in one group as the simulation progressed. This was observed by staff as well as being commented upon in the focus group. It was clear that students needed more information in advance to manage their expectations and support them to prepare effectively.

This evaluation is not without limitations. The focus group was facilitated by JS, a member of staff involved in delivering the simulation. This may have influenced the responses received and their interpretation. However, the use of a topic guide and the inductive approach to the thematic analysis provides mitigation and supports the generation of themes which were not predetermined. Furthermore, the focus group was held with both student teams together. Holding a separate focus group for each team may have fostered a deeper discussion of each individual team's experience by reducing the influence of social desirability bias; that is to say, it may have removed any inhibitions they had discussing their team's performance in front of the other team.

Overall, the MI simulation was well received by students and was subsequently adopted as a core component of the MPharm final year program. It has been developed further as a direct response to this evaluation.

An increased number of enquiries are now included. These are presented by a variety of methods including via videocall, emails and in-person, in addition to telephone calls. This also facilitates the inclusion of more variety in student responses, for example they have the opportunity to formulate written responses using the SBAR model.[25]

More guidance is provided to students in advance of the session about the format of the simulation, applying the principles of promoting psychological safety to ensure SBE is as effective as it can be.[26] This includes details of the physical set-up of the room, the resources they will have available, the types of enquiries they may expect and how they will be delivered, and the roles and tasks they need to plan for in their teams. As pre-work, each team is expected to develop a Standard Operating Procedure on receiving and recording a MI Enquiry, which they are expected to use during the session. After the simulation, the students can make adjustments to their SOP before submitting a final version for credit as part of their Professional and Personal Development Portfolio.

Students are also encouraged to allocate roles and break times in advance, with an explicit expectation that each team member has a minimum of a half hour rest break during the simulation, planned as two 15-min rest breaks or one 30-min rest break. To accommodate the full MPharm cohort in this activity, teams now consist of 10–14 students, more than double those of the pilot, which further underlines the necessity of effective planning, organization and communication.

There are additional changes we would like to introduce if resources allow. These include using a different staff member for each enquiry or better still, actors rather than staff members to role-play the various enquirers. This would increase the fidelity of the simulation but may be difficult to implement for enquiries from healthcare professionals, where a certain level of clinical knowledge is necessary to interact realistically with the students. However, for patient roles, this would address a potential bias in how the satisfaction survey is scored; actors would not have knowledge of the accuracy of the answers with which they are provided and therefore this could not influence their scoring, particularly regarding confidence in the answer received and overall satisfaction.

Nevertheless, we would recommend an MI department simulation activity as a useful approach to support pharmacy students to develop their abilities to handle a range of clinical enquiries alongside leadership, management and teamworking skills.

Declaration of competing interest

No author has any conflict of interest to declare. No funding source had any involvement in conducting the research or in preparing the article.

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