

# Collaborating to develop Clinical Pharmacy Teaching in Sri Lanka

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## Abstract

**Background:** Bachelor of Pharmacy programs were introduced in 2006 into two Sri Lankan universities - University of Peradeniya and University of Sri Jayewardenepura. Due to minimal clinical pharmacy experience in the country, these universities invited international colleagues to develop and teach the clinical pharmacy course.

**Aims:** To describe development, delivery and evaluation of both a clinical pharmacy undergraduate course and a "Train-the-trainer" program provided to local academics delivering undergraduate pharmacy programs.

**Method:** In 2009, Australian pharmacist academics developed and piloted an undergraduate clinical pharmacy course at University of Peradeniya. In 2010, this was refined and delivered at University of Sri Jayewardenepura, along with a "train-the-trainer" program for local academics. These were evaluated using surveys.

**Results:** Most students considered lecture delivery speed and use of audio visual aids appropriate, and lecture content relevant. Most academics found the "Train-the-Trainer" program increased their knowledge and improved their teaching skills.

**Conclusion:** Experienced pharmacist academics can improve the quality of clinical pharmacy teaching in developing countries such as Sri Lanka.

**Keywords:** Australia, Education, Pharmacy, Sri Lanka

## Introduction

Sri Lanka has a National Medicinal Drug Policy that indicates its commitment to improving quality use of medicines (QUM) and recognises the value pharmacy degree holders can add to their healthcare service (World Health Organization 2006). Pharmacy training was first introduced in Sri Lanka in the early 1950's. By 1957, a full time pharmacy certificate course was introduced. Since then, three types of pharmacy certificates have been developed: A certificate of proficiency in pharmacy, a certificate of efficiency in pharmacy and a diploma of pharmacy. A Bachelor of Science (BSc Pharmacy) degree course commenced at the University of Colombo in 1999. The Bachelor of Pharmacy (BPharm) program was introduced in 2006 at the University of Peradeniya (UP) and University of Sri Jayewardenepura (USJ).

There is limited published literature regarding pharmacy practice in Sri Lanka. The Second International Consultation on Undergraduate Medical and Pharmacy Education

convened by the World Health Organization (WHO) was held in Sri Lanka in 2005. A Sri Lankan community pharmacist speaking at this five-day consultation commented:

*"In Sri Lanka, practice of pharmacy is one of the neglected areas of health services and medical practice. Both community and hospital pharmacies are in a deplorable state and although official reports have made recommendations for their improvement, nothing has been done in this direction"* (Health Action International 2005).

This is an encouraging indication that forward-looking Sri Lankan pharmacists can see the need for further developing the profession in order to benefit patient care. There are a small number of pharmacists employed in Sri Lankan hospitals. However, their role is limited to drug procurement, distribution, dispensing in the outpatient and inpatient setting, and inventory control. This is similar to the early days of pharmacy services in hospitals in many developed countries. In developing countries, the lack of clinical pharmacy

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services is due to professional isolation and lack of recognition of the role of clinical pharmacists within the healthcare system (Anderson, 2002). In Sri Lanka there are no published data regarding medication errors and adverse drug events in hospitals.

One way to develop a generation of pharmacists who will be better equipped to engage in contemporary pharmacy practice and deliver better patient care is through introducing comprehensive clinical pharmacy teaching curricula at university level. The introduction of clinical pharmacy services in healthcare facilities would need to be supported by government resources. Enablers to capacity building such as the development of clinical pharmacy teachers in academia, establishment of clinical pharmacy positions in hospitals and acceptance by the medical profession, are also important. These merit a wider discussion which is out of the scope of this paper.

At present there is minimal clinical pharmacy experience and expertise amongst practitioners and academics in Sri Lanka, which has resulted in a relative inability to develop and deliver a rigorous and effective clinical pharmacy teaching program. There are no clinical pharmacy mentors, clinical tutors or role models. The current BPharm programmes are taught predominantly by academics with pharmacy, medical and science backgrounds including clinical pharmacologists, but with little or no clinical pharmacy experience. Students had limited exposure to clinical placements during their undergraduate years. Sri Lankan academics were concerned about gaps in clinical pharmacy expertise and so approached Australian pharmacist academics to collaborate to develop and teach the clinical pharmacy subject.

The majority of the international collaborations in clinical pharmacy are associated with post-graduate training programs (Ehrensberger *et al.*, 2005; Kanke *et al.*, 2000; Parthasarathi *et al.*, 2002; Kishi, 2001; Manges & Dhillon 2000; Duwiejua *et al.*, 2004; Nyfort-Hansen & May, 1998). These collaborations include partnerships between the United States of America (USA) and Japan (Kanke *et al.*, 2000; Kishi, 2001) the United Kingdom (UK) and Germany (Ehrensberger *et al.*, 2005), the UK and Spain (Manges & Dhillon, 2000), UK and Ghana (Duwiejua *et al.*, 2004) and between Australia and India (Parthasarathi *et al.*, 2002; Nyfort-Hansen & May, 1998; Lal & Rao, 2005). These international collaborations were established because of the limited exposure to clinical pharmacy practice in certain countries and the lack of experts in these countries to provide appropriate training in clinical pharmacy (Kanke *et al.*, 2000; Duwiejua *et al.*, 2004; Nyfort-Hansen & May, 1998).

The central aim of all these collaborations was to help facilitate the development of skills required to work as a clinical pharmacist (Kanke *et al.*, 2000; Nyfort-Hansen & May, 1998). The collaborations ranged from training local academics in teaching clinical pharmacy using “train-the-trainer” techniques (Manges & Dhillon, 2000), to international academics travelling abroad yearly to deliver teaching (Kanke *et al.*, 2000). The USA-Japan and the Australia-India collaborations involved students from Japan and academics from India travelling to USA and Australia respectively to undergo clinical clerkships in hospitals (Kanke *et al.*, 2000; Nyfort-Hansen & May, 1998). The experiences from these international collaborations were taken into consideration when developing this Sri Lanka-Australia collaboration.

The aims of this paper are:

1. To describe the development, delivery and evaluation of a clinical pharmacy undergraduate program delivered to two pharmacy schools in Sri Lanka.
2. To describe the development, delivery and evaluation of a “train-the-trainer” program provided to local academics delivering undergraduate pharmacy programs in Sri Lanka.

## Methods

### *Development and delivery of undergraduate teaching*

**2009 Pilot - Clinical Pharmacy Course at UP:** In 2009, two of the authors were invited to develop and teach a clinical pharmacy course comprising of a series of lectures, tutorials and case studies to 4th year students of the first BPharm cohort at UP between January and March 2009.

As there was no access to hospital wards for clinical teaching, the course was taught in a classroom setting using interactive problem-based learning in case-based tutorials. The students were taught clinical pharmacy skills including medication history taking and reconciliation, and core principles of clinical pharmacy review of a patient’s medication chart. A series of interactive modules covering respiratory, cardiac, renal, endocrine, neurological, gastroenterological and anti-infective areas were used to demonstrate the practical application of information gathering, problem identification, problem prioritisation and resolution.

As part of their assessment, students were asked to present a short case study discussing indications, contraindications, adverse effects and counselling points for a range of medicines. Students provided anonymous feedback on the course using a standard feedback form. The pilot was well received by the students and yielded useful insights for further refinement of the course for delivery in 2010 at USJ. For example, the two authors (JC and IC) involved in teaching the 2009 cohort reflected that the students had good foundational knowledge on pharmacotherapeutics, but lacked insight on how to put this into practice. As a result, more case-based work and facilitated ward-based experiential learning was included in 2010 at USJ.

**2010 - Clinical Pharmacy Course at USJ:** In collaboration with the Australian pharmacist academics who taught the 2009 UP course, USJ sought and secured a grant from the World Health Organization (WHO). The purpose of the grant was to run a “Train-the-Trainer” course for pharmacy academics in Sri Lanka and coordinate the USJ clinical pharmacy course in 2010.

A team of five clinical pharmacists was formed to refine the 2009 course and to develop, teach, assess and evaluate the course in 2010 in collaboration with the USJ staff. All members of the team were experienced in the practice of clinical pharmacy and in the provision of education and training at undergraduate and postgraduate levels.

The specific objectives of the WHO grant included:

1. **“Train-the-Trainer” program** - The aims were to train the academics on the role of a clinical pharmacist and how to deliver and assess the case based clinical pharmacy course. The “Train-the-Trainer” workshops were open to all BPharm academics from all Sri Lankan schools of pharmacy.

2. **Undergraduate teaching** - To deliver a comprehensive program to enhance students' understanding of theory and practice of clinical pharmacy and pharmacotherapeutics and to develop the skills to apply this knowledge into practice through a program of lectures, tutorials and facilitated ward-based experiential learning for final year students of the BPharm program.
3. **Assessment** - To establish an effective and feasible assessment methodology for the clinical pharmacy and pharmacotherapeutics subject.

### ***“Train-the-Trainer” program***

A series of five one-day workshops was developed and delivered. The workshops were attended by academics from five Sri Lankan universities with current or potential pharmacy undergraduate courses. Academics included staff from both the pharmacy and clinical pharmacology departments.

The content of the workshops was developed to prepare these academics to deliver the clinical pharmacy curriculum using the interactive approach used by the Australian academics at UP and USJ. The program for the workshops is outlined below:

1. Introduction to the 4<sup>th</sup> year clinical pharmacy course
2. Undertaking clinical evaluation, providing feedback and providing clinical “teaching on the run”
3. How to deliver a clinical tutorial and lecture
4. Up-skilling in facilitating ward-based experiential learning (this was conducted in workshops at a nearby hospital)
5. Gathering current evidence to prepare and update clinical tutorials and lectures
6. Delivery of tutorials and lectures by participants with peer evaluation
7. Human error awareness and medication safety
8. Developing and evaluating Objective Structured Clinical Examinations (OSCEs) for both formative and summative assessments.

Developing multiple choice and short answer questions was not covered in these “Train-the-Trainer” workshops, as Sri Lankan academics were familiar with these methods of evaluation.

### ***Development and delivery of the undergraduate clinical pharmacy course***

#### **Development of subject**

In February 2010, the team began the process of course development. USJ provided the BPharm course curriculum and information regarding the topics to be covered. The team developed a program of lectures, tutorials and ward-based teaching sessions based on the work from 2009 pilot. Regular feedback in this phase to the USJ coordinators via Skype<sup>®</sup> communication allowed tailoring of the course to meet local needs and facilities.

### ***Delivery of course***

The clinical pharmacy course was delivered by the team to 19 fourth (final) year BPharm undergraduates at USJ over a 6-week period during June and July 2010. Forty-five hours of lectures, 21 hours of tutorials and 12 hours (6 sessions) of facilitated ward-based experiential learning sessions were delivered. The lectures were interactive, case- and problem-based, and the team encouraged student participation in class.

Tutorials and ward-based sessions were held in small groups (up to 10 students) to maximise the learning experience. The tutorial tasks included theoretical questions and case studies where the students were encouraged to integrate their pharmaceutical knowledge into practice. At the facilitated ward-based experiential learning sessions, the students were tasked with obtaining a medication history from a patient, gathering relevant information from the medical notes, determining the appropriateness of the prescribed medicines. They then presented their findings to the class and participated in a facilitated discussion. Local lecturers and medical graduates waiting to commence their intern year were employed as tutors and assisted with translation, patient selection, consent and coordination of the facilitated ward-based sessions.

### ***Assessment of students***

Theoretical knowledge was evaluated using multiple choice and short answer questions. Patient care, communication, problem solving skills, and application of knowledge were assessed using OSCEs. The students were given the opportunity to become familiar with the OSCE process by participating in a mock OSCE prior to the summative OSCEs.

### **Results**

#### ***Evaluation of “Train-the-Trainer” program:***

Eighteen Sri Lankan academics participated in the program including academics from pharmacy and clinical pharmacology departments. Feedback using a Likert scale was received from 67% of the participants (Table I). They rated the workshops as informative and provided them with increased knowledge particularly on gathering current evidence from online resources, human error awareness and medication safety, and developing and using OSCEs. They agreed that the workshops were delivered with effective communication style and appropriate audiovisual aids.

Some sessions of the program were attended only by the pharmacy academics (N=10). These academics prepared and delivered tutorials and lectures and attended facilitated ward-based sessions. Their feedback identified that their style of teaching was less interactive than that of the Australian academics. Interestingly, during these sessions, the academics wanted more cases, more ward visits, and more interactive activities. A common comment was “*don't tell us what to do - show us.*” Although most academics found the workshops beneficial in increasing their knowledge and skills, many felt further ongoing support from experienced clinical teachers was desirable.

**Table I: Evaluation and feedback from Train-the-trainer programme**

	Strongly Disagree	Disagree	Slightly Disagree	Slightly Agree	Agree	Strongly Agree	No response
<b>Introduction and background to Clinical Pharmacy</b>							
Informative and provided me with increased knowledge					5	5	2
Effective audiovisual aids and appropriate communication					4	6	2
<b>Clinical Teaching, supervising students and clinical assessment and feedback</b>							
Informative and provided me with increased knowledge				1	4	4	3
Effective audiovisual aids and appropriate communication					3	6	3
<b>Preparation and updating of lectures and examples from lectures</b>							
Informative sessions and increased my knowledge.					7	5	0
Effective audiovisual aids and appropriate communication.				1	4	7	0
<b>Ward visit plan and Preparation of Tutorial</b>							
Informative sessions and increased my knowledge.					3	9	0
Effective audiovisual aids and appropriate communication.				2	3	7	0
<b>Objective structured clinical examinations (OSCES) n=8</b>							
	Strongly disagree	disagree	No opinion	agree	Strongly agree	No response	
Effective audiovisual aids	1	1		3	3	0	
Help understand the topic	1			3	4	0	
<b>Examples of Key messages recorded by participants</b>							
<p>“To use case histories”</p> <p>“To be more interactive when presenting”</p> <p>“How to identify the core components to be tested in an OSCE”</p> <p>“Never hesitate to point out an error”</p>							
<b>Examples of comments given by Participants</b>							
<p>“include more audiovisuals”</p> <p>“Use more role plays”</p> <p>“All of you are more active and no one boring</p> <p>“I very much enjoyed all the sessions. Apart from being of immense value to the BPharm course, I felt that many of the points were of equal importance to the medical students and postgraduates”</p> <p>“Accent difficult to catch quickly”</p> <p>“Really interesting, by looking at your presentations I learnt a lot of things that would help in my teaching/presentations”</p> <p>“I thoroughly enjoyed the lectures and would have liked to have been able to attend the workshop on the previous days”</p> <p>“Series of workshops was quite beneficial for us. Fantastic and they are useful to improve our teaching skills in all aspects”</p>							

### **Evaluation of the undergraduate teaching**

**Evaluation of the lectures:** A total of 19 students participated in the clinical pharmacy course. Feedback questionnaires were distributed to students after the initial lecture by each team member and then after a subsequent lecture by the same team member later in the course. The feedback questionnaire consisted of five point Likert scale questions (Table II) and open ended questions (Table III). Anonymous feedback was received from 19 students from the initial lecture (response rate = 100%) and 17 students from the subsequent lecture (response rate = 89%). The content and delivery of the lectures were continually refined during the course in response to student feedback.

Table III outlines the themes and student comments from the open ended questions as well as a description of the adaptations made by the teaching team in subsequent lectures. The themes from the first and second set of feedback questionnaires were similar.

Interesting observations from the feedback questionnaires were regarding the speed of the delivery of the lecture. The results from the Likert scale questions showed that majority of the students agreed or strongly agreed that the lecturer delivered the lecture at the right speed. However, in the opened ended questions, some students commented on the need for the lecturer to reduce the speed of the lecture. No separate evaluation was undertaken of tutorials or facilitated ward-based sessions.

**Table II: Results from the Likert scale questions (average for all the team members) %**

The lecturer delivered the lecture at the right speed			
	Strongly Agree & Agree	No opinion	Strongly Disagree & Disagree
Initial lecture (N=19)	82%	9%	9%
Subsequent lecture (N=17)	92%	7%	1%
The lecturer used effective audiovisual aids			
Initial lecture (N=19)	85%	13%	2%
Subsequent lecture (N=17)	89%	11%	0%
The lectures were useful in helping me understand the topic			
Initial lecture (N=19)	97%	1%	2%
Subsequent lecture (N=17)	99%	1%	0%

**Table III: Results from the open ended questions**

Theme	Student comment [sic]	Strategies to address feedback
Reduce the speed of delivery of the lectures	<p><i>“Speak slowly &amp; loudly. Sometime I couldn't understand because of the speed &amp; pronunciation”</i></p> <p><i>“It is better to slow down speed of lecturing and stress the important parts”</i></p> <p><i>“A little hard on understanding due to different pronunciations but I think it will be ok soon after few days with you”</i></p>	<p>Local and team academics attended lectures and signaled when they thought the team lecturer was speaking too fast</p> <p>Team members tried to choose simple words, and avoided idiomatic English, jargon, or slang.</p> <p>Team members also attempted to enunciate their words to improve clarity and decrease speech rate.</p>
Strong preference for visual reinforcement of the material covered in lectures	<p><i>“Use more diagrams when explaining”</i></p> <p><i>“If can add more pictures about disease because we never see these patients”</i></p> <p><i>“Lecture was good. Especially using video clip it was more practical and help not be boring”</i></p>	<p>Team members continued to use visual reinforcement, using diagrams, pictures and videos to highlight important information and ease the cognitive load of listening alone.</p>
Use of case studies and examples was preferred to enhance the students' understanding of the lecture.	<p><i>“I feel that we should have spent more time with the examples, case studies as this was an area we had not covered before.”</i></p> <p><i>“Use more practical examples, we like to see what actually happen in hospitals”</i></p> <p><i>“Including case studies to the lecture is interesting and easy to understand the topic”</i></p>	<p>Team members tried to discuss case examples that they had encountered during the facilitated ward-based session to highlight the key concepts.</p> <p>Team members also tried to incorporate Sri Lankan terminology, names of people and places when teaching.</p> <p>Other team members observing the lectures contributed by providing examples of patients and situations from their experiences.</p>

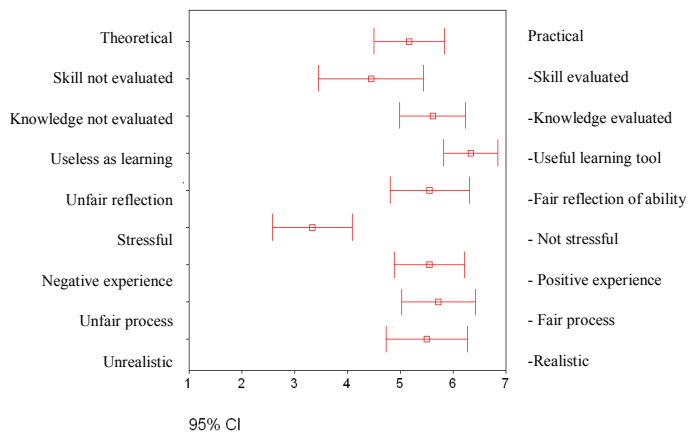
From the questionnaires, it appears that most students felt that the lecturers used effective audiovisual aids in the lecture. The comments from the open ended questions allowed the students to expand on this. Students commented that they would like more pictures and diagrams in the PowerPoint® presentations to reinforce the material covered in the lecture.

The majority of the students found the lectures helpful in understanding the topic. The students requested the use of case studies and practical examples in the lectures to enhance the students understanding of the content covered.

**Evaluation of assessment**

The students' feedback on the OSCE process both as an exam and as a learning opportunity was obtained by completion of an anonymous feedback questionnaire consisting of seven point Likert scale questions. The students found the process a practical and positive experience that evaluated their skills and knowledge. They felt it was an objective reflection of their performance and was both a fair and realistic exam. All respondents reported that they found the process stressful to varying degrees. The results from the mock OSCE feedback questionnaire are shown in Figure 1.

**Figure 1: Student feedback on mock OSCE process (mean and 95% ci)**



**Discussion**

Considering the success of the 2009 and 2010 collaborations, this program could continue with support from the universities for visiting lecturers. However, a longer term capacity building solution is required both for the development of clinical pharmacy trainers and importantly the establishment of clinical pharmacy positions in Sri Lankan hospitals. Key strategies which can act to support establishment of these positions within the hospital system include publication and dissemination of the work to date (Coombes, J. & Coombes, I. 2009; Coombes, J. 2010; Coombes, I. 2010; Peters *et al.*, 2011; Coombes *et al.*, 2011), formalisation of the clinical pharmacy course within the two B. Pharm programs, support for local educators and trainers, and development of local evidence of the benefit of clinical pharmacists.

At the completion of the 2010 clinical pharmacy teaching program, the team made the following recommendations to local academics:

**Recommendation 1:** Consider whether the subject should continue to be taught as short blocks with visiting lecturers from overseas or to revise the fourth year curriculum to incorporate the subject throughout the year. As a result of awareness of the work completed to date, another Australian clinical pharmacist is currently in Sri Lanka delivering aspects of the clinical pharmacy course with the local academics at UP and USJ over a nine-month period.

**Recommendation 2:** To ensure ongoing success of the clinical pharmacy course, the local academics will need to constantly revise the clinical material provided by the team in 2009 and 2010 by using the skills gained in the “Train-the-Trainer” program.

**Recommendation 3:** The current graduates and the “Train-the-Trainer” participants should nurture a culture of clinical pharmacy services and act as role models for future graduates. This would be one enabler to support the development of clinical pharmacy services in Sri Lanka.

**Recommendation 4:** Clinical pharmacy standards and competency frameworks should be further developed by a group formed from the “Train-the-Trainer” participants and promoted as a National Standard. This will need to be integrated into hospital and university accreditation and clinical pharmacist credentialing pathways to foster both needs-based and lifelong learning.

#### **Further collaboration between UQ and UP**

A critical component of a successful collaboration involves the signing of a memorandum of understanding or letter of agreement which will foster further collaboration and potentially enable future visiting or exchange of lecturers between the facilities. This is currently being considered by The University of Queensland and University of Peradeniya.

#### **Importance of local clinical pharmacy practitioner input into the BPharm program**

The need for experienced clinical pharmacists to develop and deliver the material both in the classroom and on the wards is acknowledged. It is important to harness the skills and enthusiasm of the 2010 graduates who become clinical pharmacists, into future BPharm programs.

Plans are in place to seek funding for ongoing collaboration in teaching clinical pharmacy and for a research program to evaluate the impact of clinical pharmacy teaching on graduate performance in the workplace.

Further research in collaboration with staff within the Sri Lankan healthcare system is planned to evaluate the impact of a clinical pharmacist to QUM.

The teaching experience gained in 2009 and 2010 and consideration of the logistic difficulties of visiting overseas universities, led to the exploration of different methods of employing technology to assist with delivering course material.

## **Conclusion**

This collaboration between pharmacists and academics from Sri Lanka and Australian universities/ healthcare system, has resulted in development and delivery of a contemporary clinical pharmacy program that was well received by students and existing staff. For the teaching of clinical pharmacy to be sustainable and to ensure continued local capacity building, a transition program needs to be planned and implemented. Application for further funding is underway to continue to deliver the program in future years.

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