



Original article

Establishing competency based internship program through participatory action research in a private pharmacy college in the Eastern Province of Saudi Arabia

Luma Ameer^{a,*}, Nousheen Aslam^a, Sherihan Ghosn^a, Jenan Al-Matouq^b, Zahra Al-Mousa^a, Safyah Alasfour^a, Manal Suroor^a, Yousif Hassan Amin^a

^a Pharmacy Department, Mohammed Al-Mana College for Medical Sciences, Dammam 34222, Saudi Arabia

^b Department of Medical Laboratory Sciences, Mohammed Al-Mana College for Medical Sciences, Dammam 34222, Saudi Arabia

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ABSTRACT

Objectives: To use Participatory Action Research (PAR) methodology to develop a competency-based training (CBT) program for Bachelor of Pharmacy interns at Mohammed Al-Mana College for Medical Sciences (MACHS), Dammam, Saudi Arabia, based on the International Pharmaceutical Federation (FIP) Global Competency Framework.

Methods: The MACHS Pharmacy Department Training Unit developed a competency-based training (CBT) framework over 6 cohorts of interns based on the FIP Global Competency Framework using the Participatory Action Research (PAR) methodology. Assignments were set throughout the training period to support competency development. Assessment methods used for the evaluation included student portfolio, site preceptor evaluation and the college-based assessments. End of training and baseline results were compared to determine the effectiveness of CBT in terms of improvement of skills. Problems were identified and action plans developed, to be implemented on the following cohort. Successful completion of CBT required a total score of 80%. The students who could not pass the assessment were given a chance to improve their weak competencies and retake the assessment.

Results: Since its implementation, five cohorts have been trained through CBT. Only 12% of interns passed the training in first attempt in the first cohort. This passing percentage dramatically increased to 75–100% in the consecutive cohorts where students scored better in the portfolio, and site preceptor evaluation as compared to the college-based assessment. Students' feedback towards the assignments was positive.

Conclusion: Participatory Action Research was found to be an effective approach towards developing a competency-based training program for Pharmacy interns. More FIP competencies and evaluation strategies will be added to the internship program in the future. Furthermore, a national approach towards implementation of CBT should be used to ensure the uniformity of competency of pharmacists across the kingdom.

1. Introduction

1.1. Background

With an increasing number of pharmacy graduates, it is paramount that the training systems in place prepare the graduates to work independently as pharmacists, and without supervision (Ni Sheachnasaigh, 2022). It is widely recognized that internships can be greatly beneficial

for graduating students (interns), as a transitional experience from university to a work environment allowing students to transfer their classroom-based learning, to workplace-based practice. Thus, a key objective of internship is the development of professional competencies in a supervised environment (Saucier et al., 2012). However, there is no international consensus on what pharmacy internship should entail, which in some cases may lead to interns being allocated menial, or irrelevant tasks (Carl et al., 2014).

* Corresponding author.

E-mail addresses: L.ameer@machs.edu.sa (L. Ameer), N.Hamid@machs.edu.sa (N. Aslam), SherihanG@machs.edu.sa (S. Ghosn), JenanA@machs.edu.sa (J. Al-Matouq), SafyahM@machs.edu.sa (S. Alasfour), imanalS@machs.edu.sa (M. Suroor), YousifA@machs.edu.sa (Y.H. Amin).

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Competencies are assessable “observable components of knowledge, skills, attitudes, and values” which can be measured (McMullen et al. 2023). Competency frameworks are a structured collection of competencies, which together demonstrate the capability of a practitioner (McMullen et al. 2023). In 2012, the International Pharmaceutical Federation (FIP) developed a global pharmacist competency-based framework (GBCF) as a benchmark to which early career pharmacists (those with less than 5 years’ experience) should meet (International Pharmaceutical Federation 2012). This framework was recently revised in 2020 and Global Pharmacist Competency-based Framework version 2 (GBCF V2) was developed. The GBCF V2 is composed of 124 competencies, which fall within 23 competency domains, and within 4 broad competency clusters. GBCF V2 was combined with developmental goals, and released by the FIP, to facilitate a needs-based assessment, and development of a pharmacy workforce (International Pharmaceutical Federation, 2020).

Competency based training (CBT) has been implemented in the medical profession for many years and is now increasingly being used in the pharmacy field. This has been illustrated by Center for the Advancement of Pharmacy Education in the United States of America; the National Competency Framework for pharmacists in Australia; and the Standards for the Initial Education and Training for Pharmacists in Great Britain (Croft et al., 2019). A systematic review conducted by Udoh et al. (2021) assessed the development, validity, and applicability of Pharmacy related frameworks and concluded that there are notable differences between the different frameworks and emphasized the need for unification (Udoh et al., 2021). At present there is no uniformly accepted internationally recognized mechanism for the registration of pharmacists, due to diverse practices being implemented depending on the regulatory bodies in different countries. For instance, in New Zealand, and Ireland, students are required to undertake Objective Structured Clinical Examination (OSCE) assessments including roleplays, and patient counselling in order to ensure competence, but this is not a requirement in other countries (Ni Sheachnasaigh, 2022, Udoh et al., 2021).

In Saudi Arabia, both the Doctor of Pharmacy (Pharm D) and the Bachelor of Pharmacy (BSc) degrees are available. Students are required to complete internship training by the end of their program of graduation, followed by a Saudi Commission for Health Specialties (SCFHS) Pharmacy Licensing Exam before they are eligible to practice as healthcare practitioners.

Mohammed Al-Mana College for Medical Sciences (MACHS) (<https://www.machs.edu.sa>) is a private higher education institute located in the Eastern Province of Saudi Arabia, which specializes in healthcare education. Department of Pharmacy at MACHS delivers a five-year Bachelor (BSc) of Pharmacy program through a well-established curriculum that offers its students a wide range of courses to help them prepare for pharmacy internship.

In 2020 Mohammed Al-Mana College for Medical Sciences (MACHS) (www.machs.edu.sa) sought to introduce Competency-Based Training for the interns of the five year Bachelor of Pharmacy program to produce more competent entry level pharmacists in line with Saudi Vision 2030 Healthcare Transformation Program. Internship was initiated as a four-month hospital based training program, where interns’ duties are rotated between inpatient and outpatient pharmacy for similar time duration. Despite having a 100 % pass rate in internship, many problems were highlighted in interviews with departmental faculty, internship supervisors, and students (interns) themselves during internship (Table 1).

Unstructured training with little follow up leads to entry level pharmacists who feel unprepared to practice independently (Ameer et al., 2016). The newly formed MACHS Pharmacy Training Unit (PTU) suggested a gradual overhaul of the Internship program by implementing competency-based training (CBT), mapped against the FIP competency framework (focusing on Cluster 2, Pharmaceutical Care, and cluster 4, Professional and personal). The Participatory Action Research

Table 1

Problems identified in internship program in 2020.

| Faculty identified problems | Site (Hospital) Preceptors identified problems | Interns identified problems |
|--|---|--|
| <ul style="list-style-type: none"> No clear criteria for college-based internship oral assessments Short training period Students expect to be “taught” and are passive about self-development Significant delays in hospital-based evaluation of students | <ul style="list-style-type: none"> High levels of absenteeism Tardiness Poor communication skills Poor knowledge of medication and calculations Poor researching skills Too many students in each training site | <ul style="list-style-type: none"> Insufficient structure to training Lack of supervision and training Insufficient training sites No allocated supervisor |

(PAR) research approach was used to sequentially improve the training program (Saramunee, 2022, Morales, 2019).

The Pharmacy Internship at MACHS is undertaken after completion of all taught courses. Internship entails 640 h of training over a 4 month period, including 2 months in inpatient, and 2 months in outpatient.

The CBT programs have shown to have many advantages for students, as well as the education facility, because it can highlight areas in the course which are meeting the course learning outcomes, or which may require revision (Croft et al., 2019). Within Saudi Arabia, the CBT approach is increasingly being explored, and implemented with Medical Students (Naji et al., 2017).

Participatory action research (PAR) is a multiphase research approach, where the stakeholder or researcher is engaged in all steps of the research process which consists of a “cycle” involving 4 stages, namely problem identification, planning, action, and evaluation, then repeated spirally (Saramunee 2022). This form of research has been used extensively in educational internships such as teacher training. It is less common in healthcare internships, although this approach was used by Saucier et al. (2012) in an exploratory study of core competency development through supervision in a family medicine residency (Saucier et al., 2012).

1.2. Objectives

As mentioned earlier, the department of Pharmacy at MACHS provides its students with a wide range of courses to prepare them for internships. The internship aims to develop professionals, competent in pharmacy practice. The study, therefore, aimed to use the Participatory Action Research (PAR) methodology to develop a competency-based pharmacy internship program that is based on the FIP global framework.

2. Methods

2.1. Study design

The study was conducted by the Pharmacy Training Unit (PTU) steering group (consisting of 5 Clinical Pharmacy Practice academic staff) at MACHS, using a PAR method. Before starting the internship (including inpatient and outpatient settings), different competencies were selected for implementation and were mapped against the GBCF V2. The action research cycle was composed of identification of problems during internship followed by action planning and implementation, and finally the evaluation of actions plans. Each cycle ended up with evaluation and led to the next cycle of action research for 6 consecutive cohorts that have been included in this study as mentioned in Table 2.

2.2. Competencies assessment methods

The Competency Assessments were defined as follow:

Table 2
Training dates for cohorts 1–6.

| Cohort | Training dates |
|--------|---|
| 1 | 7th February- 4th May 2021 |
| 2 | 4th July- 21st August 2021 |
| 3 | 17th October 2021- 4th January 2022 |
| 4 | 6th February 2022- 26th May 2022 |
| 5 | 1st August- 17th November 2022 |
| 6 | 1st February 2023 – current (at time of submission) |

Verification of Order: The pharmacist prospectively reviews and assesses each medication order for appropriateness before medication preparation, and administration to the patient.

Final check: The pharmacist checks the prepared item relating to quantity, strength, expiry date, or dose. This is the last step in the dispensing process before the patient's medication is handed out. (Dupree et al., 2022).

Communication with a physician: The pharmacist contacts the physician if an error is identified on an order, and recommendations are made on how therapy can be modified.

To pass training, the interns were required to score 80 % or more overall in the final site evaluations and college assessments. Interns were also required to prepare a student's portfolio as evidence showing what they have achieved in internship.

A checklist of required competencies that should be demonstrated by the interns and followed-up by the college preceptors was prepared and made available in the training manual for the interns. This checklist also improved the "student's self-reflection"- an essential FIP competency. Consequently, three different assessment methods were used for core competencies assessment, in the form of triangulation. These assessment methods included college assessments, hospital evaluation, and the student's portfolio. The selection of these assessment methods was also aligned with the curriculum design and assessment manual of MACHS as shown in Table 3.

Table 4 shows the steps which were followed across these 6 cohorts. Newly introduced competencies were aligned with the GBCF V2, (see notes below Table 4).

2.3. Implementing the action research cycles

Table 3
College Assessment alignment with FIP competencies.

| Domains | FIP Competency | College Assessment Methods |
|---|---|----------------------------------|
| Pharmaceutical Care (Compounding medicines) | 2.2.1: Prepare pharmaceutical medicines (e.g. extemporaneous, cytotoxic medicines), determine the requirements for preparation (calculations, appropriate formulation, procedures, raw materials, equipment etc.) | Calculations |
| Pharmaceutical Care (Dispensing) | 2.3.5: Document and act upon dispensing errors | Final check of dispensed item |
| Professional/Personal (Communication skills) | 4.1.2: Communicate effectively with health and social care staff, support staff, patients, carer, family relatives and clients/customers, using lay terms and checking understanding | Communication OSCE |
| Professional/Personal (Continuing Professional Development (CPD)) | 4.2.3: Evaluate accuracy of knowledge and skills | Multiple Choice Questions (MCQs) |

3. Results

3.1. Cycles

Over a period of 2 years, 5 cohorts undertook the training (with cohort 6 currently engaged in internship). One hundred and fifty-six (156) interns have successfully completed training. Over the 5 cohorts, six action research cycles were used, and 17 actions were implemented to improve the training program (Table 4), which currently assesses 14 competencies in the FIP framework. The student results across all six cohorts are summarized in Table 5.

Twelve percent (12 %) of cohort 1 interns passed the internship in the first attempt. The causes of low pass rate were identified to be poor intern engagement; insufficient hospital preceptor guidance; and ambiguous policies from the pharmacy training unit. The high failure rate led to dramatic changes in the college approach to training, implemented for cohort 2. Practice calculation, verification of order assignments (newly added competency,) and more cognitive multiple-choice questions (MCQs) were posted on google classroom, with other assignments to scaffold student learning, along with the mid training assessments, to highlight areas of weakness. New training sites were also added to the already available sites to students providing more robust training opportunities to the included interns. The first attempt passing rate increased to 87 % in cohort 2.

A baseline assessment was implemented in cohort 3 following the notable improvement in cohort 2. Early in the training, hospital preceptor feedback showed that many interns were not proactively engaged in training, undertaking only minimal operational tasks such as medication preparation. This cohort (cohort 3) was unique in a way that many of the interns opted for a 4 month break before starting the internship. We may assume that it possibly led to less motivation and enthusiasm among these interns when they started their training. The hospital, and college preceptors also highlighted the professionalism issues. Overall, these factors explain the drop in first attempt passing rates from 87 % (cohort 2) to 76 % in cohort 3.

Cohort 4 was more engaged in the internship, possibly due to concern about the high failure rate in the previous cohort and 100 % of interns passed in their first attempt. However, hospital preceptors identified a weakness in interns' pharmacotherapy knowledge. This assessment was added to the baseline assessments in Cohort 5.

Changes in Cohort 5 were minimal, but it was noted that students needed more practice in verification of the order, which was undertaken through a Drug Therapy Problem (DTP) workshop. The training unit debated how this competency could be more reflective of real practice, which led to the use of timed OSCE stations, for the final check, and verification of order for implementation in Cohort 6.

Figs. 2, 3 and 4 show that with the implemented changes, intern performance improved throughout internship, highlighting the benefit of the changes implemented.

3.2. Assessments

Baseline assessments were introduced in Cohort 3 onwards to identify any problems in student knowledge and skills at the beginning of training, allowing more focused college preceptor attention. Furthermore, the baseline assessments highlighted weaknesses in the undergraduate Pharmacy program, for referral to Department leadership for further action. Table 6 and Fig. 1 show improvement in baseline assessment performance, with the most notable improvements noted in cohort 6 (calculation, verification of order, pharmacological classes). This improvement was thought to be because of changes in the undergraduate courses coming to fruition, and due to the condition of attaining 50 % in baseline assessments (calculation and pharmacological classes) prior to starting. The assessment method for verification of order was changed in cohort 6 to be more reflective of real practice (open book timed OSCE) which led to an improvement in baseline marks

Table 4
Action research cycles implemented over 6 cohorts.

| Cycle | Number of interns | Problem identification (Feedback from faculty, and hospital preceptor) | Action Plan | Implementation | Evaluation |
|-------|-------------------|---|---|---|---|
| 1 | 17 | <ul style="list-style-type: none"> Unclear training criteria Student perception that everyone passes training Delayed hospital preceptor evaluation Unprofessional student behavior (tardiness, and absenteeism, poor communication skills) Poor background knowledge in medication and calculations Lack of site preceptors | <ul style="list-style-type: none"> Establish final assessment criteria, aligned with FIP framework Prepare an orientation program focusing on professionalism | <ul style="list-style-type: none"> Students were asked to collect evidence for portfolio to be assessed by faculty at the end of training Students and preceptors were informed that there will be end of training assessments Criteria and grade distribution were shared with students. | <ul style="list-style-type: none"> Twelve percent of students passed final training assessment criteria from the first time Low hospital evaluations, and college assessment marks Students very frustrated, and not engaged in the competency-based process Low calculation assessment results |
| 2 | 34 | <ul style="list-style-type: none"> Short training duration (12.5 weeks) Students' passive learners Unprofessional behavior Disengaged students Resistance to the portfolio Unclear instructions or portfolio requirements Disengaged preceptors Variability in preceptor evaluations Hospital rubric not linked to competencies measured for internship. Too many marks from the hospital preceptor Students and preceptors focus on operational tasks such as dispensing. No focus on identifying drug therapy problems. Very poor calculation skills Students unfamiliar with end of training assessments No clear policy for failed students | <ul style="list-style-type: none"> Prolonged training. Increase marks for college-based assessments. Adjust hospital evaluation to include proactive learning, professionalism ^a Orientation to focus on professionalism, given by external speakers. Increased number of training sites with more extensive services Increase weekly assignments to include verification of order examples. Include verification of order competency in college assessments ^b Portfolio checklist ^c Mock assessments needed before final Clearer policy for failed students | <ul style="list-style-type: none"> Training increased to 16 weeks. 60 % hospital evaluation, 40 % college assessments Hospital evaluation linked to competencies, include professionalism and proactive learning Orientation program changed Open more training sites Weekly assignments on therapeutic classes of medication, calculation, MCQ and verification of order example Pilot new competency (not graded) Introduce mock assessments at mid training point. | <ul style="list-style-type: none"> Eighty seven percent of students passed first time Improved preceptor evaluation of students Positive feedback from interns about assignments Calculations remains area of weakness |
| 3 | 31 | <ul style="list-style-type: none"> No way to measure intern progress from beginning to end of training Failing student policy is not clear | <ul style="list-style-type: none"> Prepare baseline assessments for next cohort Review current failing student policy | <ul style="list-style-type: none"> Implement baseline assessment | <ul style="list-style-type: none"> 74 % of students passed internship Poor baseline marks, Calculation remains area of weakness |
| 4 | 24 | <ul style="list-style-type: none"> Demotivation and poor engagement from students who had taken a 4 month break between college courses and the start of training Students showing unprofessional behavior within their college-based days, such as late arrival, inappropriate attire, apathy to college assignments and workshops Poor baseline marks for calculations, and verification of an order High failure rate linked to heavy attribution of marks to MCQ assessments which are not related to competencies directly. | <ul style="list-style-type: none"> Implementation of policy, training to start within 1 month of completing college courses Grades to include professionalism mark given by college Poor college and baseline discussed with departmental committee | <ul style="list-style-type: none"> Adjustment of content in the undergraduate programs to increase calculations (aim to improve baseline calculation marks) Recommendation to purchase the same references as those used in the hospital (Lexi) to improve student verification of order skills. Redistribution of college-based assessment marks, to decrease MCQ marks, and implement professionalism marks. | <ul style="list-style-type: none"> 100 % of students passed internship Poor baseline marks Despite a high pass rate, preceptors reported that students have little knowledge of pharmacotherapy. Students performed very well in hospital evaluation, but less well in college assessments. |
| 5 | 33 | <ul style="list-style-type: none"> No measure of student knowledge of pharmacotherapy No improvement in baseline assessments despite encouragement, and guidance Validation of order competency still not improving | <ul style="list-style-type: none"> Develop pharmacotherapy baseline assessment (in coordination with advanced level course instructors) Discuss with hospital preceptors' criteria for college assessments. Show hospital preceptors examples of college assessments, to promote consistency in marking criteria. Develop Drug Therapy Problem (DTP) workshop to reinforce student knowledge to be | <ul style="list-style-type: none"> Implement DTP workshop during mid assessments Inform upcoming cohort that they must achieve more than 50 % in the baseline assessments for training (calculation, and pharmacotherapy assessments, give practice to students (this cohort not affected) | <ul style="list-style-type: none"> 95 % of students passed first time. More students are scoring very highly in college assessments, but the average was brought down by a number of low performing students |

(continued on next page)

Table 4 (continued)

| Cycle | Number of interns | Problem identification (Feedback from faculty, and hospital preceptor) | Action Plan | Implementation | Evaluation |
|-------|-------------------|--|---|-------------------------------|------------|
| 6 | 32 | <ul style="list-style-type: none"> Baseline calculations are still low Verification of order at end of training is still not as high as anticipated. | <ul style="list-style-type: none"> implemented during midterm assessments Prepare upcoming cohort for minimal passing mark for upcoming assessments Implement minimal passing mark for calculations, and verification of order. Change format of baseline validation of order, and dispensed item accuracy check assessments to be open book OSCE stations. | Current cohort still Training | |

a. 4.2.8 Reflect on performance.

4.5.4 Prioritize work, practice punctuality and time management,

4.4.1 Respect and acknowledge the expertise, roles and responsibilities of colleagues and other health professionals.

b. 2.3.3 Appropriately validate prescriptions, ensuring that prescriptions are correctly interpreted and legal.

c. 2.4.3 Ensure appropriate medicines, route, time, dose, documentation, action, form and response for individual patients.

2.2.1 Prepare pharmaceutical medicines (e.g. extemporaneous, cytotoxic medicines), determine the requirements for preparation (calculations, appropriate formulation, procedures, raw materials, equipment etc.).

2.2.2 Compound under the good manufacturing practice for pharmaceutical (GMP) medicines.

2.3.1 Accurately dispense medicines for prescribed and/or minor ailments, including an embedded checking process.

2.3.7 Label the medicines (with the required and appropriate information).

2.4.4. Package medicines to optimize safety (ensuring appropriate re-packaging and labelling of the medicines).

Table 5

Results of all baselines, midterm, and final assessments across 6 training cohorts.

| | COHORT | 1 | 2 | 3 | 4 | 5 | 6 |
|--|-------------------------|------|------|------|-------|------|------|
| | Number of students | 12 | 34 | 31 | 14 | 33 | 32 |
| Baseline marks (%) | Pharmacological Classes | NA | NA | NA | NA | 55 | 75 |
| | MCQ | NA | NA | 45 | 45 | 34.8 | 34.8 |
| | Calculation | NA | NA | 24 | 27 | 22.6 | 54 |
| | Verification of order | NA | NA | 15 | 22.9 | 25.5 | 54 |
| | Final Check | NA | NA | NA | NA | 49.7 | 42.5 |
| MID training marks (%) | Pharmacological Classes | NA | NA | NA | NA | NA | NA |
| | MCQ | NA | 51 | 47.4 | 49.8 | 55.8 | |
| | Calculation | NA | 72 | 37.6 | 46.2 | 41.1 | |
| | OSCE | NA | 78 | 70.5 | 84.2 | 56.4 | |
| | Final Check | NA | 72 | 75 | 56.4 | 75.8 | |
| Final Assessment Marks (%) | Verification of order | NA | NA | 44 | 37.1 | 48 | |
| | Pharmacological Classes | NA | NA | NA | NA | NA | |
| | MCQ | 52 | 65 | 61 | 66.1 | 64.7 | |
| | Calculation | 42 | 77 | 59 | 65.5 | 68.2 | |
| | OSCE | 65 | 76 | 81 | 87 | 88.2 | |
| | Final Check | 57 | 76 | 71 | 76 | 85.5 | |
| | Verification of order | NA | NA | NA | 62.1 | 59.7 | |
| Portfolio | 59 | 94 | 94 | 100 | 95.2 | | |
| Professionalism | NA | NA | NA | 80.4 | 86.7 | | |
| Percentage (%) of students who passed in first attempt | | 12 % | 87 % | 74 % | 100 % | 95 % | |

NA: The assessments had not been introduced at this time.

Table 6

Changes in baseline assessments across cohorts (baseline assessments not conducted for cohorts 1 and 2).

| Cohort | 3 | 4 | 5 | 6 |
|--------------------------|----|------|------|------|
| MCQ* | 45 | 45 | 34.8 | 38 |
| Calculations* | 24 | 27 | 22.6 | 54 |
| Final Check* | NA | NA | 49.7 | 42.5 |
| Verification of order* | 15 | 22.9 | 25.5 | 54 |
| Pharmacological Classes* | NA | NA | 55 | 75 |

NA Final Check assessments not conducted at this time.

* Marks shown are the average percentages.

(from 25.5 % up to 54 %). The drop in the internal performance in the MCQ questions between cohorts 3 and 4 was due to the introduction of more practice-based questions.

At the end of internship, the students were evaluated by hospital preceptors (inpatient and outpatient) and were assessed in the college in the core competencies.

Policies: first cycle started, the grade distribution for the final assessments was as follows; 70 % hospital preceptor evaluation, 30 % college assessments (including: calculation; final check; multiple choice questions related to the hospital policies; and role play of communication with a physician).

Students scored significantly higher in hospital preceptor evaluations, compared to college assessments (Table 7), highlighting the subjective nature of preceptor evaluations. Preceptors reported feeling pressured to give high grades to avoid conflict or gave high grades to interns who completed the tasks they needed done, as opposed to the training competencies assigned to them resulting in grade inflation which led to interns passing internship, without having achieved the core skills required of a pharmacist. This was addressed through the

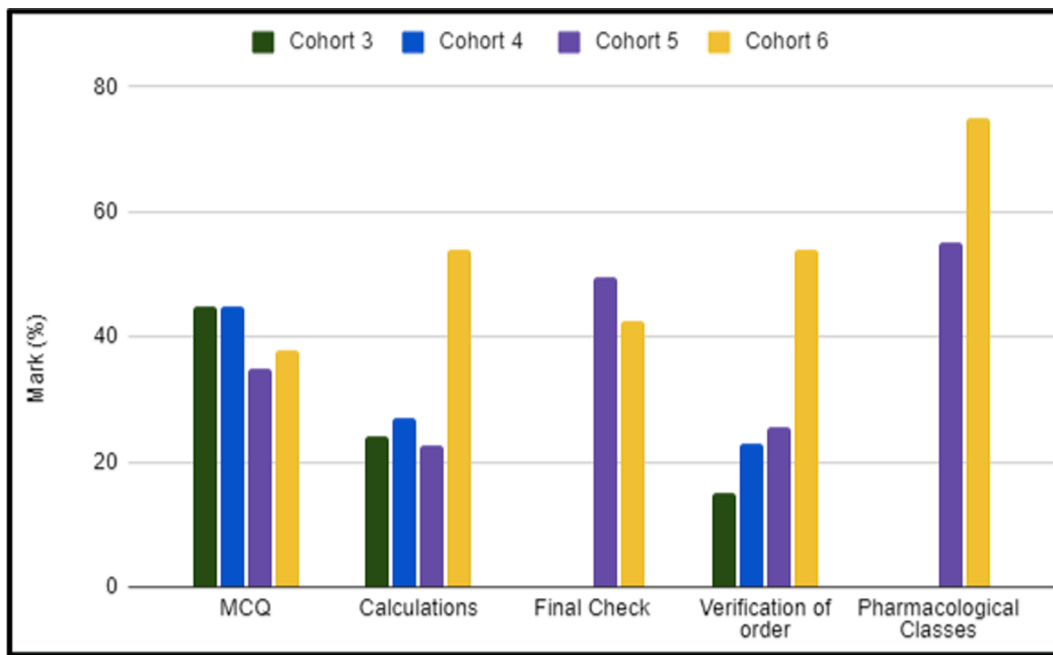


Fig. 1. Baseline assessment results in cohorts 3-6.

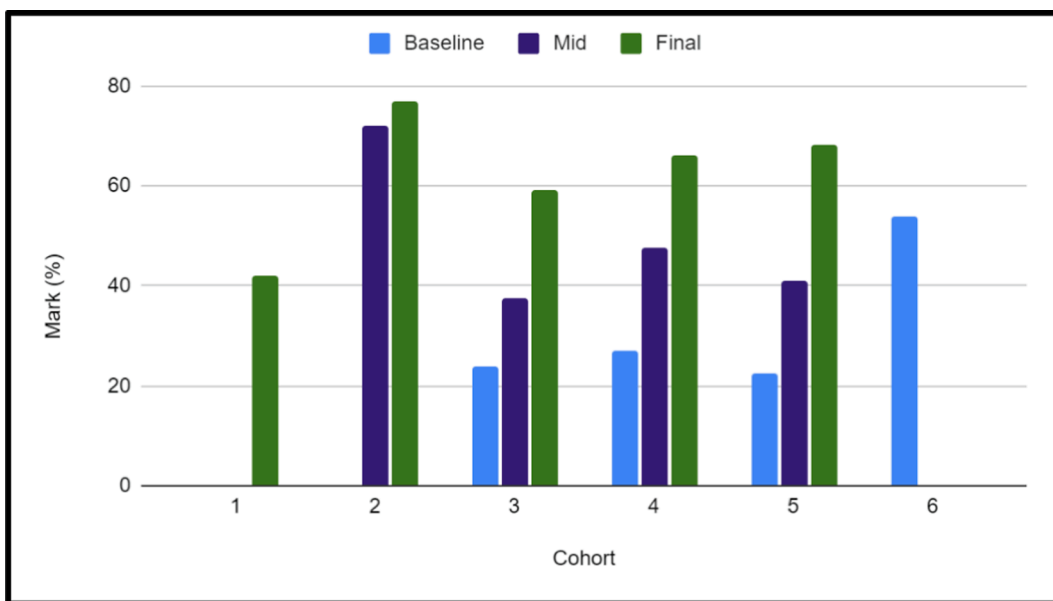


Fig. 2. Student performance in calculations assessments in baseline, mid, and final assessments (note mid assessment were introduced in cohort 2, and baseline assessments were introduced in cohort 3).

regular feedback between the college and hospital, especially when dealing with difficult, or borderline students, and the implementation of the “Preceptorship program,” a training course offered to support hospital preceptors. Grade distribution was adjusted for Cohort 2, to be 60 % for the site preceptor, and 40 % for the college assessments.

4. Discussion

The participatory action research (PAR) model was an effective tool to develop a CBT program. Comparing the program delivered to cohort 1 with that of cohort 6, it is clear that the incremental changes led to improvements in the training program, as reflected by the improved passing rates, preceptor evaluations, and college assessment marks

(Table 4 and 7).

Throughout the process, there were a number of recurrent challenges which were faced by the PTU. The first challenge was poor student engagement. It was felt that following the very high failure rate in cohort 1, students in consecutive cohorts became more engaged as reflected by the improved portfolio marks.

Differences in training sites led to interns having varied exposure to key competencies, with some sites focused on operational tasks, such as expiry date checking, and stock control rather than the required competencies of order verification and patient counselling. This continues to be an issue, but the implementation of assignments to support intern development in cohort 2 proved to be a valuable intervention, giving students some exposure to cognitive pharmacist tasks. The use of

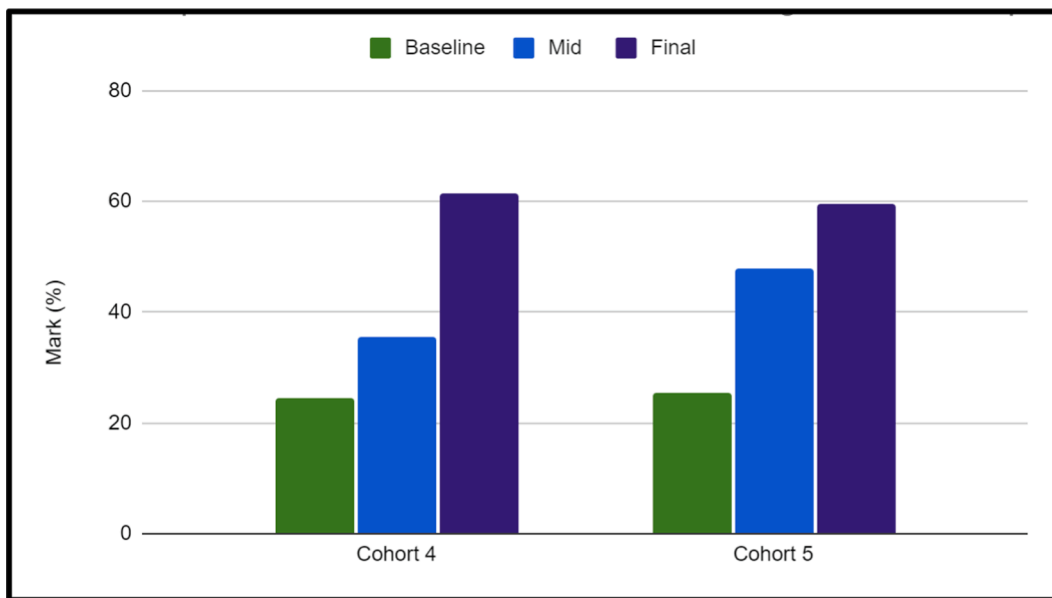


Fig. 3. Intern improvement in marks for verification of order in cohorts 4 and 5.

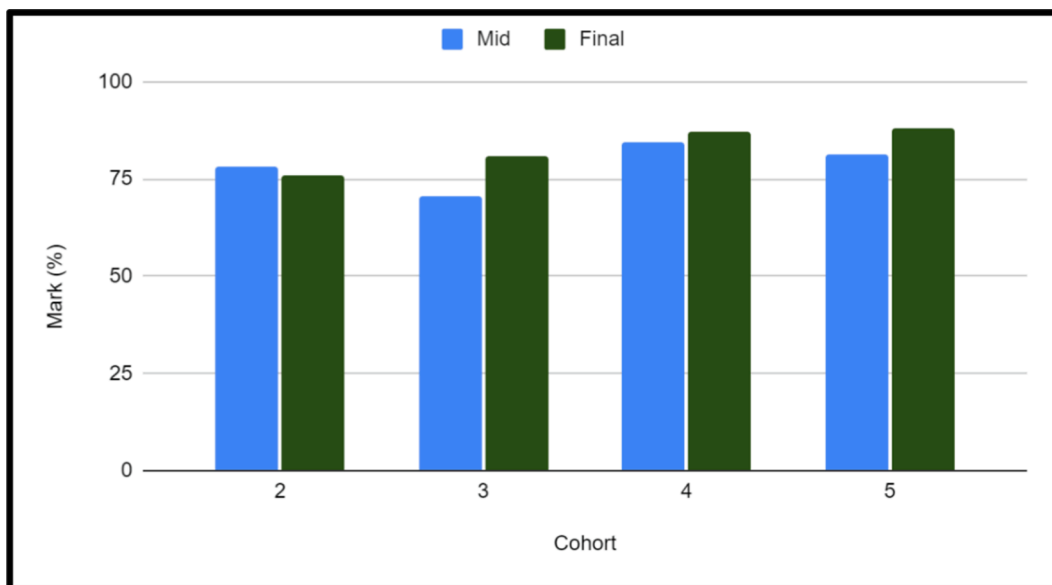


Fig. 4. Student performance in communication with a physician assessment.

Table 7

Final evaluation marks, and percentage of students who pass training the first time.

| Cohort | Hospital Preceptor evaluation | | College Assessments Overall (%) | Percentage of students who scored more than 80 % first time |
|--------|-------------------------------|------------|---------------------------------|---|
| | Inpatient | Outpatient | | |
| 1 | 80.2 | 89.4 | 56 | 12 % |
| 2 | 91 | 88 | 73.7 * | 87 % |
| 3 | 91 | 95 | 77.4 | 74 % |
| 4 | 89.2 | 94.7 | 77.6 | 100 % |
| 5 | 92.6 | 92.7 | 80.1 | 95 % |
| 6 | NA | NA | NA | NA% |

* Includes marks of resit exams in students who were required to repeat evaluations.

assignments, and active preceptor involvement has been discussed as an effective way of building a successful internship by [Carl et al., 2014](#), [Rath et al., 2019](#), and [Abu Blan et al. 2019](#).

Disengaged preceptors were identified by interns, and the steering unit as a barrier to internship development. Challenges which are often reported by preceptors include workload, time constraints, stress, reluctance to take on the preceptor role, and poor preceptee knowledge ([Hilli et al., 2014](#)). Research conducted by [Al Arifi \(2018\)](#) explored the preceptor-preceptee relationship of King Saud University Pharm D interns. In this, students reported that 42.3 % were satisfied with their preceptors' knowledge and skills, 57.7 % of preceptors liked to teach, and 38.5 % of preceptors are approachable, with only 44 % providing frequent feedback. Whilst these findings cannot be extrapolated in this research, it highlights that barriers do exist across the Kingdom. In Saudi Arabia there is no national model for preceptor involvement in pharmacy students training programs in terms of a structured role, responsibilities, expectations, evaluation, and feedback.

Whilst the challenges, mainly related to training sites and preceptor disparity are notable, they are by no means insurmountable. The plans from the Training Unit for the future include more stringent selection criteria for training sites and a formal recruitment process for hospital-based preceptors. It should be noted that in the United Kingdom and New Zealand, an internship preceptor must have a minimum of 3 years of experience. In Saudi Arabia there are currently no national requirements.

5. Future work

The pharmacy training unity plans to increase the difficulty level of the training assessments, and incorporate more competencies listed in the GBCF V2 framework for more stringent assessments, they plan to incorporate the following assessments using the PAR model:

2.5.2 Apply therapeutic medicines monitoring and assess impact and outcomes (including objective and subjective measures.).

2.6.5 Discuss and agree with the patient on the appropriate use of medicine, considering patient's preferences.

6. Conclusion

In the space of 2 years a preliminary competency-based training program has been developed, using the participatory action research model. The competency-based training program was based on the FIP Global Competency Framework, and led to improvements in student performance, higher success rates in internships, and improved competency development. The current training program covers some of the competencies which are in the global framework, and there is great potential for the training program to be further developed to cover more competencies relating to therapeutic drug monitoring, patient counseling, leadership, and decision making.

The authors of this paper are of the view that in order to ensure that internship training is of a consistently high caliber across Saudi Arabia, the implementation of a national internship framework (based on GBCF V2) with strict criteria for the selection of training sites and preceptors, and a mandatory cap on the number of interns who can be trained by one preceptor. The implementation of realistic end of training OSCEs could be implemented on a national level to assess intern competence in key skills in addition to the Saudi Pharmacist Licensing Exam (SPL) to ensure all qualifying pharmacists are competent to practice, although it is recognized that this will be logistically challenging.

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