Abstract

An interprofessional education conference was developed and delivered to undergraduate medical and pharmacy students to address training needs around appropriate antimicrobial prescribing, identification and management of sepsis, patient safety and interprofessional working. The day consisted of keynote lectures delivered by specialist speakers and three small group interprofessional teaching sessions exploring (1) the choice and prescribing of antimicrobials for a range of infections, (2) the diagnosis and management of sepsis utilising simulation methodology and (3) the discussion of a clinical error using significant event analysis. Students' attitudes and acceptance towards this educational intervention were assessed using a mixed methods evaluation. The delivery of an effective learning and teaching intervention in a conference format to a large cohort of pharmacy and medical students (n=352) was found to be feasible. The logistics of organising an IPE conference of this scale were challenging but not insurmountable if sufficient staff and financial resources can be secured. Scheduling access to adequate teaching rooms and student timetabling were amongst the other important aspects affecting the success of such an event.

Introduction

The necessity to provide undergraduate healthcare students with opportunities for interprofessional education (IPE) interactions for the long-term benefit of patient care is well established and required by regulating bodies. However, achieving this against a backdrop of large student cohorts, limited resources and crowded timetables presents significant challenges (Bridges, Davidson, Odegard, Maki, & Tomkowiak, 2011). In recent years, we have developed IPE activities for pre-clinical undergraduate medical and

pharmacy students as part of a cross-institutional collaboration in the North East of England, as neither institution had both programmes. The geographical separation of campuses and the institutional differences in timetables made the coordination of multiple IPE sessions through the year challenging. Consequently, we decided to develop an 'Interprofessional Education Conference', a full-day event to reduce the logistical challenges of repeated travel and timetabling. The novel conference format, and its full-day nature, allowed us to spotlight specific topics of importance in our curricula. We designed the conference around antibiotic prescribing and, more broadly, the safe management of infection and prevention of sepsis in a multidisciplinary context.

We chose these topics because prescribing is a complex task that students often feel underprepared for on graduation (Rothwell et al., 2012). The EQUIP study highlighted high rates of prescription errors in junior doctors, occurring most often in prescriptions for antimicrobials (Dornan et al., 2009). A key recommendation of the EQUIP study was to provide IPE opportunities designed to replicate the future working responsibilities of each healthcare professional group. Simulation-based teaching has been found to be particularly conducive to IPE-based activities because it is experimental/experiential in nature and can bridge the gap between the classroom and the clinical environment (Paige, Garbee, Brown, & Rojas, 2015). Consequently, the aim of this study was to develop, implement and evaluate an undergraduate conference using interprofessional and simulation methods to learn about antibiotics and the management of infections. This report presents a mixed-methods evaluation of the 2016 conference with the following objectives:

i. To assess the feasibility of delivering an IPE conference to a large cohort of pharmacy and medical students across two higher education institutions (HEIs)
i. To assess the attitudes and acceptance of students to IPE and simulation as pedagogical methods for delivering learning and teaching

Methods

This was a joint initiative between the School of Medical Education at Newcastle University UK and the Pharmacy School at The University of Sunderland UK for Stage 2 medical and pharmacy students. IPE learning materials were developed to address specific learning objectives from both degree programmes. The method of delivery was a full-day conference that included lectures from keynote speakers, interprofessional workshops and simulation sessions (see Table 1). The conference ran with the Twitter hashtag #IPEConference2016 where images from the day can be seen. Students started and ended the conference together in traditional lecture-based sessions but, predominantly, rotated around three interprofessional workshops, in which they worked in small groups containing balanced numbers of pharmacy and medical students (up to ~6 students per group), facilitated by staff from medicine, nursing and pharmacy backgrounds. An example student timetable is shown in Table 1. Society stalls relevant to the content of the day and representatives and regulatory bodies from each professional group were present. Students received clinical cases as pre-reading and, on registration, were provided with a conference workbook, which contained materials and tasks for the day, including blank prescription forms and other relevant documentation. At the end of the day, students were directed to complete

an evaluation form in their conference packs. 352 students attended the conference in 2016 (n=157 medical students, n=195 pharmacy students).

Data collection and analysis

All participants were asked to complete an evaluation form asking for free-text feedback on positive and negative aspects of the conference and suggestions for improvement. Thematic content analysis using grounded theory principles (Pope, Ziebland, & Mays, 2000) was used to analyse responses. Initial broad analysis to identify patterns of meaning was followed by focused coding and recoding by two independent researchers to produce themes and subthemes that emerged inductively from the data. Two sets of preliminary codes were discussed and combined to create the final codes used for analysis. Individual comments often covered a range of topics, and in these instances the pertinent sections of the text were sorted into the different codes, so the number of total codes exceeded the number of submitted evaluation forms. This project met the ethical expectations of the Faculty of Medical Science Ethics Committee, Newcastle University (reference 4542/2016).

Results

Evaluation forms were returned by 226 students (64.2% response rate overall): 128 pharmacy students (65.6% response rate) and 98 medical students (62.4% response rate). In response to the question 'What did you enjoy about the conference format?' *logistics* and *content* were the most common themes to arise from the analysis, with 164 positive comments recorded in each theme. Within the *logistics* theme, the most common opinion expressed related to

how ‘well organised and structured’ the conference was. This opinion was common across both groups of students (n=24 medicine, n=30 pharmacy).

> *‘Organised timetable with small groups of well divided students for Interprofessional discussion’* (Medical student)

Seventy-six medical students and 88 pharmacy students commented positively on the *content* of the conference. ‘SimMan3G™’ (n=18) and the ‘interactiveness’ of the conference (n=17) were the most popular aspects among medical students who agreed it was *‘a great learning experience.’* Pharmacy students also enjoyed these (n=12 SimMan; n=12 interactive), but more often said that the content was ‘interesting’ (n=15); they also appreciated the ‘range of topics and activities’ (n=13).

Fifty-five medical students and 61 pharmacy students commented positively on the *interdisciplinary nature* of the conference, with similar numbers of pharmacy (n=49) and medical students (n=42) mentioned the ‘mixing of the professions’ as an enjoyable aspect. Some students commented on how the conference was a good representation of multidisciplinary working practises.

> *‘I loved working through the cases in small mixed groups and explaining the medicine behind decisions to the pharmacy students.’* (Medical Student)

> *‘It was a delight to get to work along the medics. They taught me a lot about medical terms + clinical decisions. I also felt I helped them learn a lot about drugs + the BNF.*

I enjoyed every session.' (Pharmacy student)

In response to the question 'What did you not enjoy about the conference format and what can be done to address this?' the most prominent themes to emerge were *timing* (83 comments) and *content* (75 comments). Within *timing*, the most prominent code was 'prefer at another point in academic year/not near deadlines' (n=34 medical, n= 9 pharmacy students). The most frequent negative response within the *content* theme came from pharmacy students who felt 'unprepared for the content/lacked prior knowledge' (n=9 pharmacy students, n= 1 medical student). Other than changing the timing of the conference to coincide with fewer concurrent academic activities and assessments, the major suggestion for change from students was a 'shorter lunch' (n=27 medical, n= 8 pharmacy students).

From an institutional perspective, the logistics of organising an IPE conference of this scale were challenging; a steering group worked on the conference arrangements for one year before the event and considerable financial resources were required. The non-staff costs were estimated to be approximately £12 per student, this included the provision of conference materials and refreshments. Twenty classrooms and additional social spaces were required on the conference day. Over 50 clinical staff were involved at some stage in the development and delivery of this initiative, supported by additional administrative staff. Timetabling of the event across two HEIs also represented a challenge.

Discussion

Our results showed that students were accepting of the content, format and interprofessional nature of the day. The conference was found to be feasible, with well managed logistics frequently noted in student evaluations, by staff and external contributors. Bridges and colleagues (2011) highlighted that substantial IPE in healthcare curriculum requires significant commitment from university administration, deans and faculty staff, and this was also our experience. It is clear that institutes need to have IPE champions with the enthusiasm and drive to see through large-scale projects, and staff on the steering committee with a range of skills and expertise such as innovative education design, the ability to influence/control timetables and research expertise in evaluation. At least one year's lead up was necessary to account for timetabling and room bookings, and support from administrative staff was invaluable in addressing practical issues before and on the day.

The scheduling of IPE activities in relation to students' other commitments, including assessments and clinical activities, has been noted as having the potential to affect their success (Stewart, Kennedy, & Cuene-Grandidier, 2010). Indeed, the most common negative comment in the evaluation of the IPE conference related to conference timing. Our conference fell the day after the medical students handed in their last assignment of the year, on the last day of the term, and pharmacy students had a formative assessment the following week. Due to the overall success of this conference, the IPE initiative was embedded into both curricula as an annual event, however we moved the date for subsequent iterations to avoid coinciding so closely with the assessment period.

One limitation of this study is that it would have been preferable to include nursing students and/or other healthcare professionals in the conference. Challenges included being very close to the maximum capacity for the lecture theatres and finding suitable venues to accommodate any larger cohort of students on one day. In the future, as the numbers of medical and pharmacy students in our HEIs are expected to rise, we anticipate the need to repeat the conference over two days, whereupon the invitation can be extended to students from other healthcare professions.

Conclusion

This paper outlines an inaugural and novel IPE approach designed to strengthen learning around antimicrobials, the management of infections and safe interprofessional working practice. We demonstrate that it is feasible to deliver an IPE conference to a large cohort of pharmacy and medical students across two HEIs, and students were accepting of this approach.

Table 1: An example student timetable with description of content

	Activity	**Content**
8:00-9:00am	Registration and society stalls	Stalls were provided and staffed by several organisations including the Centre for the Advancement of Interprofessional Education (CAIPE), British Pharmacological Society (BPS) and pharmacy and medicine regulatory and professional bodies.
9:00-10:00am	Introduction and keynote speakers	A speaker from Health Education North East and the Chief Pharmacist at Gateshead NHS Foundation Trust.
10:00-12:00pm	Inter-professional workshop: Choosing the Right Antibiotic	In this workshop, students were provided with two cases to work through one focusing on pyelonephritis and one on meningitis. Students had to choose the appropriate antimicrobial at each stage of treatment and complete prescriptions with the correct dose, duration and route of administration.
12:00-13:30pm	Lunch and society stalls	
13:30-14:30pm	Interprofessional workshop: SimMan™ Sepsis	In this workshop a patient arrived in a secondary care setting with sepsis

		following delays in the prescribing and administration of antibiotics in primary care. Students worked with SimMan3G™ to diagnose and manage sepsis. Each small interprofessional group worked through a series of clinical questions, and shared their responses with the entire group through a voting system. The collective student choice for management and treatment was applied to the SimMan3G™ so students could observe the effects their treatment had on the patient in real time.
14:30- 15:30pm	Inter-professional workshop: Significant Event Analysis	In this workshop, students looked at the errors in decision making and communication that led to the patient in the SimMan3G™ session being admitted to hospital with sepsis. Video material was provided in which actors portrayed the health professionals involved in the error and students had to perform a significant event analysis.
15:30- 16:15pm	Summary quiz and evaluation	

Acknowledgements

We would like to thank Lesley Scott and Andrew Teodorczuk for their input into the design and implementation of the conference and evaluation. We thank Neil Gammack and Chris Tiplady for delivering stimulating keynote lectures, senior medical student volunteers and the Newcastle Surgical Rotation doctors on Anatomy and Clinical Skills demonstratorships for their assistance in the smooth running of workshops and the School of Medical Education administrative staff. This project was supported by grants from the Catherine Cookson Foundation and the Faculty of Medical Sciences Unit for Educational Research, Development and Practice, Newcastle University.

References

Bridges, D. R., Davidson, R. A., Odegard, P. S., Maki, I. V., & Tomkowiak, J. (2011). Interprofessional collaboration: three best practice models of interprofessional education. *Med Educ Online, 16*. doi: 10.3402/meo.v16i0.6035

Dornan, T., Ashcroft, D., Heathfield, H., Lewis, P., Miles, J., Taylor, D., . . . Wass, V. (2009). An in depth investigation into causes of prescribing errors by foundation trainees in relation to their medical education: EQUIP study. Final report for the GMC.

Paige, J. T., Garbee, D. D., Brown, K. M., & Rojas, J. D. (2015). Using Simulation in Interprofessional Education. *Surg Clin North Am, 95*(4), 751-766. doi: 10.1016/j.suc.2015.04.004

Pope, C., Ziebland, S., & Mays, N. (2000). Analysing qualitative data. *BMJ, 320*(7227), 114-116. doi: 10.1136/bmj.320.7227.114

Rothwell, C., Burford, B., Morrison, J., Morrow, G., Allen, M., Davies, C., . . . Illing, J. (2012). Junior doctors prescribing: enhancing their learning in practice. *British Journal of Clinical Pharmacology, 73*(2), 194-202. doi: 10.1111/j.1365-2125.2011.04061.x

Stewart, M., Kennedy, N., & Cuene-Grandidier, H. (2010). Undergraduate interprofessional education using high-fidelity paediatric simulation. *Clin Teach, 7*(2), 90-96. doi: 10.1111/j.1743-498X.2010.00351.x