TITLE PAGE

Inter-professional Prescribing Masterclass for Medical Students and Non-medical Prescribing Students (nurses and pharmacists): A Pilot Study

Paterson R[1], Rolfe A[2], Coll A[3] and Kinnear M[4]

[1] (RP) Lecturer, Edinburgh Napier University and Chair of Scottish non-medical prescribing university network.

[2] (AR) Clinical Education Fellow, The University of Edinburgh Medical School

[3] (AC) Lead Pharmacist Medical Education, NHS Lothian Pharmacy Service

[4] (MK) Head of Pharmacy Education, Research & Development, NHS Lothian Pharmacy Service

Corresponding author: r.paterson@napier.ac.uk, Room 4.B.36, Edinburgh Napier University, Sighthill Campus, Edinburgh, EH11 4BN. Tel:0131-455-5663.

Word count: 2431 (excluding references)

ABSTRACT

Background and Aims

Prescribing errors cause significant patient morbidity and mortality. Current legislation allows prescribing by different health professions. Inter-professional collaboration and learning may result in safer prescribing practice. This study aimed to develop, pilot and test the feasibility of a simulated inter-professional prescribing masterclasses for non-medical prescribing students, medical students and pharmacists.

Methods and Results

A three-scenario, simulated patient session was designed and implemented by an expert panel. Medical students, non-medical prescribing students and pharmacists worked together to formulate and implement evidence-based prescriptions. The Readiness for Inter-professional Learning Score (RIPLS) and a self-efficacy score was administered to the students and the Trust in Physician Score to the simulated patients. A focus group was convened after the intervention and the results thematically analysed. Overall, the RIPLS and self-efficacy scores increased. Pharmacists showed the highest rating in the

Trust in Physician score. Focus group analysis suggested that the intervention was viewed as a positive educational experience.

Conclusion

An inter-professional prescribing masterclass is feasible and acceptable to students. It increases self-efficacy, readiness for inter-professional learning and allows students to learn from, about and with each other. A larger trial is warranted and the use of feedback from simulated patients explored further.

Keywords (3-5 words)

Prescribing Safety

Team working

Simulation

MAIN TEXT

Introduction

Protecting patients through safe, effective prescribing is essential for sustaining health. In the UK, medication errors are the third most common cause of patient safety events (1, 2) Current prescribing legislation permits doctors, nurses, pharmacists, physiotherapists and podiatrists to independently prescribe any medication within their professional competence.

A recent in-depth investigation into the causes of prescribing errors by foundation year (FY) doctors (EQUIP study) reported the prescribing error incidence rate as 5.9% – 10.3% for doctors, with the highest rates seen in FY doctors, and 6.9% for nurses (3). One of the EQUIP study recommendations was inter-professional education in safe prescribing, which is reflected in the Scottish Government document, Prescription for Excellence (4).

Prescribing is a complex process which frequently involves collaboration with different health care professionals in order to make safe, effective, and evidence-based prescribing decisions. A problem solving, case-based approach to learning allows students to work collaboratively with other professions to

solve complex prescribing dilemmas, which aim to optimise clinical outcomes. The development of competence requires a combination of knowledge, performance, skills and attitudes, which is attained through inter-professional observation and supervision. This inter-professional experience is intended to help appreciate professional boundaries and identify when the skills of another profession may be required.

Simulation in clinical education has been shown to be beneficial for the development of clinical practice and skills, permitting the learner to develop skills in a controlled and safe environment (5-7). This has recently been demonstrated in a large scale study with nurse and doctor participants (8). However, as far as the authors are aware, there is no published evidence that this type of learning occurs between nurse and pharmacist non-medical prescribing students and medical students.

The aim was to develop, pilot and test the feasibility of a simulated inter-professional prescribing masterclass for medical students and nurse and pharmacist non-medical prescribing students.

Methods

An inter-professional, expert advisory panel was convened to design, pilot and evaluate an inter-professional masterclass with trainee prescribers from medicine, nursing and allied health professionals and pharmacy. The expert advisory panel comprised of four members; one doctor (AR), one nurse (RP) and two pharmacists (AC, MK) with expertise in prescribing, education and simulated teaching. Medical students learn to prescribe at an undergraduate level while non-medical prescribers and pharmacist prescribers are able to gain extra skills in prescribing post-registration.

Three cases, which would commonly be encountered in practice and at the level of a foundation doctor or non-medical prescriber, were designed; one sepsis, one polypharmacy and one community-based case

Insert box 1.

Model answers using local and national guidelines were prepared. The sepsis and community scenario cases required a history to be taken from a simulated patient, a suitable diagnosis to be decided upon and a prescribing management

plan formed and executed. The third, a polypharmacy case, was designed as a paper-based scenario and focused on developing skills in medication review, recognition of adverse drug reactions and BNF/local formulary navigation. Each scenario lasted 45 minutes, was facilitated by a member of the panel and one participant from each of the three professions formed the delegate groups. On completion of each scenario, the facilitator checked the prescribing decisions made against the model answers and gave feedback on participant performance. Students and simulated patients were also encouraged to feedback on their perceptions of the scenario.

To verify accuracy, relevance and timing, the scenarios were initially tested with a cohort of non-medical prescribing students. Ethical approval was sought and approved by Edinburgh Napier University and the University of Edinburgh Medicine and Veterinary Medicine Student Advisory Committee. NHS research ethics approval was not necessary.

Recruitment

Participants were recruited through participating organisations. A poster with a point of contact was circulated to eligible participants. Simulated patients were invited via a university simulated patient programme. Prior to the masterclass

all participants and simulated patients were briefed on the purpose of the project, the anonymity of any results and compliance with data protection. Written consent was requested.

Outcome measures

Evaluation consisted of a validated pre- and post- readiness for inter-professional learning score (RIPLS) (9) and a self-efficacy score (10). Simulated patient views were evaluated using the trust in physician score (11). Following the masterclass a group discussion was convened with all participants and facilitators to provide a more in-depth, descriptive exploration of the intervention.

Readiness for inter-professional learning (RIPLS).

The RIPLS questionnaire consists of 12 questions using a 5 point Likert scale with end points 'strongly disagree' to 'strongly agree'. An overall RIPLS score (range 12-60) is calculated and a higher score correlates with greater readiness for learning. A free text comments box is available for any additional relevant comments relating to the benefit of the education session to the participant and patients.

Self-efficacy score

Self-efficacy perceptions are linked to the likelihood of taking on a certain task and they influence not only the ability to perform a task but also goals and aspirations(12).The self-efficacy score is a 16 item score validated for students in medicine, dentistry and other health professions. The scale was used to calculate an overall self-efficacy score (range 16-160). An increased score pre and post masterclass indicates increase confidence and was considered a useful measurement of effect.

Trust in Physician scale.

The decision to involve service users in the evaluation was based on the principle that an effective and trusting patient/practitioner relationship is associated with improved adherence to treatment regimens (11, 13, 14). The term ‘physician’ was changed to ‘health care professional’ to more accurately reflect the participant group. The scale is an 11 item scale and the total score is calculated out of 100. The higher the score, the greater the trust in the health care professional.

Descriptive data collection

On completion of the masterclass a group discussion was carried out with all participants. This was led by a member of the expert panel using a topic guide

based on the principles of best practice debriefing techniques (15). Free text comments were also collected from RIPLS and self-efficacy questionnaires.

Data Analysis

The RIPLS and self-efficacy scores were compared (paired t-test) pre and post masterclass using Microsoft Excel 2003 and Graph Pad QuickCalcs 2015. Although the sample was small, the significance of differences in scores was tested. The pilot served to provide an estimate of the difference in scores which can be used for future sample size calculations.

Qualitative comments from group discussion were analyzed using Clark's theory of inter-professional learning as a framework (16). This theory of social learning suggests that participants are encouraged to view the world from a perspective different to their own. This develops professional judgement, breaks down biases and false assumptions thereby improving team working. Applying this framework, all free text comments and notes from the group discussion were read, themed and cross checked by the expert panel.

Results

The masterclass was attended by 10 participants, two fourth year medical students, three pharmacist independent prescribing students (IPs), three nurse prescribing students (NMPs) and two simulated patients. One medical student was unable to attend at short notice. All nurse and pharmacist prescribing students were post registration while the medical students were undergraduates.

Analysis of the discussions, prescriptions and documentation at each of the scenarios suggested that participants displayed safe, effective, evidence-based prescribing. The overall RIPLS scores pre-masterclass and post-masterclass significantly increased (two-tailed $p = 0.019$). Prior to the masterclass it was observed that the pharmacist IPs group placed the highest value on inter-professional learning where the NMPs group placed the lowest value. Following the masterclass the NMPs score increased significantly ($p = 0.035$) and had the same value as the IPs. The increase in medical students and IPs scores were not significant.

INSERT TABLES 1 AND 2

Self-Efficacy

Overall participants reported an increase in confidence in their abilities following masterclass participation. Self-efficacy scores increased after the masterclass ($p = 0.010$). Medical students were least confident prior to the masterclass and IPs were the most confident group. The increase in confidence confirms the comments received in the RIPLS questionnaires.

INSERT TABLES 3 AND 4

Simulated patient feedback.

Simulated patients scored the professionals after each case (table 5). Nurse prescribers scored the lowest and pharmacists scored the highest mean scores.

INSERT TABLE 5

Free text and group discussion results

The free text comments from the pre and post questionnaires and group discussions suggested that the masterclass was positively received.

'Working in teams to make decisions regarding prescribing. Will help as a doctor in knowing how to seek help and what the competences of other staff members are' (Medical student).

Participants felt it beneficial to work in small numbers. The simulated patients commented that it was interesting to watch different professions working and to see how they listened to each other. They also commented on how well the groups worked together stating '*Would not know that they did not know each other'.*

All participants developed an awareness of other professional roles. Medical students commented on their improved knowledge of the role of the pharmacist and nurse in the clinical team, nurses commented on their reliance on the pharmacist for accuracy of prescribing decisions and pharmacists noted the importance of considering a more holistic approach to the prescribing consultation. Participants noted that the learning would be beneficial in both pre and post graduate education.

Discussion

The results suggest that an inter-professional prescribing masterclass is worthwhile and feasible. The scenarios were appropriate although a broader range of scenarios may be required if participants were recruited from a wider range of clinical backgrounds. This would provide the opportunity to challenge the participants within and out with their current competence. Furthermore, by incorporating the patient safety agenda into cases by using critical incidents and examples of complex patient management the masterclasses would expose participants to more complex cases in a controlled simulated environment.

The success of the masterclass may be reflective of the cohort recruited and the clinical experience of the nursing and pharmacist independent prescribing students. Participants were a small number of self-selected students and practitioners. It is unknown how this would translate to a larger group of students or if this was a compulsory part of prescribing education however this study suggests that it is a positive learning experience. The RIPLS score was able to demonstrate a change in attitude towards inter-professional learning which is anticipated to benefit collaborative clinical practice.

An increase in self-efficacy scores is consistent with previous inter-professional research (8, 17). A significant increase in confidence was noted for the medical students. Medical students may have had low scores prior to the workshop because they have little or no exposure to the clinical environment whereas the other professional groups were postgraduates with an excess of 3 years clinical experience. There is some evidence that simulated education has a positive impact on patient outcomes and that self-efficacy has a role in improving prescribing skills which may improve patient safety (7, 8, 18), however further research in this area is recommended to demonstrate what effect postgraduate prescribing simulation has on self-efficacy and most importantly patient outcomes.

Involvement of the simulated patients in feedback is an important precedent for person-centered care. Although previous studies have noted that simulated patients have a role to play in the student's learning journey there is limited evidence of use of a standardized measurement instrument to assist with feedback (19). The trust in physician score may be a useful instrument for future simulation research. Moreover, the positive feedback received from the simulated patients during the focus group suggested good team work and communication skills were important to the simulated patient. Shared decision

making between the patient and the health care professional is associated with improved medication adherence (20) and it is recommended that feedback from patients in a simulated environment should be further explored.

The free text and group discussion evaluation suggested that the participants learned from, about and with each other. This social process is considered to be as important as the content of the masterclass and is associated with patient safety (21). Participants had an improved understanding of the importance of team working in effective learning (from each other), a greater awareness of the each other's professional roles (about each other), shared learning (with each other) and the benefit to patient care as a result of collaborative working all of which is consistent with theories associated with inter-professional learning (16).

Conclusions

The masterclass was positively received. This pilot adds to the literature on prescribing simulation and suggests that it has a positive effect on students' confidence and appreciation of the expertise of others taking on a prescribing role. Furthermore the trust in physician score in a simulated environment appears to be a useful measurement instrument to obtain feedback from

patients. This study suggests outcome measures used were appropriate and have the potential to be used in larger groups of student prescribers. In conclusion this pilot study has demonstrated that an inter-professional masterclass is feasible and beneficial. Recommended next steps are to conduct a well-designed randomized control trial that evaluates a cohort of students who have participated in an inter-professional prescribing workshop compared to those that have received standard education. Using clear outcome measures which are linked to patient outcomes may establish the absolute value of this type of learning.

Declaration of conflicting interests

The Author(s) declare that there is no conflict of interest

Funding

The project was supported by a small grant from the Nursing, Midwifery and Allied Health Professional (NMAHP) Directorate of NHS Education for Scotland (NES).

Box 1

Case scenarios

Sepsis

65 year-old woman (simulated patient) admitted to hospital with severe sepsis. The scenario required management of septic shock and prescribing of antimicrobial treatment according to local guidance.

Community

62 year-old woman (simulated patient) at a GP appointment for management of uncontrolled hypertension, uncontrolled type 2 diabetes and over anticoagulation. The scenario required review of patients' current medication, evaluation of possible reasons for lack of efficacy and optimization of treatment following local guidelines.

Polypharmacy

80 year-old woman admitted to hospital due to confusion secondary to multiple medications. The scenario required review of her 10 medications for cerebrovascular disease, increased frequency and nocturia, depression and hypothyroidism.

Tables

Table 1 - RIPLS scores pre and post masterclass for all participants

	Pre masterclass	Post masterclass
Item numbers	1-12	1-12
Range of possible points	12-60	12-60
Number of participants	8	8
Mean(SD)	55.1(2.97)	59.8(0.46)
Range	52-60	59-60

Table 2 - RIPLS scores pre and post masterclass by professional group

Professional group (n)	Pre-masterclass Mean(SD) Range	Post-masterclass Mean(SD) Range	p value
Medical students (2)	58.0 (2.83) 56-60	60 (0) 60	0.500
Pharmacist IPs (3)	58.7 (1.15) 58-60	59.7 (0.58) 59-60	0.225
NMPs (3)	53.7 (2.08) 52-60	59.7 (0.58) 59-60	0.035
Overall	55.1 (2.97) 52-60	59.8 (0.46) 59-60	0.019

Table 3 - Self-efficacy scores pre and post masterclass for all participants

	Pre masterclass	Post masterclass
Item numbers	1-16	1-16
Range of possible points	16-160	16-160
Number of participants	8	8
Mean(SD)	126.9 (23.37)	144.9 (11.76)
Range	96-153	125-159

Table 4 -Self-efficacy scores pre and post masterclass by professional group

Professional group (n)	Pre-masterclass Mean(SD) Range	Post-masterclass Mean(SD) Range	p value
Medical students (2)	110.0(12.73) 101-119	135.0(14.14) 125-145	0.026
Pharmacist IPs (3)	152.7(0.58) 152-153	156.7(4.04) 152-159	0.253
NMPs (3)	112.3(15.18) 96-126	139.7(4.62) 137-145	0.089
Overall	126.9(23.37) 96-153	144.9(11.76) 125-159	0.010

Table 5 - Trust scores by professional group

Professional group (n)	Case 1 Score	Case 2 score	Mean
Medical students (2)	78	75	76.5
Pharmacist IPs (3)	71	81	76
NMPs (3)	76	67	71.5
Mean	75	74	

References

1. Basey AJ, Krska J, Kennedy TD, Mackridge AJ. Prescribing errors on admission to hospital and their potential impact: a mixed-methods study. BMJ Quality & Safety. 2014;23(1):17-25.

2. Lewis PJ, Dornan T, Taylor D, Tully MP, Wass V, Ashcroft DM. Prevalence, incidence and nature of prescribing errors in hospital inpatients: a systematic review. Drug Safety: An International Journal Of Medical Toxicology And Drug Experience. 2009;32(5):379-89.

3. Dornan T, Ashcroft D, Heathfield H, Lewis P, Miles J, Taylor D, et al. An indepth investigation into causes of prescribing errors by foundation trainees in relation to their medical education: EQUIP study. London: General Medical Council (GMC), 2009.

4. Government S. A prescription for excellence: a vision and action plan edinburgh2013. Available from: http://www.gov.scot/Resource/0043/00434053.pdf.

5. Shin S, Park J-H, Kim J-H. Effectiveness of patient simulation in nursing education: meta-analysis. Nurse Education Today. 2015;35(1):176-82.

6. Evans LV, Crimmins AC, Bonz JW, Gusberg RJ, Tsyrulnik A, Dziura JD, et al. A comprehensive, simulation-based approach to teaching clinical skills: the medical students' perspective. The Yale Journal Of Biology And Medicine. 2014;87(4):575-81.

7. Woodfield G, O'Sullivan M, Haddington N, Stanton A. Using simulation for prescribing: an evaluation. The Clinical Teacher. 2014;11(1):24-8.

8. Watters C, Reedy G, Ross A, Morgan NJ, Handslip R, Jaye P. Does interprofessional simulation increase self-efficacy: a comparative study. BMJ Open. 2015;5(1):e005472-e.

9. Reid R, Bruce D, Allstaff K, McLernon D. Validating the Readiness for Interprofessional Learning Scale (RIPLS) in the postgraduate context: are health care professionals ready for IPL? Medical Education. 2006;40(5):415-22.

10. Mann K, McFetridge-Durdle J, Clovis L, Martin-Misener J, Matheson R, Beanlands T, et al. Development of a scale to measure health professions students' self-

efficacy beliefs in interprofessional learning. Journal of Interprofessional Care. 2012;26(2):92-9.

11. Thom DH, Ribisl KM, Stewart AL, Luke DA. Further validation and reliability testing of the Trust in Physician Scale. The Stanford Trust Study Physicians. Medical Care. 1999;37(5):510-7.

12. Bandura A. Social foundations of thought and action: a social cognitive theory. London: Prentice Hall; 1986.

13. Ciechanowski P, Russo J, Katon W, Von Korff M, Ludman E, Lin E, et al. Influence of patient attachment style on self-care and outcomes in diabetes. Psychosomatic Medicine. 2004;66(5):720-8.

14. Fuertes JN, Mislowack A, Bennett J, Paul L, Gilbert TC, Fontan G, et al. The physician-patient working alliance. Patient Education & Counseling. 2007;66(1):29-36.

15. Lyons R, Lazzara EH, Benishek LE, Zajac S, Gregory M, Sonesh SC, et al. Enhancing the Effectiveness of Team Debriefings in Medical Simulation: More Best Practices. Joint Commission Journal on Quality & Patient Safety. 2015;41(3):115-25.

16. Clark PG. What would a theory of interprofessional education look like? Some suggestions for developing a theoretical framework for teamwork training 1. Journal Of Interprofessional Care. 2006;20(6):577-89.

17. van Schaik SM, Plant J, Diane S, Tsang L, O'Sullivan P. Interprofessional team training in pediatric resuscitation: a low-cost, in situ simulation program that enhances self-efficacy among participants. Clinical Pediatrics. 2011;50(9):807-15.

18. Brydges R, Hatala R, Zendejas B, Erwin PJ, Cook DA. Linking simulation-based educational assessments and patient-related outcomes: A systematic review and meta-analysis. Academic Medicine. 2015;90(2):246-56.

19. Bokken L, Linssen T, Scherpbier A, van der Vleuten C, Rethans J. Feedback by simulated patients in undergraduate medical education: a systematic review of the literature. 2009;43(3):202-10.

20. Schoenthaler AM, Schwartz BS, Wood C, Stewart WF. Patient and Physician Factors Associated With Adherence to Diabetes Medications. Diabetes Educator. 2012;38(3):397-408.

21. Brock D, Abu-Rish E, Chiu C-R, Hammer D, Wilson S, Vorvick L, et al. Republished: Interprofessional education in team communication: working together to improve patient safety. Postgraduate Medical Journal. 2013;89(1057):642-51.