

*Research Article*

## Inter-professional prescription safety workshop for non-medical prescribing and pharmacy students: A cross-sectional study.

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**ABSTRACT**

This article reports on an evaluation of a prescribing workshop to increase 'shared learning' between registered practitioners undertaking a non-medical prescribing (NMP) course (midwifery, nursing, physiotherapy and podiatry) and undergraduate pharmacy students to increase awareness of, and understanding of the roles. The focus was on three domains of safe prescribing: Knowledge (of commonly prescribed medicines and their suitability for individual patients); Process (of legal requirements and supply of medicines and associated patient information); and Relationships (between prescribers and pharmacists). A cross sectional evaluation was utilised with 6-point Likert-style items and a free text section, completed by 337 participants. Participants reported positively about the workshop content and their learning experience, although some differences between pharmacy and NMP participants were noted in the knowledge domain. Quantitative analysis revealed significant differences ( $p < 0.001$ ) of low-to-moderate magnitude (partial- $\eta^2 = 0.146$ ) between NMP and Pharmacy student on all 3 domains, with NMP students reporting slightly more positive outcomes (between 0.4 and 1.5 points higher) in all cases. However, both groups scored positively; with mean domain scores of 15.6 to 16.5 on scales with maximum scores of 18.

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**INTRODUCTION**

In recent years, legal structures for the supply of prescription medicines have been transformed. With the advent of increased prescribing rights, the supply process is no longer limited to the doctor diagnosing and prescribing, the pharmacist dispensing and the nurse or patient administering (Davies & Gidman, 2011). Recent initiatives have put both the patient's involvement with their health and medicines safety at the centre of policy change (Royal Pharmaceutical Society, 2013; National Institute of Health and Care Excellence, 2015). Patients are involved with many health care practitioners in the receipt of their care, and so successful inter-professional working is of paramount importance (Davies & Gidman, 2011). Furthermore, the inception of prescribing beyond the medical profession, 'non-medical prescribing', has brought new challenges to Higher Education Institutions (HEIs) as to how best to deliver teaching

and learning strategies that facilitate safe and effective prescribing (Courtenay, 2013). One such strategy that has gained prominence is inter-professional learning (IPL), frequently with a focus on medicines safety (Stenner & Courtenay, 2008).

**Patient safety as a pressing priority in healthcare**

The World Health Organisation (2010) estimated that over 50% of all medicines around the world are either prescribed, dispensed, administered or taken inappropriately. There is a need, therefore, to improve the way medicines are managed and to optimise the patient experience (NICE, 2015). Lapkin, Levett-Jones & Gilligan (2012) stated that to optimise the patient experience with medicines, the expertise and skills offered by various professionals within the system of healthcare needs to be fully utilised. In 2011, the World Health Organisation set out a patient safety programme that called for all HEIs to develop patient safety modules into their programmes (WHO, 2011).

In the UK, professional regulatory bodies also focus on ensuring that practitioners are safe and competent to practice, and require learning outcomes related to medicines safety (Eraut, 1994; General Pharmaceutical Council, 2011; Health and Care Professionals Council, 2016; Nursing and Midwifery Council, 2018).

### **Interprofessional Education and safe prescribing**

Lawliss, Anson & Greenfield (2014) point out that enabling effective Interprofessional Education (IPE) involves a synchronised and sustainable collaboration of all stakeholders involved in the delivery. Thus it involves a move away from a single discipline approach to an integrated approach involving several disciplines. HEIs can facilitate such pedagogical change by providing educational interventions aimed at improving collaboration between practitioners (Borduas et al., 2006). Such interventions need to focus on 'shared learning' rather than 'shared teaching' (Horsburgh, Lambdin & Williamson, 2001). Shared teaching involves students sitting side-by-side for economic reasons, and delivery of teaching, which may be in the form of a didactic lecture rather than learners taking part in collaborative exercises. This experience may reinforce stereotypes between professions (Areskog, 1998). In contrast, IPE is an educational strategy in which students are provided with structured learning opportunities to foster knowledge, skills and professional attitudes they would not acquire in uni-professional groups (Hosburgh et al., 2001). Cresswell et al. (2013) point out that the focus on values, safe practice and professional roles has existed as long as healthcare professionals have been recognised; however, the underlying mechanisms affecting the aetiology of errors in practice, and the study of what education can do to improve practice, is a more recent concept.

There is growing evidence that collaboration, including improved communication, leads to a better access to, and delivery of care and improved patient outcomes (Brock et al, 2013; Lapkin et al, 2013). IPE interventions have been shown to improve medicines safety and decrease duration of hospital stay (Reeves, Perrier, Goldman, Freeth & Zwarenstein, 2013). A review of the literature found several studies evaluating IPE focused on medication safety. With an undergraduate student focus, Hardisty, Scott, Chandler, Pearson & Powell (2014) developed an inter-professional training activity aimed at improving medication safety for medical, nursing and pharmacy students. Lapkin et al. (2014) described using multi-media resources; where medical, nursing and pharmacy students learned about medication safety to prepare for inter-professional practice. Brock et al. (2013) focused on inter-professional

communication to improve patient safety for medical, nursing, pharmacy and physician assistant students. Wilbur and Kelly (2015) investigated the impressions of nursing and pharmacy students toward each other and inter-professional working. Hawkes et al. (2013) assessed pharmacy, nursing and medical students' attitudes to each other's professions before and after an IPE workshop. All the studies reported how interprofessional education can prepare students toward communicating effectively with each other and problem solve when faced with factors that could lead to medicine errors.

Inter-professional education for NMP students is regarded as a primary educational goal to produce safe and competent prescribers (Davies & Gidman 2011; Courtenay, 2013). Courtenay evaluated a workshop that involved non-medical prescribing and medical students who shared learning with a mandatory session including drug interactions, prescription writing and legal and accountability issues. Achike et al. (2014) utilised a case study approach involving rational drug choice and prescription writing, involving nursing and medical perspectives. Keijsers et al. (2014) tested the pharmacological knowledge and prescription-writing skills of medical and pharmacy students. Paterson, Rolfe, Coll & Kinnear (2014) piloted and tested the feasibility of simulated inter-professional prescribing session for non-medical, medical and pharmacy students.

In summary, the authors agree with Frenk et al. (2010) who suggested that the key to successful IPE is the timing, duration and relevance of sessions in promoting effective collaboration between healthcare practitioners in order to respond to the need to of the increasingly complex and interdependent healthcare contexts. One factor considered important at the University of Huddersfield (the institution at which the authors of the current paper were based) was of a focus on the interprofessional process, knowledge and relationship aspects and potential impact toward the safe prescribing of medicines. Although these three factors are mentioned in the IPE literature and medicines safety, they have never alone been used as the underpinning factors for such a workshop. To date there was no evaluation of a workshop involving non-medical prescribing (nurses, podiatrists and physiotherapists) students and undergraduate pharmacy students.

## Process

Safe and effective prescribers need to understand the processes by which medicines are prescribed, supplied and administered; thus a collaborative approach with all involved in these processes is needed (Cooke, Gormley, Haughey, & Barry, 2017). If prescribers provide an incomplete prescription which cannot be dispensed by pharmacists, due to missing information, violating formulary restrictions or failing to meet legal standards, then the patient will experience delays in receiving their medication. Delayed doses of medication may result in harm, particularly when regarded as 'critical medicines', for example insulin, anticonvulsants, antiepileptic agents and are therefore deemed unacceptable (Royal Pharmaceutical Society, 2013).

## Knowledge

The NMP and pharmacist must be able to identify and understand the patient's condition and the use of their chosen agent. The drug chosen has to have a suitable dose, formulation and dose regime, and safety considerations and contra-indications must also be considered. Many patients take more than one drug, and so safe combinations must be selected. Although much decision support material is available in the BNF, NMPs and pharmacists need to know how to find and interpret that information, as well as how to apply it to their patient (Greenwood, Horncastle & Stephenson, 2016). All prescribers must know how access further information and how to seek additional support as appropriate.

## Relationships

There is evidence that the best outcomes for patients are achieved by effective inter-professional working. The inherent reluctance to work across professional boundaries and to develop effective informal teams can be reduced by having a better understanding of the role, knowledge and working practices of different groups (Cooke et al., 2017). This improved understanding leads to mutual respect and increases the likelihood of inter-professional referral and shared working (Davies & Gidman, 2011). Whilst students can be taught the benefits of working across professional groups in a shared way, practical arrangements in practice can hamper this. Figure 1 schematically illustrates the inter-relationships of the three factors.

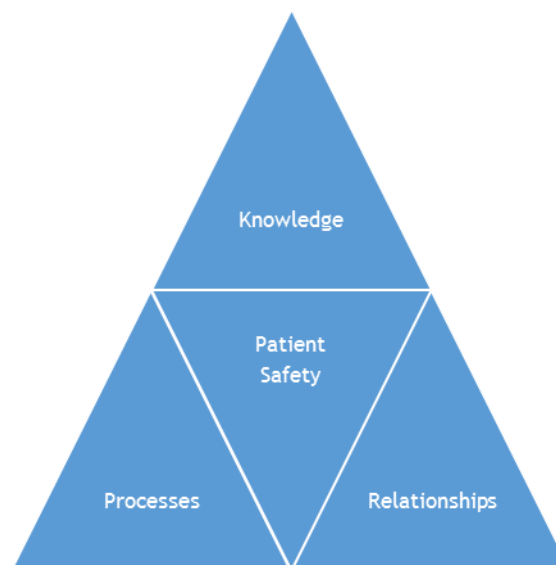


Figure 1. Prescribing Safely – teaching and assessing simulations and real life.

Reeves and Barr (2016) provide a useful guide to evaluating IPE using four approaches: formative, seeking to understand the effects of introducing IPE so as to develop and embed in the curriculum; summative, assessing the impact of the IPE intervention; process-focused, exploring the workshop content; and outcomes-focused, for example, evaluating the effects of the workshop, whether long- or short-term.

As this was the first time such workshops were run, the workshop evaluation would be considered formative, as well as process focused in terms of assessing the workshop content and facilitation. The aims and objectives therefore this shaped the aims and objectives used.

## Aim

To evaluate the introduction of an interprofessional workshop toward safe prescribing practice for student NMPs and MPharm undergraduates.

## Objectives

- 1) To undertake a cross sectional questionnaire study to evaluate the workshop using the process, knowledge and relationship aspects of interprofessional working for the safe prescription of medicines.
- 2) To utilise the questionnaire both pre and post workshop to inform the future planning of interprofessional education and safe prescribing.
- 3) To evaluate how the content of the workshop experienced by the learners.

- 4) To assess any changes in knowledge about roles and to establish whether interprofessional role collaboration can enhance medicine safety.

## MATERIALS AND METHODS

### Workshop design

In line with Centre for the Advancement of Interprofessional Education (CAIPE) (2017) guidelines, the aim of effective inter-professional learning is to be instrumental in facilitating communication and collaboration between practitioners who can work in partnership to resolve problems and provide effective care. With this in mind, joint working between student NMPs (nurses, podiatrists and physiotherapists) and 4th Year MPharm (final year of the undergraduate pharmacy degree) students was introduced in the form of an inter-professional workshop centred around the issue of prescriptions, and determinants of competence and safety.

In designing the workshop, it was considered important that all participants, regardless of their area of practice or level of experience, should feel able to contribute and understand the relevance of the experience to their current or future practice. The workshop was based around three prescriptions, each with a set of questions, and representing and illustrating different aspects of safe prescribing: antibiotics for a child, where dose and administration of a complete course were the critical factors; a non-steroidal anti-inflammatory drug for an elderly patient who may have co-morbidities, where appropriateness of choice of analgesic was the focus; and a prescription for lithium where monitoring and choice of preparation were profoundly important. Each session was facilitated by two staff members: a pharmacist and a qualified NMP (nurse, physiotherapist or podiatrist) in order to demonstrate interprofessional relationships to the students. After a brief introductory presentation outlining the aims of the workshop, the students were allocated 20 minutes to work together to answer the questions for the first prescription, before feeding back to the facilitators who were able to supplement their answers where necessary. The questions relating to the second and third prescriptions were tackled in the same way.

The prescription form used in NHS primary care, the FP10, was chosen as the format for the workshop prescriptions, as it was familiar to all participants. Furthermore, the drugs were chosen for their familiarity by the general public; again, putting neither group at disadvantage, and making the content relevant to all participants. The questions

relating to each prescription were designed such that the students should have been able to answer them from their existing knowledge or experience, or by use of the current British National Formulary, with which both groups were provided, and which both groups would use in practice. The prescriptions provided a vehicle for the formal learning outcomes of the workshop which related to safe prescribing, with the aim of making the workshop content authentic for students in mirroring the reality of prescribing scenarios (Reeves et al., 2010).

One major intention of the workshop was to foster inter-professional interaction, as neither group could answer all the questions on their own. Teams of students could solve the problems and answer the questions only by working together and pooling their knowledge and experience. A problem-based approach was adopted, whereby all students would learn new information from each other, but also such that they would have the opportunity to appreciate that colleagues from other disciplines have a different body of skill and knowledge to themselves. The overall objective of the process was that they would appreciate that optimum outcomes would be achieved by working co-operatively (Reeves et al., 2010). In this sense it was how the problem is solved rather than the focus of the problem (Donner & Bickley, 1993).

Each workshop ran over 90 minutes with group sizes of approximately 30 students. Each group was divided into inter-professional 'teams' of 6 to 8 students with, as far as possible, equal numbers of pharmacy students and NMP participants in each. Students were allocated into groups as they arrived, and encouraged to introduce themselves and to discuss what they expected from the session; thus creating a comfortable environment in which both formal and informal learning were promoted (Nisbet, Lincoln & Dunn, 2013). Each student was provided with a printed copy of the prescriptions and the questions which they completed in the workshop and were able to take away as a personal resource.

At the end of the workshop, the aims were revisited, to enable students to summarise and to reflect on their learning experience before completing the exit evaluation form. The workshop was evaluated over two academic years, using a questionnaire assessing the knowledge, process and relationships of interprofessional working.

In practice, lack of knowledge and understanding of other's roles, expertise and skills can hinder collaboration. The post-workshop evaluation aimed at assessing all three areas of process, knowledge and relationships without placing any bias on a particular

aspect. Knowledge and process were anticipated to have positive outcomes, as students shared their previous learning – the scenarios were developed with the aim that neither group was likely to be able to answer the questions without support from the other. Practitioners can help and support each other when communication and mutual understanding is effective. Individual practitioners can only ask for help when they appreciate the role in the process of prescribing and the knowledge of others. The main outcome of this workshop was, however, designed to provide students with a memorable and enjoyable learning experience which would lead them to appreciate that professions have complementary and non-competitive roles and that patients can benefit from professions working and communicating effectively together.

### Questionnaire design

The evaluation questionnaire was piloted amongst staff to assess clarity and validity. It was designed to be quick and simple to complete, to facilitate a high response rate.

A cross-sectional, self-administered questionnaire was used, comprising 15 questions. The first 9 questions offered options, each with answers ranging from Strongly Agree to Strongly Disagree on a 6-point Likert scale. Three questions related to each of the domains: 'knowledge' which included the ability to assess a prescription for legal and clinical validity; 'process' which included an understanding of how medicines are supplied and paid for through pharmacies and the role of both prescriber and pharmacist; and 'relationships' which included attitudes to joint working, clinical problem solving and information sharing. The questions relating to each domain were mixed so as to avoid overtly asking about the themes inadvertently. Example questions included: 'This workshop has demonstrated that my profession shares common skills and attitudes with pharmacists / NMPs' to assess 'relationships' and attitude to inter-professional working'; and: 'This workshop has increased my knowledge of the prescribing process' to assess 'process'. Six further questions allowed free text answers, encouraging feedback about the session itself, ranging from 'Do you think you had enough time for each prescription scenario?' to 'How did you find the inter-student relationships?'

### Statistical Methods

Knowledge, Process and Relationships scores were obtained from all participants as the summed total of each of three Likert-style items on the evaluation questionnaire.

Knowledge scores were determined to be the summed total of scores obtained on the following items: The workshop has increased my knowledge of the BNF; The workshop has given me an insight into the role of another professional group; My learning from the workshop has been enhanced by the contribution of another professional group.

Process scores were determined to be the summed total of scores obtained on the following items: The workshop has increased my knowledge of the prescribing process; I believe that individuals in my profession must depend on the work of other professions; I believe that this shared experience will increase my ability to understand clinical problems.

Relationships scores were determined to be the summed total of scores obtained on the following items: The workshop has demonstrated that my profession demonstrates common skills and attitudes with prescribers / pharmacists; I believe that this experience of shared learning will help me become a more effective member of a healthcare team; I believe that this experience of shared learning will improve my professional relationships after qualification. Options for each item varied from Strongly Disagree (1 point) to Strongly Agree (6 points); leading to a range of possible values of 6-18 for each domain.

The status of each participant was recorded as MPharm (pharmacy student) or NMP (student on non-medical prescribing course, including nurses, podiatrists and physiotherapists). The extent of missing data was assessed. Cases with missing or invalid status data were deleted from the data set. Cases with missing scores on individual items were considered for imputation.

The sample was summarised descriptively. A multivariate analysis was conducted on the data, following determination of the extent of correlation between the outcome measures of the Knowledge, Process and Relationship scores to assess the suitability of the data for a multivariate treatment. Further univariate analyses were conducted to investigate the source of any between-groups differences.

### Qualitative Content Analysis

Written responses to the six open-ended questions were subject to a content analysis of the data. According to Bengtsson (2006), two approaches can be used in content analysis: (i) examine the answers to present questions deductively; or (ii) allow themes to be developed inductively from the data. Deductive content analysis was used because the analysis was structured on the basis of prior knowledge already

ascertained from the quantitative results (Elo & Kyngäs, 2007). Open-ended responses were considered on their own to see if any themes could be abstracted, but when compared to the statistical results, comments emerged that further explain the knowledge, process and relationship scores.

### Ethical considerations

All participants were students of the University of Huddersfield and took part in the workshops as part of their respective courses. The evaluation was voluntary, and was conducted when the IPL workshop was completed. Recruitment of students was from the University where the researchers had employment, therefore, voluntary participation and anonymity was vital, and an approach in line with Clark & McCann (2005) recommendations was used. While the researchers were absent from the classroom, students were asked to place the questionnaire (completed or uncompleted) in a box which, which was then sealed. Consent was assumed if students completed the questionnaire. Ethical approval was obtained through the University of Huddersfield School of Applied Science Ethical Approval Panel.

## RESULTS AND DISCUSSION

### Quantitative analysis

Valid responses were obtained from 337 students: 131 from MPharm students and 206 from NMP students. Less than 0.4% of item responses were recorded as missing.

Responses on all items were heavily skewed towards more favourable options. The most favourable option (scoring 6) was the most frequently chosen of the 6 alternatives in all 9 items; in 6 out of 9 items, this option alone accounted for over 50% of all responses. Furthermore, the second most favourable option (scoring 5) was the second most frequently chosen of the 6 alternatives in 8 out of the 9 items. Reported data variability was correspondingly low in all domains.

In both groups of students represented, scores reported on the Relationships domain were higher than those reported in the Process domain; with Knowledge scores lower still. NMP students reported higher scores than MPharm students in all 3 domains; with mean scores 1.5 points higher in the Knowledge domain, 1.1 points higher in the Process domain and 0.4 points higher in the Relationships domain.

The sample is summarised descriptively in Table 1. The three outcome measures were all mutually correlated. Correlations were positive and strong ( $r=0.802$  for Knowledge and Process scores;  $r=0.750$

for Knowledge and Relationships scores;  $r=0.750$  for Process and Relationships scores). All correlations were highly significant ( $p<0.001$  in all cases). The pattern of correlations suggested the requirement for a multivariate treatment of the data.

*Table 1. Descriptive summary of sample.*

Domain	MPharm students	NMP students	All students
Knowledge, mean (SD)	14.7 (2.23)	16.2 (2.25)	15.6 (2.36)
Process, mean (SD)	15.3 (1.99)	16.4 (2.07)	15.9 (2.11)
Relationships, mean (SD)	16.2 (2.05)	16.6 (2.12)	16.5 (2.10)

A multivariate analysis revealed that student status (MPharm or NMP) was significantly associated with a linear combination of outcome measures ( $F_{3,333}=18.9$ , Wilk's  $\Lambda=0.854$ ,  $p<0.001$ ). The effect was of low-to-moderate magnitude (partial- $\eta^2=0.146$ ).

Follow-up univariate analyses revealed that between-group differences existed in all three domains ( $F_{1,335}=37.2$ ,  $p<0.001$  for Knowledge;  $F_{1,335}=23.1$ ,  $p<0.001$  for Process;  $F_{1,335}=4.00$ ,  $p=0.046$  for Relationships). The effect of student type was largest, albeit small in magnitude, in the determination of Knowledge scores (partial- $\eta^2=0.100$ ). The effect of student status (i.e. Pharmacy or NMC student) in the determination of Process scores was small (partial- $\eta^2=0.064$ ). The effect of student type in the determination of Relationships scores was very small (partial- $\eta^2=0.012$ ).

### Qualitative analysis

The open-ended data gave some insights into how the students rated the relationship, process and knowledge domains.

### Relationships and Process

In terms of relationships and process both sets of students reported undertaking such workshops and their value to their learning positively. NMPs and Pharmacists responded when asked about the session design:

'Working alongside pharmacy students was very useful as they approach prescribing from a different angle' (NMP);

'It was good with a group discussion after each script allowing an insight into different views';

And specifically the session structure was:

'designed well was able to interact with NMPs' (pharmacy)

In terms of learning pharmacy students enjoyed particular aspects of learning together:

'It was good to see how different professions view prescribing and prescriptions' (pharmacy)

Added to this:

'Gave other insights into dealing with particular patients' (pharmacist)

NMP students went further than pharmacy students in explaining how the workshop helped the inter-professional relationship as it mirrored the clinical context:

'Good helps to consolidate learning into practice'

And specifically related to a future inter-professional work:

'Enjoyable and hopefully a precursor to future relationships' (NMP)

### Knowledge

In terms of knowledge as with the statistical scores both sets of students overall valued the workshop:

'Better understanding of how others (NMP) work'

'Yes I now have an understanding of other professions knowledge' (pharmacy)

However, there was certainly a variance as to the value of knowledge gained: One pharmacy student commented about the content of the session:

'Somewhat like a revision session, went through stuff we already knew'

This was further echoed by a student who was nonetheless able to see the benefit for them as a pharmacist:

'I felt more as a pharmacy student that I was teaching more than learning, but this helped to identify

areas of knowledge that needs work but also made me more confident that I have a lot of knowledge'

For the NMP students who had just started their course, the value of interacting with pharmacy

students who have been exposed widely to drugs, how they work and the British National Formulary

(BNF) the benefit was much more explicit:

'Yes I learnt a lot from the pharmacy students about deeper issues with drugs' (NMP)

Furthermore NMP participants clearly valued the use in the session and learning about how to use

the BNF; something not stated by any pharmacy student:

'Yes increased knowledge about the BNF layout' (NMP)

'Useful to talk to 4th year pharmacy students who have more knowledge on the drug and BNF' (NMP)

Thus how this contributed to their future role:

'Yes increased knowledge about writing prescriptions' (NMP)

Positive feedback was given overall by both NMP and pharmacy students, who could see learning together as a valuable tool to assist the process of, working knowledge and professional relationships necessary to enhance their future roles in medicines management. The students gave an insight into why the content of the workshop facilitated their understanding of the process of prescribing, and furthermore facilitated a working relationship and understanding that facilitated their pharmacological and therapeutic knowledge toward the prescription of medicines. Pharmacy and NMP participants commented on how both sets of students answered questions about the three prescriptions. Thus with pharmacy students:

'We worked as a team' and 'it was nice to learn things from each other' and about the workshop outcome 'went very well, was able to get along and discuss options easily'

NMP students reiterated the pharmacy students' positive comments about their experience of the workshop:

'Good example of MDT (multidisciplinary team) working', 'good as we could learn from each other's skills' and 'much more useful than theory'

A comment that seemed to encapsulate the learning by both sets of students was the facilitation of the sessions:

'Very interactive' (Pharmacy) and 'enjoyable, fun and informative' (NMP)

### Ways to improve

Comments received indicated a desire for more rather than less of these sessions.

'Maybe a full day rather than a couple of hours' (NMP)

Thus the value of a practical clinically focussed session was indicated:

'More of these sessions, very interesting and assist learning, more than lectures with regard to Pharmacology' (NMP)

There were some comments about how to make the content more widely pertinent to practice:

#### **Whether specific to clinical context:**

'Need to include inpatient charts, one example could be an inpatient scenario' (NMP)

Hospital drug charts rather than FP10s (pharmacy)

Or more inclusive of specific fields of practice:

'Include a child example' (NMP)

There were some critical comments regarding the content and timing of the session. Thus for the NMP students due the timing of the session was very early in the course so as to coordinate with the pharmacy student timetable. Thus this led to comments about preparation to help NMP students have a broader understanding of the BNF, so they can interact with pharmacy students toward the questions set:

'Maybe a BNF orientation session before' (NMP)

The potential disadvantage of the NMP students due to the timing at the early stage might be offset by a later timed or repeated workshop:

'Second session when NMPs further on in the course' (NMP)

The potential imbalance of knowledge of NMP as against Pharmacy students could be also commented upon, with possible solutions to the imbalance identified:

'Sessions too easy for the pharmacy student. More problems suited to NMPs needed' (pharmacy)

'Areas for the NMP students to contribute to knowledge more' (pharmacy)

More therapeutics in terms of content was also suggested:

'To keep up the sessions re legalities etc., valid prescriptions not already used' (NMP)

Thus the workshop had worked but some changes in timing and content could enhance the overall learning, relation to practice and contribution of both sets of students.

The lack of inter-professional communication, respect and understanding has been frequently cited as contributory to breakdowns in care (Brock et al., 2013; Lapkin et al., 2013). One solution which had been put forward is to develop improved understanding and knowledge of the roles of other professions to promote effective and timely communication (Davies & Gidman). Regulatory bodies and providers of professional teaching have responded by including the requirement for inter-professional learning in their courses, but often without any clear specification for the way in which it is delivered (Barr, 2009).

If IPE is to succeed in meeting its aims and these are to translate into reality in clinical practice, it will be most effective whilst individuals are developing their own professional identity and before uni-professional norms of behaviours and attitudes become a barrier. Effective IPE is about much more than learning together; it is about developing respect for each other and about appreciating that there is value in having different approaches, knowledge and skills. This enhanced by timing the workshop at the point of development of systemic roots of professional attitudes (Lapkin et al., 2012).

The inter-professional workshops for NMPs and pharmacy students were developed with an aim of supporting open and interactive professional problem solving – working together for a common purpose of prescription and patient safety (Courtenay & Stenner, 2008). The material was designed to be common to participants from all backgrounds, and to call upon existing knowledge and experience, rather than relying on new teaching, as this most closely represents the workplace environment.

The focus of our workshops was on the process of prescribing and supplying medicine safely: using readily available information and acknowledging the checks that are in place to support safety; and, essentially, on the use of inter-professional working in terms of effective relationships to provide an outcome that was inherently safer than one achieved by professionals working in isolation (Abu-Rish, et al., 2012; Cresswell et al., 2013). In essence the primary aim was to support the relationships between professional groups, with the ultimate aim of translating this toward the clinical practice context: a concept championed as a major facilitator for patient safety (Lawlis et al., 2014; Wilson, Palmer, Levett-Jones, Gilligan & Outram, 2016).



The analysis of the student evaluations clearly demonstrates that all participants rated the workshop highly. The small effects of student professional group seen in the statistical analysis may be due in part to the consistently very high scores recorded overall which left little scope for one group of students to exhibit substantial differences from the other groups. However, the highest score was seen for 'Relationships'; 'Process' scored slightly lower and 'Knowledge' a little lower still. This is an extremely satisfactory outcome and correlates to the ranking of the aims of the workshop. It also mirrors the positive results from previous studies supporting the value of students learning together as a social element (roles and responsibilities) (Courteney, 2013; Paterson et al., 2015) and as a determinant of future safe practice (Achike, et al., 2014; Thom et al., 2016; Wibur & Kelly, 2016). Ultimately an understanding of each other's professional roles should avoid problems which are seen when communication is poor (Anderson et al., 2017).

It is interesting that NMP students rated the workshop slightly higher than MPharm students on all domains. This appears to indicate that the level of the workshop content may have been more familiar for the pharmacy students and less so for NMPs; thus more challenging for the latter. These findings overlap with other studies where non-pharmacy students stated that they were impressed and respected pharmacy students' knowledge of medicines (Wibur & Kelly, 2015). Keijsers et al. (2014) tested the knowledge of pharmacy students compared to medical students and showed that pharmacy students had a greater knowledge of basic pharmacology than medical students, and were equal to medical students when assessed in applied pharmacology. The workshop content was devised and compiled by a pharmacist, and a more collaborative approach to workshop design may have avoided this issue and achieved the aim of the content being at the same level for both; i.e. using existing skills rather than introducing new ones. This apparent disparity in knowledge was commented on by both NMP and pharmacy students who both felt the timing of the workshop (at the beginning of the NMP course) and content could be changed so that non-pharmacy students would be more on par with respect to pharmacological knowledge and contribute their experiential knowledge to the benefit of pharmacy students (Wilbur & Kelly, 2015). The value of cross-discipline learning was also recognised by students in this study, but this could be enhanced so that nursing and other non-pharmacy disciplines can contribute on a more equal footing (Brock et al, 2013; Thom et al., 2016)

Despite both the NMP and MPharm participants being at Master's level, there is a challenge in designing a workshop which effectively facilitates effective outcomes for participants with very different educational and experiential backgrounds: NMPs have over three years' clinical experience post-registration, and are experienced in patient-facing clinical practice; while pharmacy students have an extensive theoretical knowledge of drugs and their use, but little or no experience in practice, and many have had little face-to-face contact with patients. These differences have to be taken into account and considered as benefits of the joint approach so that neither group is put at a disadvantage, and learning opportunities are maximised for all otherwise they could become barriers to learning (Courteney, 2013). The authors believe that despite differences and challenges in designing a workshop for students with different educational and clinical backgrounds, the knowledge of these 'differences' can be used to strengthen any IPE delivery (Keijsers et al., (2014).

Lawlis et al. (2014) reported on barriers and more important enablers to IPE. One outstanding finding is that despite the limitations (barriers), the evaluations and the participant response to the workshop show overwhelmingly that participants' from both cohorts enjoyed the workshop and valued the opportunity to learn from each other in a safe environment- a clear enabler. There was effective inter-professional working that the statistical results suggest will contribute to the preventing or breaking down of barriers and stereotypes and support effective clinical practice. Small groups enabled all the students to interact in comfort and to contribute to the problem-solving, which we anticipate will create an expectation that working together is a strength: a workshop design feature that mirrors other reported studies (Achike et al., 2014; Brock et al., 2013; Paterson et al., 2015; Hardisty et al., 2014; Brock et al., 2013). Due to the wide variety of experience of NMP students, and little clinical exposure of MPharm students, it would not be possible to offer specific choice of topic or condition, as in Brock et al. (2014). However, following the positive feedback received, the events can now take a priority in timetabling and be delivered at a later point in the NMP calendar.

The initial inter-professional workshops delivered over an academic year (2015-2016) met with overall satisfaction, and although not subject to the luxury of a pilot study that other studies reported (Achike et al., 2014; Courteney, 2013; Patterson et al., 2014), these sessions are now included in the routine timetable and seen as of primary importance in both course curricula. Thus IPE is formally embedded as the WHO

(2011) suggest is needed in order to improve patient safety of the prescribing of medicines.

The positivity of staff in co-facilitating, and the enthusiasm of students when they have experienced the workshop seems to have overcome any barriers described in this research, but allowed the enabling central theme of patient safety to come across to students (2014) as evidenced in the prescribing domains of knowledge, process and relationships. Whilst having fun may not be the primary aim of university educational events, taking part in an enjoyable and memorable event is likely to leave a positive long-term impression as reported elsewhere (Gilligan, Outram & Levett-Jones, 2014; Hudson & Bristow, 2006).

### Limitations of the study

There were several limitations to consider. The paper evidences a workshop design only used in one university. However, there is no reason to suggest that the results would not be similar if used elsewhere or in a similar classroom context; hence the setting should have limited impact on generalisability. The workshop evaluation questionnaire has not been psychometrically tested, so the reliability and validity has not been proven. The sample of pharmacy students and prescribing students (nursing, podiatry and physiotherapy) is only a snapshot of professions which contribute to the prescribing process.

Furthermore this study was only a formative and process evaluation (Barr and Reeves, 2016). Thus the introduction of and perceptions of the workshop content were considered. Thus no formal or summative impact in practice or attending students could be evaluated with a subsequent limit to what the study could claim.

### CONCLUSIONS

This paper presented an evaluation of a workshop with the aim of enhancing safe prescribing. The findings show that bringing together stakeholders in the prescribing process to learn together as well as from each other fosters an understanding of roles, and the knowledge and processes of prescribing. Importantly it showed how important relationships are in gaining a shared approach to prescribing that is necessary to set up the right conditions for optimum outcomes from the prescribing of medication.

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