

RESEARCH ARTICLE

Students' experience and evaluation of community pharmacy internship in Iraq

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Abstract

Background: Pharmacy internship programmes are driven by most developed countries to outweigh the ongoing growth in the pharmacy career which encourages pharmacists to play a significant role as healthcare providers. **Objectives:** This study examines pharmacy students' perception, satisfaction, challenges, and limitations with the internship curriculum. **Method:** A cross-sectional study was conducted using an online survey with different elements to examine students' perceptions of various aspects. **Result:** Most students reported a positive impression regarding their internships, however, they were less satisfied with the allowance for filling prescriptions and compounding also, the college's follow-up was inadequate. Finding a pharmacy and devoted time for the training were the most reported challenges. Whether the preceptor is a pharmacist or not, the duration of the training and the pharmacy type have been demonstrated as important factors in the training outcomes. **Conclusion:** Students have acquired experience and knowledge. However, there are still improvements needed in the interns' perception towards the programme.

Introduction

In Iraq, a bachelor's degree in pharmacy and pharmaceutical sciences would be earned by the completion of ten semesters of basic and pharmaceutical sciences in five academic years. By 2022, there will be 16 governmental and 40 private colleges of pharmacy in Iraq. All of these colleges follow a unified curriculum which includes experiential education as an integral part of pharmacy study. (The Electronic Portal of the Department of National University Education, n.d.) Pharmacy internship (experiential learning) programmes are driven by most developed countries to outweigh the ongoing growth in pharmacy careers. This would encourage pharmacists to play a potential role as healthcare providers (Brown *et al.*, 2009). Furthermore, internship programmes are considered an integral part of pharmacy education to develop professionalism by training the student in in real-world setting. It is also

required to deliver qualified graduates with high-quality skills and knowledge (Rodger *et al.*, 2008; Alnajjar & Mohammed, 2020).

In Iraq, pharmacy student's internship is called "summer training" which is a prerequisite for graduation. It is usually performed after finishing the third and fourth years of their study, and students should fulfil a total of 200 hours of training throughout the four months of the summer holidays. In the past, the summer training was conducted in different institutions/ places such as community pharmacies, hospitals, and pharmaceutical industries. Nowadays, it is limited to community pharmacy internships (College of pharmacy/Tikrit university, 2018).

Although experiential learning is a vital part that students need to build and enhance their skills in the community pharmacy, students have demonstrated a number of challenges which has negatively influenced their attitude towards this setting. Differences in the training sites with limited resources and support,

inadequate evaluation tools, and short time of training were reported as some of the challenges that pharmacy students faced in developing countries. (Aljadhey, 2012; El Hajj *et al.*, 2014) Furthermore, the remarkable increase in the number of pharmacy students decreased the chances of getting adequate and efficient training sites and preceptors.

The review of the literature demonstrated a large number of studies that have evaluated the pharmacy internship programmes in the region (Sattari, 2012; El Hajj *et al.*, 2014; Almetwazi *et al.*, 2020; Alnajjar & Mohammed, 2020). However, none of these studies was conducted in Iraq. To fill this gap in the knowledge, this study was conducted and aimed to evaluate the perception and satisfaction of pharmacy students towards pharmacy internship components (preceptors and pharmacy) and to address the potential challenges and barriers encountered during the internship.

Methods

This was a cross-sectional, online survey conducted between 10 January and 2 March 2021. Fourth- and fifth-year's pharmacy students in Iraq were invited to participate in the survey. The sample size was calculated using an online calculator (Sample Size Calculator - Confidence Level, Confidence Interval, Sample Size, Population Size, Relevant Population - Creative Research Systems, n.d.) with a confidence level of 95%, and the required sample size was 377 participants.

After a thorough review of the literature, the survey questionnaire was adopted from previous studies (Young *et al.*, 2014; Carrido *et al.*, 2015; Carrido *et al.*, 2016; Almetwazi *et al.*, 2020; Alnajjar & Mohammed, 2020) with some modifications to meet the study goals. The questionnaire consisted of two main domains; the first domain included questions about the sociodemographic information of the participant and the preceptor, training site (site of pharmacy in the provenance, type of pharmacy, average daily dispensing rate, average training time, whether the preceptor was a pharmacist, and the number of interns in each pharmacy). The second domain consisted of six items assessing the perception of the students toward different aspects; (preceptors, pharmacy, tasks performed during training, the outcome of the training, the programme, and finally, the challenges that the interns might face during the training process). A five-point Likert scale was used to measure the extent of agreement of pharmacy students towards the study objectives (1=strongly disagree, 2=disagree, 3=neutral, 4=agree, and 5= strongly agree).

Following gaining ethical approval from the scientific committee of the college of pharmacy at Al-Kafeel University, the face validity of the study questionnaire was assessed through peer review by relevant experts. The comments from experts were used to refine the final version of the questionnaire and remove any ambiguity and redundancy. Furthermore, the survey questionnaire was piloted on 30 participants, in addition to the reliability. In which the Cronbach alpha indices were above 0.7 for all variables. The online survey link was distributed through official social media, which were mainly (Facebook and Telegram) to fourth and fifth-year pharmacy students.

Statistics and analysis

Collected data were retrieved and cleaned in Microsoft Excel 2019. Descriptive statistics (mean, standard deviation (SD), frequencies, and percentages) for the survey items were performed using Statistical Package for the Social Sciences (SPSS) version 25. Parametric (*t*-test and ANOVA) and non-parametric tests (Kruskal Wallis test or Mann Whitney U test) were used to compare sociodemographic data (students' and preceptors' gender, students' stage, university, province, site of the pharmacy, whether the preceptor was pharmacist or not, and the type of pharmacy) with different perceptions of the interns. The level of $p < 0.05$ was considered to be significant.

Results

Six hundred and seventeen students from ten different universities in seven provinces have completed the survey (Table I). The majority (77.31%) of the participants were female. The mean age was 22.45 (± 1.31). More than one-half (52.51%) of the interns were in their fifth year of study. The highest responses (26.26% and 18.15%) were from Al-Najaf and Baghdad provinces, respectively.

More than two-thirds (67.1%) of the students were trained in pharmacies located in the centre of provinces. The majority (63.21%) of these pharmacies were both prescription-based (near a clinic) and by hand (depending on refilling and OTC medications). More than half (53%) of the pharmacies have one working pharmacist and one intern. In contrast, only 7.62% of the pharmacies had no pharmacist in the pharmacy. About three-quarters (63.05%) of the preceptors were males and were recently graduated within the age group of 25-30 years. More than one-half of the students (56.56%) spent less than ten hours per week in training.

Table I: Demographics and characteristics of participant students

Characteristic	n=617 (%)
Gender	
Male	140 (22.69)
Female	477 (77.31)
Age	
Mean (SD)	22.45(1.31)
Year of study	
Fifth	324 (52.51)
Fourth	293 (47.49)
Province	
Al-Najaf	162 (26.26)
Baghdad	112 (18.15)
Nineveh	83 (13.45)
Qadisiyyah	44 (7.13)
Kirkuk	26 (4.21)
Diyala	25 (4.05)
Babil	24 (3.89)
Others	141 (22.85)
University	
Al-Kafeel	129 (20.91)
Mosul	103 (16.69)
Kufa	69 (11.18)
Tikrit	47 (7.62)
Baghdad	37 (6.0)
Al-Mustansiriyyah	27 (4.38)
Al-Qadisiyyah	26 (4.21)
Basra	16 (2.59)
Dohuk	15 (2.43)
Others	148 (23.99)

With regards to the perception toward the preceptors, more than one-half of the students reported that they had received good support and help during their internships. In contrast, the highest rate of disagreement was related to the item "the preceptor allowed me to fill prescriptions and prepare different compounding" (3.17 \pm 1.13) (this was only accessible when the preceptor was absent). Although the students highlighted the availability of adequate amounts of medicines in the pharmacies (3.89 \pm 0.9), they emphasised the limited resources of information needed in their training (3.24 \pm 1.05) (Table II).

Regarding the tasks performed by the interns during the internships, more than one-half (54.7%) of the students were instructed to organise and store medications. However, less than one-half of the

students were integrated into the process of interviewing patients and filling prescriptions. And only one-quarter of them were able to prepare and compound extemporaneous preparations.

Regarding the outcome's perception, about two-thirds of students expressed that their communication and clinical skills were improved, and they learned how the pharmacy operates and how the business works.

Table III shows that around one-half of the interns agreed to achieve their goals from the training programme (3.58 \pm 0.91), whilst a higher rate of disagreement was reported with the term "the staff members of the college regularly visited me during the internship", which indicated a poor audit to the interns (2.29 \pm 1.2). With regards to the challenges, the interns faced during the internship, finding a pharmacy for training was reported by one-half of the students (3.42 \pm 1.33), followed by an inadequate time devoted to the training to get the desired benefits and information (3.38 \pm 1.25) (Table III).

Table IV summarises the comparison of different perceptions aspects across gender and whether the preceptor was a pharmacist or not. There was a statistically significant difference in tasks performed and outcomes of the training with regards to gender. Both had a higher score for males as compared with females reflecting further agreement.

Furthermore, there were statistically significant differences in all perceptions aspects except for the tasks performed in training. Students who had training with a pharmacist had a higher score in perceptions towards (the pharmacist, the pharmacy, outcomes of the training, and perception toward the training programme) whilst those who had a non-pharmacist preceptor had a higher score in the challenges aspect (Table IV). A comparison of different aspects of perception across the site of the pharmacy was conducted using an independent samples t-test. A statistically significant difference in perception towards the training programme was observed. Students who received the training in pharmacies located in the city centre had a higher score than those who received training in pharmacies on the outskirts. In addition, a comparison of different aspects of perception across governorates was conducted using one-way ANOVA or Kruskal Wallis test (whenever possible), and Bonferroni posthoc adjustment was used for the pairwise comparisons. No statistically significant difference in all aspects except for challenges during the internship was observed. Those who had training in Al-Najaf had a higher score in the challenges in comparison with those who had their training in Baghdad (Table V).

Table II: Perception of the interns toward the preceptors and the pharmacy

Items	Strongly agree n(%)	Agree n(%)	Neutral n(%)	Disagree n(%)	Strongly disagree n(%)	Mean (SD)
Perception toward the preceptor						
The preceptor (trainer) supported me to learn and get more knowledges	199(32.30)	225(36.50)	147(23.80)	34(5.50)	12(1.90)	3.92(0.97)
The preceptor (trainer) allowed me to interact with the patients in the pharmacy	169(27.40)	210(34.00)	156(25.30)	53(8.60)	29(4.70)	3.71(1.10)
The preceptor (trainer) allowed me to fill prescriptions and prepare different compounding	75(12.20)	181(29.30)	183(29.70)	129(20.90)	49(7.90)	3.17(1.13)
The preceptor (trainer) had adequate knowledge	161(26.10)	263(42.60)	148(24.00)	36(5.80)	9(1.50)	3.86(0.92)
The preceptor trainer was available to answer my questions	188(30.50)	232(37.60)	146(23.70)	36(5.80)	15(2.40)	3.88(0.10)
The preceptor (trainer) provided feedbacks and evaluated my performance	99(16.00)	218(35.30)	203(32.90)	76(12.30)	21(3.40)	3.48(1.01)
The preceptor (trainer) was interested to train me	128(20.70)	216(35.00)	185(30.00)	64(10.40)	24(3.90)	3.58(1.05)
I will recommend this preceptor (trainer) to other students	115(18.60)	196(31.80)	169(27.40)	101(16.40)	36(5.80)	3.41(1.14)
Perception toward the pharmacy						
The pharmacy had an adequate amount of medicines	158(25.60)	282(45.70)	139(22.50)	27(4.40)	11(1.80)	3.89(0.90)
The pharmacy served large number of patients	151(24.50)	253(41.00)	167(27.10)	44(7.10)	2(0.30)	3.82(0.90)
The pharmacy was well organised	120(19.40)	255(41.30)	197(31.90)	35(5.70)	10(1.60)	3.71(0.90)
The pharmacy size was spacious for me and the staff	117(19.00)	197(31.90)	172(27.90)	113(18.30)	18(2.90)	3.46(1.08)
The pharmacy had drug information resources that I needed during my internship	67(10.90)	192(31.10)	212(34.40)	112(18.20)	34(5.50)	3.24(1.05)

Table III: Perception of the interns toward the training programme and the challenges during internship

Items	Strongly agree n(%)	Agree n(%)	Neutral n(%)	Disagree n(%)	Strongly disagree n(%)	Mean (SD)
Perception toward the training programme						
The training goals were clear to the preceptor and myself	85(13.80)	270(43.80)	191(31.00)	59(9.60)	12(1.90)	3.58(0.91)
The official manual for the training course was well prepared	53(8.60)	223(36.10)	241(39.10)	75(12.20)	25(4.10)	3.33(0.94)
The staff members of the college regularly visited me during the internship	30(4.90)	92(14.90)	102(16.50)	197(31.90)	196(31.80)	2.29(1.20)
The internship exam was fair and assessed my knowledge	45(7.30)	181(29.30)	231(37.40)	121(19.60)	39(6.30)	3.12(1.01)
The knowledge I got from the college was linked to the real Life	44(7.10)	191(31.00)	235(38.10)	101(16.40)	46(7.50)	3.14(1.02)
The challenges during internship						
The trainer was not interested in the training	41(6.60)	83(13.50)	163(26.40)	229(37.10)	101(16.40)	2.57(1.11)
The pharmacy staff did not like my presence	30(4.90)	70(11.30)	127(20.60)	261(42.30)	129(20.90)	2.37(1.08)
I was not well prepared	33(5.30)	101(16.40)	192(31.10)	214(34.70)	77(12.50)	2.67(1.06)
I was not interested in the training	28(4.50)	59(9.60)	114(18.50)	256(41.50)	160(25.90)	2.25(1.08)
The time for the training was not enough	131(21.20)	194(31.40)	124(20.10)	113(18.30)	55(8.90)	3.38(1.25)
The preceptor (trainer) was not qualified	41(6.60)	66(10.70)	161(26.10)	245(39.70)	104(16.90)	2.51(1.10)
There was no official training handbook	74(12.00)	148(24.00)	143(23.20)	193(31.30)	59(9.60)	2.98(1.20)
I had difficulties to find a pharmacy for the training	185(30.00)	132(21.40)	103(16.70)	154(25.00)	43(7.00)	3.42(1.33)
The presence of other students in the same pharmacy negatively influenced my training	76(12.30)	129(20.90)	147(23.80)	184(29.80)	81(13.10)	2.89(1.23)

Table IV: Comparison of different perception aspects across gender and whether the preceptor was a pharmacist or not

	Gender		p-value	The preceptor was a pharmacist or not		
	Male N=140 Mean± SD	Female N=477 Mean± SD		Non-Pharmacist N=117 Mean± SD	Pharmacist N=500 Mean± SD	p-value
Perception toward the preceptor	33.06 ±6.32	32.62 ±7.06	0.508	27.95 ±7.74	33.84 ±6.17	<0.001
Perception toward the pharmacy	18.09 ±3.39	18.13 ±3.34	0.919	16.80 ±3.47	18.43 ±3.24	<0.001
Tasks performed in the training	16.88 ±4.18	15.62 ±4.06	0.001	15.38 ±4.46	16.03 ±4.03	0.130
Outcomes of the training	34.54 ±5.47	31.95 ±6.24	<0.001	30.46 ±6.63	33.02 ±5.96	<0.001
Perception toward the training programme	15.61 ±3.51	15.41 ±3.26	0.524	14.28 ±3.49	15.73 ±3.22	<0.001
Challenges during internship	140 (24.41 ±6.51)	477 (25.23 ±6.34)	0.185	28.19 ±6.22	24.31 ±6.20	<0.001

Table V: Comparison of different perceptions toward training programmes and challenges items across universities, site of pharmacies and governorates

Perception toward the training programme	N	Mean	SD	p-value		
University	Kafeel	129	15.67	3.22	<0.001	
	Qadesiya	26	15.35	4.37		Kafeel > basra
	Mustansrya	27	14.59	3.38		Baghdad> Basra, Dohuk, Kufa, Others
	Baghdad	37	17.08	2.84		Mosul > Basra
	Basra	16	12.81	3.31		Tikrit > Basra
	Dohuk	15	13.33	2.97		Mosul > Dohuk
	Kufa	69	14.77	3.85		Mosul > others
	Mosul	103	16.36	3.21		
	Others	148	14.99	2.87		
	Tikrit	47	16.23	2.72		
Site of pharmacy in the city	periphery	203	15.06	3.32	0.037	
	center	414	15.65	3.30		
Challenges during internship	N	Mean	SD	p-value		
Governorate	Babil	24	25.54	5.88	0.012	
	Baghdad	112	23.95	6.59		Najaf > Baghdad
	Diyala	25	23.72	6.56		
	Kirkuk	26	24.31	6.45		
	Najaf	162	26.64	6.22		
	Nineveh	83	25.49	6.30		
	Others	141	24.45	5.87		
	Qadisiyyah	44	23.95	7.40		

*Comparison of different perception items across universities was made using one-way ANOVA and Bonferroni post-hoc adjustment was used for the pairwise comparisons.

Using Bonferroni adjustment, there was no statistically significant difference between prescription-based, hand-based, or both pharmacies toward the pharmacy perception. Furthermore, pharmacies with both types of dispensing had better training outcomes than pharmacies that exclusively dispense prescriptions, although prescription-based pharmacies had more challenges. With regards to the training time, there was

a statistical significance in all aspects in which students who have trained for less than ten hours had a lower score than those who trained for a longer time, except in the challenges' perception, students with the training of fewer than ten hours have shown a higher score in the challenges compared to those who trained for a longer period (Table VI).

Table VI: Comparison of different perception items across the type of pharmacy and different training times

	Type of pharmacy			p-value	Training time				p-value
	By hand based N=164 Mean± SD	Prescription based N=63 Mean± SD	Both N=390 Mean± SD		Training <10 hrs N=349 Mean± SD	10-20 hrs N=178 Mean± SD	21-30 hrs N=66 Mean± SD	>30 hrs N=24 Mean± SD	
Perception toward the preceptor	32.86 ±7.02	31.19 ±7.28	32.92 ±6.76	0.175	32.02 ±6.74	33.55 ±6.86	34.17 ±7.01	32.92 ±8.06	0.009 <10hrs lower than 10-20
Perception toward the pharmacy	17.72 ±3.34	17.51 ±3.23	18.38 ±3.35	0.032*	17.79 ±3.11	18.37 ±3.43	18.61 ±3.72	19.71 ±4.28	0.006 <10hrs lower than >30
Tasks performed in the Training	15.90 ±4.57	15.13 ±3.13	16.03 ±4.06	0.129	15.05 ±4.03	16.60 ±3.79	17.74 ±4.34	18.21 ±3.76	<0.001 <10hrs vs all
Outcomes of the Training	32.54 ±6.33	30.68 ±5.90	32.83 ±6.10	0.037 Both> Prescription	31.48 ±6.12	33.57 ±5.93	34.62 ±5.76	34.46 ±6.70	<0.001 <10hrs lower than 10-20, 21-30hrs
Perception toward the training programme	15.43 ±3.54	15.48 ±2.28	15.46 ±3.37	0.993	15.28 ±3.40	15.51 ±3.02	16.17 ±3.54	15.67 ±3.55	0.246
Challenges during internship	24.85 ±6.37	27.13 ±5.48	24.79 ±6.48	0.023 Prescription > by hand, both	26.46 ±6.18	23.51 ±6.02	22.61 ±6.52	22.54 ±6.55	<0.001 <10hrs higher than all others

* No difference in post hoc comparison

Discussion

The current study explored the experience of the students with their internship (summer training course). Although there is a number of studies on students' perceptions of pharmacy internships globally, little is known about pharmacy students' experiences in Iraq. Of note, the training programme is planned to allow students to enrol in a programme of learning and education which would empower them to be skilled pharmacists.

Numerous studies have explored the students' perception of the trainer, training site, and their opinion about the outcome of the training. For instance, in a study conducted in the United Arab Emirates (UAE) (Alnajjar & Mohammed, 2020) amongst 250 pharmacy students who had completed their training in community pharmacies, nearly half of them reflected the considerable interpersonal skills of the preceptor, which has imposed a positive effect during their training. In addition, they reported the crucial role of the preceptors in providing encouragement and support to acquire more practical knowledge. Similarly, these findings have been reported in a study on 43 pharmacy students in a community pharmacy settings in Saudi Arabia (Almetwazi *et al.*, 2020), from which

around half of the students were satisfied with their preceptors who encouraged them during the period of training.

Of note, the preceptor's support and encouragement are very important factors as they will positively affect the student's performance. Their understanding of the requirements that meet the students' needs will, in turn, empower their confidence and self steam. Notably, the quality of pharmacy education mostly relies on the efficiency and quality of the trainer (Sørensen *et al.*, 2005). In addition, approximately 70% of the students revealed that the preceptor was available to answer their questions. Similar results were reported in the previous study in Saudi Arabia, in which the majority of students were satisfied with their trainers. (Almetwazi *et al.*, 2020).

A further major concern is the training site itself. In the current study, the majority of the students have highlighted the availability of adequate amounts of medicines in the pharmacies. The presence of a variety of medications in the pharmacy will allow students to learn more about different groups of medications. It will also bloom their minds to know how these medications work, their indications, adverse effects and interactions. Furthermore, the current study has emphasised the limited resources of information

needed in their training. Similar results were found in a study conducted in Qatar in which most students considered the inadequate resources of drug information in the pharmacy as a barrier (El Hajj *et al.*, 2014). The pharmacy should be provided with an updated bank of information to refer to. This will be useful especially; the undergraduate students are still in need of acquiring additional knowledge about different medicines.

Turning to the tasks performed during the internships, around half of the students were instructed to organise and store medications. In a study conducted in the Philippines, check of pharmaceutical products for proper storage was one of the students' activities that were also evaluated (Carrido *et al.*, 2015). This is important as the proper storage of pharmaceutical products is considered one of the essential tasks that students must learn clinically and financially. With regards to the ability of students to fill prescriptions or dispense medications, less than half of the students in the current study were happy when performing those tasks. A nearly similar finding was observed in a study conducted by Vivienne SL Mark and colleagues (Mak *et al.*, 2013). The authors noticed that 61% of community-based training participants were seen as competent in dispensing medications.

Furthermore, nearly half of the students were able to communicate with patients and educate them regarding their medicines. This was consistent with a study conducted in Saudi Arabia, where half of the students had adequate patient interaction (Almetwazi *et al.*, 2020). Regarding the perception of the outcome, about three-quarters of students agreed that they've learned new skills which were not covered during college study. This was consistent with a study in Denmark by Sorensen and colleagues (Sørensen *et al.*, 2005), which concluded that students who take part in the Pharmacy University Study (a project by the Danish University to assess the acquired knowledge from the internship), achieved better results than those who did not participate in the internship. This is partly owing to the students' improved situation in terms of legitimate peripheral active participation (Sørensen *et al.*, 2005).

In a study conducted in South Korea in 2019 that examined students' experiential practice at community pharmacies, only a small percentage of students claimed that the knowledge they learned in school could be applied in the real world. This was similar to the finding of the current study (Kim *et al.*, 2019). It seems that educational institutions should have the necessary tools to ensure that students are well-prepared for the career path and apply their knowledge in practice. The inadequate time devoted to the training to get the desired benefits and information was

reported as one of the main challenges for nearly half of the students. This was comparable with the study of Kim and researchers in which less than half of students claimed that there was a lack of educational training time (Kim *et al.*, 2019). The reason for this may be attributed to the time when this study was conducted, which was during the COVID-19 pandemic, where lockdown and local restrictions were in place, which limited the working hours of community pharmacies.

The present results identified a statistically significant difference in tasks performed in training and outcomes of the training with regards to gender, where males had a higher score in both sections. This could be explained by some students who may have started their training in community pharmacies before the summer training course began. In a study in the Philippines conducted in 2016, there was a statistically significant difference between genders in the development of attitude. The average score of male interns was also higher than that of female interns (when they were asked if the internship increased their employment opportunities in the future) (Carrido *et al.*, 2016). Moreover, the present study reported that students who received the training in a pharmacy located in the centre had a higher score in their perception of the training programme than those in a pharmacy at the periphery. In a study in South Korea, the practice site was one of the factors that affected the changes in community pharmacy experiential outcomes (Kim *et al.*, 2019). This might be explained by the fact that the pharmacies that are located in the centre serve a larger number of patients, and thus the students learn more than the pharmacy, which is at the periphery.

Limitations

This study has several limitations; firstly, an online survey could not provide an ultimate evaluation of the internship programme if compared with the face-to-face interview of both students and preceptors. Secondly, there was no previous valid standard evaluation form of the internship programme in Iraq to be considered, and finally, this study was conducted during the COVID-19 era, which might have affected the findings of this study.

Conclusion

The current findings revealed that students have acquired experience and knowledge during their internship and have been provided with the necessary skills to practice effectively. However, there are still improvements needed concerning the interns' perception of the training programme. This can be

achieved by focusing on topics such as clinical pharmacy in the pharmacy education curriculum as a modification of the curriculum and making it more interactive; this would enhance future pharmacists' performance significantly.

Conflict of interest

The authors have no conflicts of interest to declare that they are relevant to the content of this article.

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