

RESEARCH ARTICLE

Developing advanced hospital pharmacy practice experiences in a Bachelor of Pharmacy programme in Jordan: A novel training programme and evaluation of student perceptions

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Abstract

Objective: To describe, introduce, and assess student perceptions of a structured clinical training programme for pharmacy students that meets the expectations of advanced pharmacy practice experiences of Doctor of Pharmacy (Pharm.D.) programmes accredited by the Accreditation Council for Pharmacy Education. **Methods:** A clinical training programme was held from July to September 2019. Training included hands-on hospital rotations focusing on essential pillars of pharmaceutical care including ensuring proper medical indication, effectiveness, safety, and patient adherence (total of 160 hours). The study population included 35 senior pharmacy students from the University of Petra. **Results:** Qualitative answers from students showed positive responses associated with the programme's pre-training orientation, clinical training, preceptors involved, and student's clinical knowledge and skills. **Conclusion:** The piloted introduction of a structured clinical training programme for pharmacy students was successful. Students reported positive evaluations and perceptions of clinical training sites and staff as well as their clinical and practical skills. The main challenge students encountered was transportation to the practice site.

Introduction

Over the last decade, pharmacy education and practice in Jordan has started to expand (Kheir *et al.*, 2008) to include increasing numbers of pharmacy graduates, with two major programmes offered by governmental and private institutions (Al-Wazaify *et al.*, 2006). The demand for pharmacists has increased with the growing number of pharmacies, now reaching 2500 community pharmacies located in different regions of Jordan (Nazer & Tuffaha, 2017). An introductory pharmacy practice programme offered as a bachelor of science (B.Sc.) in pharmacy is currently available at 18 schools of pharmacy; the B.Sc. programme requires the completion of 160 credit hours

and 1440 internship hours as part of the Jordan Pharmaceutical Association pre-enrolment requirement (Al-Wazaify *et al.*, 2006). Internships can be fulfilled in hospital and community pharmacies. On the other hand, the Doctor of Pharmacy (Pharm.D.) programme, offered by only two governmental schools, provides an advanced pharmacy training opportunity or as it is often called Advanced Pharmacy Practice Experiences (APPEs); this programme includes 219 credit hours. The final sixth year of the programme is considered an experiential year, in which students are exposed to 14 weeks of community and hospital pharmacy training, followed later by five

connected six-week hospital rotation cycles in different medical departments (Al-Wazaify *et al.*, 2006). Although there is a clear distinction in the curriculums of the two offered programmes, this distinction is not clearly observed in actual pharmacy practice. In Jordan, pharmacists with both Pharm.D. and B.Sc. in pharmacy degrees are considered pharmaceutical care providers and are allowed to counsel, dispense medication, and provide pharmacotherapy management to patients in both community and hospital settings (Ababneh *et al.*, 2019; Basheti *et al.*, 2019; Mukattash *et al.*, 2018; Tahaineh *et al.*, 2019). Academic pharmacy institutions in the United States of America (USA) were among the first to transition from traditional B.Sc. in pharmacy into more advanced Pharm.D. degrees (Supapaan *et al.*, 2019). Moreover, studies conducted in the USA show that although pharmacists with a Pharm.D. degree have a clear advantage in a hospital setting, in which they contribute to patient care in medical floors and critical care units (Anderson, & Marrs, 2018; Basri *et al.*, 2018; Moore, & Kenworthy, 2017), B.Sc. holders are also required to have independent and critical roles in inpatient and outpatients pharmacies (Stewart, Thomas, & Tutag-Lehr, 2018). Pharm.D. programmes in Jordan offer structured advanced pharmacy hospital training. However, contrary to community pharmacy training, hospital training in introductory (B.Sc.) programmes do not share the same organisational structure with varying exposures to the hospital environment. A lack of clinical training focus on patient oriented pharmaceutical care, where students get to interact with the health care team and patients has been observed in hospital settings for B.Sc. students (AbuBlan *et al.*, 2019). The Accreditation Council For Pharmacy Education (ACPE) recognises hospital training as a required area of APPE (ACPE, 2015). ACPE also provides insights on the optimal settings for APPEs to be conducted efficiently. ACPE accreditation standards focus on the following:

1. Patient care emphasis; APPEs applied in a hospital setting should involve patients with both acute and chronic conditions. Additionally, providing preventative care and wellness promotion in a hospital setting
2. Diverse populations; APPEs should expose students to special populations of patients including geriatrics, paediatrics, women's health, and socioeconomic aspects
3. Inter-professional experiences; APPEs should expose students to different members of the health care team in a hospital setting including nurses, physicians, pharmacists, and other healthcare professionals

4. APPE duration; each APPE should consist of a minimum of 160 hours of focused direct patient care
5. Timing; APPEs should follow the students passing prior Introductory Pharmacy Practice Experiences (IPPEs) in order to obtain a proper background to maximise the benefit of APPEs

[ACPE, 2015]

The University of Petra (UOP) pharmacy degree programme is certified by ACPE using the Certification Quality Criteria (QC) (University of Petra, n.d.). The Certification QC are applied globally in the context of different countries and degree programmes. The QC are, by design, not as specific and detailed as the ACPE accreditation standards; which were designed to be applicable to only Pharm.D. programmes in the USA. It was, however, UOP's objective to meet the expectations of the Pharm.D. accreditation standards for APPEs when designing its practice experiences for this pilot.

The aim of this study is to describe this new programme designed at UOP because the B.Sc. of Pharmacy curricula do not focus on this type of clinical training in Jordan. Moreover, the authors also aimed to measure student perceptions of this pilot programme to investigate its acceptability and expandability.

Methods

A pilot training programme was designed by the UOP and implemented in cooperation with Al-Basheer Hospital, one of the largest governmental hospitals in Jordan.

This training pilot started with a three hour session at the inpatient pharmacy in which students were introduced to the standard and daily inpatient pharmacy operations. This was followed by a concentrated and intensive clinical training in internal medicines, paediatrics, orthopaedics, and critical care departments.

The study was supervised by a clinical pharmacy faculty member of UO, who served as an internal preceptor, in addition to a team of external preceptors, who also operated under direct supervision of the pharmacy department director at Al-Basheer Hospital. Both internal and external preceptors accompanied the students during the entire pilot trial facilitating different aspects of clinical training. This study started in July and finished in September 2019. Students participated in the clinical training three days a week. They spent eight hours a day for the first two days in medical wards and four hours a day for the third day participating in oral case discussions

for a period of eight weeks (totalling 160 hours). The study population included 35 students from the UOP pharmacy school who were in their fifth year. The students had to have completed the Clinical Pharmacy I module to be included in the study.

Pre-clinical training and orientation

Students attended two orientation sessions; one extensive orientation at the campus at the Faculty of Pharmacy and Medical Sciences (FPMS) UOP, and the other at Al-Basheer Hospital, before starting the study. The orientation at the UOP campus aimed to prepare students through a detailed workshop on case preparation, medical file components, inter-professional communication skills, and patient interview skills. The orientation at Al-Basheer Hospital included ensuring patient privacy, introduction to hospital departments, and general safety precautions. All students were required to take essential vaccinations if not already taken, and to provide proof of vaccinations as per hospital policy.

Inpatient pharmacy training session

This was a three hour session at the inpatient pharmacy. Students were introduced to prescription filling, common medication errors, sterile medication preparation, and other things related to the operation system in the hospital.

Clinical training

The clinical training had three core stages described below:

Stage-1: Case selection and patient profiling

Students were allocated to several nursing stations and were allowed to divide into teams of three to four and then choose a medical case taking into consideration the medical condition, medications, and availability of laboratory information. Students then consulted with different resources to create their patient profile. These resources included talking with the attending physician and conducting patient interviews if necessary, collecting laboratory test results and physician notes found physically in patients' medical files and virtually on the Hakeem computerised patient filing system. Students also participated in physician medical rounds and medication related discussions.

Stage-2 Identifying treatment related problems

After selecting medical cases, patient profiling, and data collection, students started to identify treatment related problems focusing on proper medical indication, effectiveness, safety, and patient adherence. Problems in medication effectiveness and safety were commonly encountered.

One of the common problems was related to the dosing of medications, especially antibiotics. Other common problems were over prescribing of antibiotics without indication or selecting the strongest newest generation from the list of medications that are active against the bacteria of interest, which can contribute to resistance. Moreover, medication monitoring frequency for drugs such as for warfarin, digoxin and over prescription of proton pump inhibitors were also noted as medication related problems.

Stage-3 Formulating pharmaceutical care plans

Students were asked to put together a pharmaceutical care plan taking into consideration each medical condition, therapeutic targets, treatment related problems, evidence based detailed non-pharmacological and pharmacological recommendations, and monitoring/ follow-up parameters.

Implementation of students' pharmaceutical care plans took place through arrangements with preceptors; clinical pharmacists would be notified, and proper physician interventions would take place in management changing treatment related problems.

Pharmacotherapy resources used by students

Students utilised several resources and databases to accurately identify treatment related problems, create detailed pharmaceutical care plans, and prepare for their evaluation. Resources included treatment guidelines such as the American College of Cardiology, American Heart Association, and American Diabetes Association Practice Guidelines. Furthermore, drug information handbooks were used to retrieve accurate and updated information about dosage regimens and medication monitoring parameters such as Lexi-Comp Drug Information Handbook (Lexi-Drugs, n.d.). Drug-drug interaction databases were consulted to identify effectiveness and safety related drug-drug interactions and interventions possibilities; an example of a database used is the one provided by www.drugs.com (Drugs.com | Find Drugs & Conditions, 2021).

Student Evaluation

Students were evaluated on a daily basis in the form of daily discussions, assignments, and homework. In addition, students had a weekly formal evaluation; each group met the internal preceptor to present their case and discuss medical knowledge, treatment related problems, and specific recommendations included in their pharmaceutical care plans. Accordingly, their weekly assessments combined with their final exam in open-book format were used to give students their final evaluations and grades.

Measurement instruments

A questionnaire was designed to assess the students' satisfaction of the different aspects of the training programme. The questionnaire contained five sections. The first section consisted of students' evaluation of the pre-training orientation part of the programme; The second section consisted of students' evaluation of the clinical training part; the third section consisted of students' assessment of the training site; the fourth section consisted of students' evaluation of their preceptor; the fifth section consisted of student's evaluations of their own skills and knowledge after taking part in this training. The questionnaire parts are represented in Tables I-V below. The answers of the questionnaire were reported on a 5-point Likert scale (strongly disagree, disagree, neutral, agree, strongly agree). Some answers were also reported as (very low, low, neutral, high, very high). The answers were then merged into three categories (disagree, neutral, agree) or (low, neutral, high).

The questionnaire was developed by the clinical faculty at the time of the study, questions were put through brainstorming and based on the expected student experiences during the training. The questionnaire was distributed electronically (using the google form free service) after the training was finished (in September 2019) to the students who participated in the training. Data was collected and analysed using MS Excel software

The authors also collected qualitative data in the form of student testimonials, describing their experiences in their own words.

Results

A total of 25 students out of 35 who participated in training completed the questionnaire. In general, the majority of students were highly satisfied with their experience. Details of answers on each section of the questionnaire are presented below. Appendix 1 includes student testimonials translated from Arabic.

1: Pre-training orientation assessment

As illustrated in Table I, A total of 84.6% of students understood the objectives of the clinical training experience prior to beginning in hospital rotations. Furthermore, students agreed that information regarding patient privacy, health and safety were given clearly during induction courses. Also, 92.0% of students felt that orientation conducted at UOP adequately prepared them for the clinical training and overall learning experience (Table I).

Table I: Pre-training orientation assessment of participants (n = 25)

Questions	N(%)
I understood the objectives of this clinical training experience prior to beginning	
Disagree	1 (3.8)
Neutral	3 (11.6)
Agree	22 (84.6)
Information regarding patient privacy, health and safety were given clearly during induction course	
Disagree	1 (4.0)
Neutral	2 (8.0)
Agree	22 (88.0)
I feel that orientation conducted in UOP adequately prepared me for the clinical training	
Disagree	1 (4.0)
Neutral	1 (4.0)
Agree	23 (92.0)

2: Clinical training programme assessment

As illustrated in Table II, significant number of students, felt that the clinical training programme objectives were clear and agreed that knowledge resources and databases needed for case preparation were available to them. The majority of students felt that they were given opportunities to observe the clinical pharmacist role in essential services at the hospital. Moreover, 84.0% of students agreed that they were given opportunities to observe the clinical pharmacist while interacting with physicians and

patients. Additionally, students felt they were given a chance to communicate with patients, staff, and other healthcare professionals. Most students also agreed that they were given the opportunity to participate in medical rounds and that their formal weekly case evaluation was useful in increasing their clinical pharmacy skills. Students agreed that the number of hours required for the learning experience was appropriate. The majority of students agreed to recommend this clinical training to their student peers (Table II).

Table II: Clinical training assessment of participants (n = 25)

Questions	N(%)
Were the course objectives clear?	
Disagree	2 (8.0)
Neutral	2 (8.0)
Agree	21 (84.0)
Knowledge resources and databases needed for case preparation were available to me	
Disagree	1 (4.0)
Neutral	1 (4.0)
Agree	23 (92.0)
I was given opportunities to observe the clinical pharmacist role in essential services in a hospital setting	
Disagree	1 (4.0)
Neutral	2 (8.0)
Agree	22 (88.0)
I was given opportunities to observe the clinical pharmacist interact with physicians and patients	
Disagree	1 (4.0)
Neutral	3 (12.0)
Agree	21 (84.0)
I was given opportunities to communicate with patients, staff, and other healthcare professionals	
Disagree	1 (4.0)
Neutral	2 (8.0)
Agree	22 (88.0)
I was given opportunities to participate in medical rounds	
Disagree	1 (4.0)
Neutral	2 (8.0)
Agree	22 (88.0)
Formal weekly case evaluation was useful in increasing my clinical pharmacy skills	
Disagree	1 (4.0)
Neutral	2 (8.0)
Agree	22 (88.0)
I feel that the number of hours required for the learning experience was appropriate	
Disagree	1 (4.0)
Neutral	1 (4.0)
Agree	23 (92.0)
I recommend this clinical training for other students	
Disagree	1 (4.0)
Neutral	1 (4.0)
Agree	23 (92.0)

3: Hospital site assessment

As shown in Table III, a significant number of students felt that orientation conducted in Al-Basheer Hospital adequately prepared them for the clinical training. A majority of students thought that hospital resources needed for case preparation were available to them. Meanwhile, 92.0% of students agreed that areas designated for group discussions and meetings were made available when requested. In contrast, students were dissatisfied with the transportation; when students were asked if transportation methods were satisfactory; 40.0% disagreed, 24.0% were neutral and 36.0% agreed. When students were asked how they would rate the skills of the medical staff, a large number of students rated the skills of the staff as high (Table III).

4: Preceptor assessment

As represented in Table IV, most students felt that the preceptor’s assessment of their performances were fair. Also, students found that the daily case evaluation by the preceptor was useful for their overall understanding of the case. Students felt that the preceptor was available to them and able to answer their questions. A majority agreed that the preceptor was effective in communicating

Table III: Hospital site assessment of participants (n = 25)

Questions	N(%)
I feel that orientation conducted in Al-Basheer Hospital adequately prepared me for the clinical training.	
Disagree	1 (4.0)
Neutral	3 (12.0)
Agree	21 (84.0)
Hospital resources needed for case preparation were available to me	
Disagree	1 (4.0)
Neutral	2 (8.0)
Agree	22 (88.0)
Areas designated for group discussions and meetings were made available when requested	
Disagree	1 (4.0)
Neutral	1 (4.0)
Agree	23 (92.0)
The transportation methods were satisfactory.	
Disagree	10 (40.0)
Neutral	6 (24.0)
Agree	9 (36.0)
How would you rate the skills of the medical staff?	
Low	0 (0.0)
Neutral	2 (8.0)
High	23 (92.0)

the content of the course, had high knowledge and competence, and able to determine goals and priorities (Table IV).

5: Students' assessment of their knowledge and skills

As demonstrated in Table V, students agreed that they had a deeper understanding of the concept of pharmaceutical care after this clinical training. Also, they agreed they were able to apply the information they learned in the theoretical courses to this clinical learning experience. Students (92.0%) rated their pharmacotherapy planning skills after finishing the training and their skills in presenting clinical cases as high. Furthermore, students suggested that they recognised the desired outcomes of drug therapy of the selected diseases. Also, they appreciated the value of collecting and interpreting information from practice treatment guidelines. More-

Table IV: Participants preceptor assessment (n = 25)

Questions	N(%)
I feel that the preceptor's assessment of my performance on the objectives was fair	
Disagree	1 (4.0)
Neutral	1 (4.0)
Agree	23 (92.0)
Daily case evaluation by the preceptor was useful for my overall understanding of the case	
Disagree	1 (4.0)
Neutral	2 (8.0)
Agree	22 (88.0)
I feel that the preceptor was available to me and able to answer my questions	
Disagree	1 (4.0)
Neutral	2 (8.0)
Agree	22 (88.0)
The preceptor was effective in communicating the content of the course?	
Disagree	0 (0.0)
Neutral	0 (0.0)
Agree	25 (100)
How would you rate the preceptor knowledge and competence?	
Low	0 (0.0)
Neutral	1 (4.0)
High	24 (96.0)
How would you rate the preceptor ability to determine goals and priorities?	
Low	0 (0.0)
Neutral	0 (0.0)
High	25 (100)

over, students felt that their knowledge or skills have improved by taking the course (Table V).

Discussion

Pharmacy practice has been changing for over three decades in the developed world. With an additional focus on pharmaceutical care and patient care (Benrimoj, & Roberts, 2005; Christensen & Farris, 2006; Fang et al., 2013; Hogue et al., 2006; Koga, & Nishimura, 2017; Nagai, 2003; Pittenger et al., 2016; Saavedra-Mitjans et al., 2018;

Table V: Student's knowledge and skills assessment (n = 25)

Questions	N(%)
I have a deeper understanding of the concept of pharmaceutical care after completing this clinical training	
Disagree	1 (4.0)
Neutral	1 (4.0)
Agree	23 (92.0)
I was able to apply the information I learned in the theoretical courses to this clinical learning experience	
Disagree	1 (4.0)
Neutral	0 (0.0)
Agree	24 (96.0)
How would you rate your pharmacotherapy planning skills after finishing this course?	
Low	0 (0.0)
Neutral	2 (8.0)
High	23 (92.0)
How would you rate your skills in presenting clinical cases?	
Disagree	0 (0.0)
Neutral	2 (8.0)
Agree	23 (92.0)
Do you recognize the desired outcomes of drug therapy of the selected diseases?	
Disagree	1 (4.0)
Neutral	2 (8.0)
Agree	22 (88.0)
How would you rate your skills in collecting and interpreting information from practice treatment guidelines after this clinical training?	
Low	0 (0.0)
Neutral	3 (12.0)
High	22 (88.0)
Do you feel that your knowledge or skills have improved by taking the course?	
Disagree	2 (8.0)
Neutral	2 (8.0)
Agree	21 (84.0)

Westerlund, & Bjork, 2006). In Jordan, there have been changes in curriculums, with the addition of the Pharm.D. degree in 2000 (Al-Wazaiy *et al.*, 2006). However, practice hasn't changed much (Al-azzam *et al.*, 2013). Pharmaceutical care has been included in teaching curriculums without highly bridging theory to practice. Although the Pharm.D. programme has been running in Jordan, there is a lack of appreciation for the newer clinical role of pharmacists by many health care individuals including physicians (Al-azzam *et al.*, 2013).

The degree programme of FPMS at the UOP is certified by the ACPE. With the accreditation bodies such as the ACPE having a large role in improving the education process, and with the shift towards a more patient centred care, a need to improve clinical pharmacy training programmes has emerged in pharmacy academia (ACPE, 2015). In order to meet this need, we have designed and implemented a clinical pharmacy hospital training programme in UOP, FPMS. It offers a B.Sc. degree in Pharmacy in Jordan. To the authors knowledge, this is the first clinical pharmacy hospital training in a B.Sc. degree programme that is designed to meet the ACPE Certification Quality Criteria for pharmacy practice experiences as an APPE.

Initially, this programme was designed to meet the requirements of the ACPE Pharmacy Accreditation Standards, as part of wide changes to the curriculum at the Faculty of Pharmacy, UOP, but as the authors see it, this is a step to move the pharmacy profession further in developing countries like Jordan through improving pharmacy education. The proportion of courses geared towards pharmaceutical care in pharmacy programs in Jordan has increased from 20.0% in 2008 to 50.0% in 2016, but this was mainly implemented in the Jordan University of Science and Technology and the University of Jordan (the only two schools that offer Pharm.D. programmes) (Alef, & Alsmadi, 2017). Before the introduction of Pharm.D. programmes, there have been sporadic non-standardised patient focused, hospital-based training, mainly in the governmental universities for the B.Sc. degree of pharmacy, which was gradually minimised and refocused to Pharm.D. students. Our clinical training programme aims to teach students how to apply the principles of pharmaceutical care in a hospital setting. It includes many of the pillars that define pharmaceutical care, with a high focus on identifying potential or actual treatment related problems in the major areas of drug indication, effectiveness, safety and patient adherence.

The programme discussed was also designed to include inter-professional interaction, patient interviewing and assessment skills. The students were also taught to consult

with multiple evidence-based medicine and drug information databases. The overall impression and assessment of this programme by the students was highly positive. Also, from student's testimonials it was evident that this programme helped students understand the essence of pharmaceutical care practice and recognise their professional role.

Another strength of this programme is the training site. The programme was conducted in a major public hospital that serves a diverse patient population including geriatric, paediatric, surgery, critical care, and emergency care. In addition to being a training site for other healthcare professions including medicine, nutrition, nursing, and physical therapy, Al-Basheer Hospital has established policies and procedures and strong pharmacy input in overall medication management. This allows students to be exposed to these patient populations in a collaborative environment where there are set rules and policies.

Over 80.0% of students were satisfied with the training site (Al-Basheer Hospital) in terms of resources available for students, orientation conducted in the hospital site, areas designated for group discussions and meetings. The main challenge students encountered was transportation to the practice site.

Future recommendations for the improvement of the programme include expansion to several hospitals either within governmental, private, and/or military hospitals. There is also a need to hire and provide continuous training for preceptors both internal and external. Logistics including transportations and meeting rooms within the training site need to be arranged meticulously to help students focus on the programme, rather than being distracted by minor issues.

Limitations

Programme implementation limitations: there were difficulties with finding the right hospital for this training, this type of training requires a separate budget that many schools of pharmacy may not have or will need approval to provide. Further development will be needed to collaborate with the Jordanian Pharmaceutical Association to implement legislation for clinical training.

This study didn't have a formal pre/post evaluation of certain knowledge areas although the authors carried out evaluations during and towards the end of this training programme. In addition study changes in learning outcomes in other related courses weren't assessed by the authors. Moreover, due to having a relatively small sample

size and the fact that not all student filled out questionnaires (25 out of 35) there is a possibility that the more motivated students were more likely the ones who responded to the post-experience survey.

Conclusion

ThisThe authors have demonstrated that it is feasible and desirable to train B.Sc. Pharmacy students on skills required to practice pharmaceutical care in a hospital-based environment. This was however a pilot study to establish a newly designed hospital training programme. Therefore, future larger sample size study need to be done once this training experience expands to the larger number of students enrolled. Students reported positive perceptions regarding the clinical training sites and the staff. They also reported improvement in their clinical and practical skills. This study indicates that this kind of training is successful and can be implemented in other universities.

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Conflict of interest

The authors declare no conflict of interest in this work.

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Appendix 1

Student Testimonials examples

1: 'During this summer's training session at the Al-Basheer hospital I gained a treasured experience that gave me a new prospective of my field of study. Firstly, I was able to work on and improve my communication skills not only with the patients, but also with the entire medical team, which includes: doctors, nurses and pharmacist. To my surprise, the patients were willing to talk in length about every aspect of their medical condition. I also gained invaluable understanding of how the entire medical team operates together, through observing the interaction between the different medical practitioners. Secondly, I was able to put together all the knowledge and different tools that I have acquired during my years of study at University of Petra in an effort to apply them to a real-life situation. Moreover, this experience gave me exposure to new medical resources that will stay with me forever. Thirdly, participating in medical rounds with Doctors gave me insight into the processes of diagnosis, monitoring and treatment. I had a few discussions with doctors during the rounds, about certain medical cases which further assured me that the knowledge that I have amassed during my years of study was applicable and extremely useful in the hospital setting. In the end, through this training session I was able to achieve such a valuable experience that cannot be replicated in class'.

2: 'Taking this course was probably the best decision I ever made during my school years, it changed my perspective regarding Clinical Pharmacy, as I can practice not only clinical knowledge but also communication skills with patients and medical staff in general, it taught me how to use my basic knowledge in anatomy and physiology and integrate them with pharmaceutical care planning for patients'.

3: 'Before starting the training I was a bit scared of the idea and I thought it was going to be a big responsibility and commitment since we were dealing with serious and real cases for the first time but when I started the training everything was different, everyone was so reassuring and helpful and the team was great. I highly recommend every

student to be involved in the training because the practice adds a lot to our literature knowledge especially that people tend to have a practical memory and learn a lot by performing rather than reading'.

4: 'I was so lucky to be one of the first students to attend this course, science it taught me how to figure out drug therapy problems and to understand the real role of clinical pharmacist and how he can be part of the medical team'.

5: 'It was Amazing experience since I had opportunities to communicate with patients also, I understand how important the interaction between clinical pharmacist and physicians'.