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RESEARCH ARTICLE

Unveiling pharmacy students' attitudes, preparedness and barriers in embracing pharmaceutical care: Insights from a UAE healthcare institution

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Abstract

Background: Pharmaceutical care (PC) has long been integrated into pharmacy education globally, yet its application in developing nations presents a varied landscape. This study aims to evaluate the attitudes, perceptions, preparedness, and challenges pharmacy students face concerning providing PC. **Methods:** A cross-sectional online survey was conducted among Fatima College of Health Sciences (FCHS) fourth—and final-year pharmacy students. Descriptive and inferential data analyses were performed using SPSS version 29. **Results:** Responses were received from 41 students (response rate 73%). Most students (78%) agreed that PC is valuable. Communication skills are reported to be the most prepared competency area. The most common barriers to PC provision included a lack of workplace for counselling in the pharmacy (46.4%), a poor image of the pharmacist's role in society (46.4%), and time constraints (41.4%). **Conclusion:** The findings revealed that pharmacy students had a positive attitude towards PC and a range of preparedness across competencies. To better prepare future pharmacists to provide effective PC services, it is essential to provide more active learning experiences to equip students with the skills and confidence to excel as future clinical care providers.

Introduction

Pharmaceutical care (PC) centres on the behaviours, commitments, concerns, ethics, functions, knowledge, responsibilities, and skills of the pharmacist in providing drug therapy to achieve definite therapeutic outcomes and improve patients' health and quality of life. (WHO Consultative Group on the Role of the Pharmacist in the Health Care System (3rd: 1997: Vancouver, Canada) & World Health Organisation Division of Drug Management and Policies, 1997) Pharmacists accepted the responsibility of PC (Allemann *et al.,* 2014) as the benefits of PC on patient care and clinical outcomes have been proven through research and implementation of projects (Berenguer *et al.,* 2004). The impact of the PC service on clinical economics and humanistic viability is also of great significance (Dalton & Byrne, 2017). Nevertheless, several studies have pointed out barriers to integrating PC into pharmacy practice (Katoue *et al*., 2014; Ahmed *et al*., 2017; Awaisu *et al.,* 2018).

The perceptions of pharmacy students towards delivering PC have been a focal point of studies, reflected by a spectrum of readiness and attitudes across different educational settings and geographical locations (Martin & Chisholm, 1999, Al-Arifi, 2009, Udeogaranya *et al.,* 2009, El Hajj *et al.,* 2014, Katoue *et al.,* 2014, Tsega *et al.,* 2015, Martinez Sanchez & del Sol, 2016, Ahmed et al., 2017, Swieczkowski *et al.,* 2017, Awaisu et al., 2018, Baral et al., 2019, Tawfiq *et al.,* 2021). While a significant portion of studies showed students' positive attitude towards PC, there

is a notable challenge to the provision of PC, including a lack of private counselling areas, inappropriate pharmacy layout, lack of access to patient medical records, inadequate training in PC, and insufficient duration of internship (Bacha, 2016, Awaisu *et al.,* 2018).

By understanding students' attitudes and preparedness towards PC, pharmacy programmes can ensure students are equipped with the necessary skills and knowledge to deliver PC effectively, which translates to a workforce equipped to optimise patient care. This is particularly relevant in the context of the United Arab Emirates (UAE), where the role of pharmacists is evolving. A nationwide study in UAE showed that final-year undergraduate pharmacy students have positive attitudes towards pharmaceutical care (Tawfiq *et al.,* 2021), but students' perception of their preparedness to deliver PC is unknown.

Another study showed that students' competencies in pharmaceutical care skills, such as communication, psychological, technical, and administrative aspects, grew as they progressed through the curriculum (Scott DM, 2010). Understanding students' attitudes and preparedness is crucial for ensuring that future pharmacists are adequately equipped to provide high-quality patient care. It is also valuable to assess the effectiveness of theoretical courses and field training provided by institutions. The current study evaluated pharmacy students' PC knowledge and skills, preparedness, attitude and perceived barriers concerning curricula and training programmes at a healthcare institution in the UAE - Fatima College of Health Sciences (FCHS).

Methods

Study design and subjects

This was a cross-sectional descriptive study conducted via a web-based survey. Data were collected between August and October 2023. All undergraduate 4th and 5th year pharmacy students at (FCHS) (all-female class) were included in the study. Of the total of 56 students, 22 students were from Year 4, and 34 students were from Year 5.

Survey instrument development

The questionnaire was developed from original survey instruments including the Pharmaceutical Care Attitude Survey (PCAS) and the Perceptions of Preparedness to Provide Pharmaceutical Care (PREP) survey, both developed and validated in the US (Chisholm & Martin, 1997; Martin & Chisholm, 1999; Ried *et al.,* 2002; Scott *et al.,* 2010). The questionnaire was piloted with five pharmacy students to assure its readability and comprehension.

The final version of the questionnaire consisted of 64 questions that were divided into four sections (A - D). Section A of the questionnaire included eight items to gather the socio-demographic characteristics of the participants and their preferred future practice settings. Section B consisted of 13 items adapted from the Pharmaceutical Care Attitudes Survey (PCAS) (Chisholm & Martin, 1997) to collect data on students' agreement attitudes on the attitudes towards PC using a 5-point Likert scale (1 = strongly disagree, 5 = strongly agree). Notably, scoring for items six and 13 was reversed due to the negatively worded statements. Section C consisted of a reduced version (33 items) of the Perceptions of Preparedness to Provide Pharmaceutical Care (PREP) survey (Ried *et al.,* 2002, Scott *et al.,* 2010), to collect data on participants' perceptions on preparedness to provide PC competencies using a 5-point Likert scale (1 = poor, 5 = excellent). In Section D, participants were asked to list in order of importance, ten pre-determined barriers to the provision of PC and to rate their significance as barriers using a 5-point rating scale (1 = the least significant barrier, to 5 = the most significant barrier).

Ethical approval

Ethics approvals for the study were obtained from the Fatima College of Health Sciences Institutional Review Board (Ref number: FCEC-3-21-22-PHA-1-SF). Participation in the study is voluntary, and all of the information included in it was completely confidential. Student consent was obtained prior to their participation in the study.

Data collection

The questionnaire was created using SurveyMonkey®, a web-based survey software, and was then shared with eligible pharmacy students on both campuses simultaneously through university emails. Eligible participants received an internet link to access the online survey via their university email addresses.

A reminder was sent to the participants two weeks after the initial survey distribution date. A second reminder was sent two weeks after the first reminder. The survey closed two months after the initial distribution date. Participation in the study was voluntary, and participants completed the questionnaire online without providing any

identifying information to ensure anonymity and confidentiality of responses.

Data analysis

The survey responses were analysed using the IBM SPSS Statistics programme, version 29.0, which is a Statistical Package for Social Sciences software developed by IBM Corporation in the United States. Both descriptive and inferential analyses were employed. Categorical variables, including students' demographic details, were presented as frequencies and percentages. All numerical data in Sections B and D were presented in numbers (percentage). In Section C, mean scores and standard deviations were determined for each item. In addition, the groups were compared using independent t-tests as appropriate. A p-value of ≤ 0.05 was considered statistically significant.

Results

A total of 41 students (73% response rate) responded to the survey. Data distribution followed a normal distribution (Shapiro-Wilk test, $p > 0.05$), allowing for independent sample *t*-tests.

Sociodemographic profile of participants

Table I summarises the participant characteristics. Most participants were 20–24 years old, with 18 (43.9%) aged 20-21 and 21 (51.3%) aged 22-24. Emirati nationality was the most prevalent, comprising 22.0% of participants. Most participants (97.6%) were single, and the majority (70.7%) were in Year 5 of their degree. As of the survey's administration, 95.1% of the participants were not working in the pharmaceutical industry in any capacity.

Student's attitudes towards PC

Table II reports participants' attitudes towards PC. Most students agreed or strongly agreed that the PC movement will improve patient health (78%), PC practice is valuable (78%), PC would benefit pharmacists (75.6%), and PC should be the primary responsibility of pharmacists (73.8%).

Table I: Sociodemographic characteristics of participants

Characteristics	N (%)
Age	
20-21	18 (43.9)
22-24	21 (51.3)
25-26	2 (4.8)
Nationality	
Emirati	9 (22.0)
Jordanian	2 (4.9)
Palestinian	1 (2.4)
Syrian	6 (14.6)
UAE	16 (39.0)
Yemeni	7 (17.1)
What is your reason for studying for a pharmacy degree?	
Self-will	37 (62.7)
Influence of family	14 (23.7)
No other choices suited me	1 (1.7)
Influence of friends or seniors	4 (6.8)
Forced by family	2 (3.4)
Curiosity	1 (1.7)
What is your marital status?	
Married	1 (2.4)
Single	40 (97.6)
Which year of your degree are you currently in?	
Year 4	12 (29.3)
Year 5	29 (70.7)
Are you currently engaged in any pharmacy-related job?	
No	39 (95.1)
Yes	2 (4.9)
What kind of pharmaceutical job are you engaged with?	
Hospital pharmacy	1 (2.4)
Safety and management	1 (2.4)
What is the field of preference after the completion of your pharmacy degree?	
Clinical pharmacy	1 (2.4)
Cosmeceutical	1 (2.4)
Hospital pharmacy	33 (80.5)
Non-pharmaceutical industry	1 (2.4)
Pharmaceutical marketing	4 (9.8)
Research and development	1 (2.4)

Table II: Student attitude towards pharmaceutical care

Item	Frequency (%)		
	Disagree	Neutral	Agree
1. All pharmacists should perform pharmaceutical care.	8 (19.5)	4 (9.8)	29 (70.7)
2. The primary responsibility of pharmacists in all healthcare settings should be to prevent and solve medication-related problems.	9 (22.0)	3 (7.3)	29 (70.7)
3. Pharmacists' primary responsibility should be to practice pharmaceutical care.	6 (14.6)	5 (12.2)	30 (73.8)
4. Pharmacy student can perform pharmaceutical care during their experiential training (placements).	5 (12.2)	7 (17.1)	29 (70.7)
5. I think the practice of pharmaceutical care is valuable.	6 (14.6)	3 (7.3)	32 (78.0)
6. Providing pharmaceutical care takes too much time and effort.	22 (53.6)	9 (22.0)	10 (24.4)
7. I would like to perform pharmaceutical care as a pharmacist practitioner.	7 (17.0)	6 (14.6)	28 (68.2)
8. Providing pharmaceutical care is professionally rewarding.	8 (19.5)	6 (14.6)	27 (65.8)
9. I feel that pharmaceutical care is the right direction for the provision.	5 (12.2)	10 (24.4)	26 (63.4)
10. I feel that the pharmaceutical care movement can benefit pharmacists.	6 (14.6)	4 (9.8)	31 (75.6)
11. I feel that the pharmaceutical care movement will improve patients' health.	6 (14.6)	3 (7.3)	32 (78.0)
12. I feel that practising pharmaceutical care would benefit my professional pharmacy career as a pharmacy practitioner.	7 (17.0)	5 (12.2)	29 (70.8)
13. Providing pharmaceutical care is not worth the additional workload It places on the pharmacist.	11 (26.9)	10 (24.4)	20 (48.8)

However, there were some areas where disagreement was notable; 48.8% agreed or strongly agreed that providing PC is not worth the additional workload it places on the pharmacist. There was no significant difference in mean attitude between Year 4 (M = 3.65, SD = 1.09) and Year 5 students (M = 3.70, SD = 0.93); t(39) = -.157, *p* = .876 (see Table III).

Table III: Independent sample *t*-test comparing response variables between Year 4 and Year 5 group

Item	Year 4		Year 5		T	df	p
	M	SD	M	SD			
Student's attitudes	3.65	1.09	3.70	0.93	-.157	39	.876
Perceived preparedness	3.45	0.94	3.50	0.81	-.161	39	.873
Technical aspects	3.46	0.88	3.50	0.80	-.136	39	.893
Psychological aspects	3.72	1.13	3.67	0.86	.148	39	.883
Communication aspects	3.87	0.83	4.13	0.45	-1.270	39	.333
Administrative aspects	2.92	1.00	3.08	0.97	-.479	39	.635
Research aspects	3.13	0.96	3.71	0.89	-1.862	39	.070

Perception of preparedness to deliver PC

Table IV illustrates participants' perception of preparedness to provide pharmaceutical care across various aspects, including technical, psychological, communication, administrative and research. Responses are presented as mean.

Table IV: Perception of preparedness to provide pharmaceutical care (PREP)

Competency areas[†]	Year 4 Mean (SD)	Year 5 Mean (SD)	Overall Mean (SD)	*p*-value
Technical aspects				
1. Recommend appropriate drug therapy	3.23 (0.97)	3.28 (0.84)	3.27 (0.87)	0.932
2. Evaluate medications and/or laboratory tests	3.33 (0.99)	3.38 (0.94)	3.37 (0.94)	0.889
3. Integrate knowledge for pharmacotherapy	3.42 (0.90)	3.45 (0.87)	3.44 (0.87)	0.917
4. Determine the appropriate drug delivery system	3.25 (0.87)	3.03 (1.12)	3.10 (1.04)	0.554
5. Recommend medication doses and dosage schedules	3.58 (1.00)	3.41 (0.95)	3.46 (0.95)	0.610
6. Identify/collect information to resolve a drug therapy problem	3.08 (0.67)	3.48 (0.99)	3.37 (0.92)	0.144
7. Evaluate laboratory test results for a specific patient	3.00 (0.85)	3.10 (1.05)	3.07 (0.99)	0.764
8. Calculate and evaluate pharmacokinetic properties	3.75 (0.97)	3.76 (0.95)	3.76 (0.94)	0.979
9. Evaluate information from patient's history and assessment	3.08 (1.17)	3.34 (0.81)	3.27 (0.92)	0.416
10. Make reasonable conclusions when data is incomplete	4.00 (1.04)	3.90 (0.94)	3.93 (0.96)	0.758
11. Provide counseling to patients	3.92 (1.08)	4.00 (0.93)	3.98 (0.96)	0.804
12. Devise methods to seek optimal patient compliance	3.58 (1.31)	3.69 (0.97)	3.66 (1.06)	0.803
13. Monitor therapeutic plan for a patient	3.67 (1.23)	3.62 (1.01)	3.63 (1.07)	0.902
14. Document information on drug-related problems	3.58 (1.17)	3.59 (1.02)	3.59 (1.05)	0.994
Psychological aspects				
15. Gather information to resolve a problem	3.67 (1.37)	3.48 (0.99)	3.54 (1.10)	0.679
16. Synthesise information and decide a course of action for a problem	3.42 (1.24)	3.45 (0.95)	3.44 (1.03)	0.465
17. Make decisions integrating social, cultural and ethical issues	4.00 (1.21)	3.76 (0.95)	3.83 (1.02)	0.249
18. Impact of values in professional decisions	3.58 (1.17)	3.66 (1.05)	3.63 (1.07)	0.424
19. Apply ethical theories to professional decisions	3.83 (1.19)	3.62 (0.94)	3.68 (1.01)	0.273
20. Understand social and cultural impact on health environment	3.58 (1.17)	3.66 (1.01)	3.63 (1.04)	0.422
21. Understand practice related to changing societal expectations	3.83 (1.19)	3.83 (0.93)	3.83 (1.00)	0.493
22. Appropriate interpersonal behaviours during patient interactions	3.83 (1.19)	3.83 (0.93)	3.83 (1.00)	0.493
23. Contribute opinions/insights to healthcare team	3.75 (1.22)	3.79 (0.90)	3.78 (1.00)	0.457
Communication aspects				
24. Communicate medical records information to health professionals	3.92 (1.08)	4.21 (0.56)	4.12 (0.75)	0.394
25. Communicate medical records information to patient	3.83 (1.03)	4.03 (0.50)	3.98 (0.69)	0.529
26. Collect information to respond to a patient DI request	3.92 (1.00)	4.14 (0.58)	4.07 (0.72)	0.483
27. Respond to an information request from a patient	3.83 (0.72)	4.14 (0.58)	4.05 (0.63)	0.162
Administrative aspects				
28. Evaluate, select and purchase pharmaceuticals	2.83 (1.12)	3.17 (1.00)	3.07 (1.03)	0.173
29. Develop and implement a pharmacy inventory control system	2.83 (0.94)	2.97 (1.02)	2.93 (0.99)	0.350
30. Manage fiscal and human resources	2.92 (1.24)	3.10 (1.08)	3.05 (1.11)	0.316
31. Develop and implement drug use evaluations and formulary	3.08 (1.08)	3.07 (1.16)	3.07 (1.13)	0.485
Research aspects				
32. Describe the research process	3.17 (0.94)	3.66 (0.94)	3.51 (0.95)	0.068
33. Provide a critical review of a publication	3.08 (1.08)	3.76 (0.91)	3.56 (1.00)	0.024

[†]Scale: 1 = poor preparation to 5 = excellent preparation

Comparing the five competency areas, participants consistently rated themselves highest on the communication aspects (mean ranging 3.98–4.12), followed by psychological aspects (mean ranging 3.44–3.82) and lowest on the administrative aspects (mean ranging 2.93–3.07). Within the communication area,

the highest-rated item was "*Communicate medical records information to health professionals*", followed by ''*Collect information to respond to a patient DI request*". All administrative aspect items were rated low, and the lowest-rated item was ''*Develop and implement a pharmacy inventory control system*". There was no significant difference ($p = 0.873$) in perceived preparedness scores among all aspects between Year 4 (M = 3.45, SD = 0.94) and Year 5 students (M = 3.50, SD = 0.81) (see above in Table III).

Student's perceived barriers to provide PC

Table V presents students' perceived barriers to providing pharmaceutical care. Responses are reported as counts and percentages.

The most notable barriers include lack of workplace for counselling in the pharmacy (46.4%), poor image of pharmacist's role in society (46.4%), time constraints (41.4%) and inadequate drug information resources in the pharmacy (39.1%).

Table V: Student's perceived barriers to the provision of pharmaceutical care

Item	Frequency		
	Disagree	Neutral	Agree
1. Inadequate drug information resources in the pharmacy	14 (34.1)	11 (26.8)	16 (39.1)
2. Lack of access to the patient's medical record in the pharmacy.	18 (43.9)	11 (26.8)	12 (29.3)
3. Lack of therapeutic knowledge.	21 (51.2)	8 (19.5)	12 (29.2)
4. Lack of understanding of pharmaceutical care.	22 (53.7)	9 (22)	10 (24.4)
5. Inadequate training in pharmaceutical care.	14 (34.2)	14 (34.1)	13 (31.7)
6. Lack of workplace for counselling in the pharmacy.	14 (34.2)	8 (19.5)	19 (46.4)
7. Inadequate technology in the pharmacy.	13 (31.8)	15 (36.6)	13 (31.7)
8. Lack of self-confidence.	24 (58.5)	9 (22)	8 (19.6)
9. Time constraints	14 (34.1)	10 (24.4)	17 (41.4)
10. Poor image of pharmacist's role in society.	14 (34.2)	8 (19.5)	19 (46.4)

Discussion

In contrast to some pharmacy education institutions offering PC as a standalone theory course (Tawfiq *et al.,* 2021), the surveyed cohorts of pharmacy students at FCHS were initially introduced to PC-related topics in Year 2 as a foundational aspect of pharmacy practice. PC skills were then developed systematically from Year 3 to Year 5 through a patient-centred approach, incorporating patient assessment, problem-solving, and communication. This involved engagement in case-based workshops, online simulations using MyDispense, skills-based sessions and hospital placements. This longitudinal exposure over three years possibly explained the positive attitude among 4th and 5th-year pharmacy students towards providing PC, with many recognising the impact of pharmaceutical care on patients. This aligns with the core principles of pharmaceutical care, which emphasise preventing medication-related problems, optimising drug therapy, and improving patient well-being. This is no surprise, as similar positive attitudes towards PC among pharmacy students have been previously reported in UAE (Tawfiq *et al.,* 2021), Qatar (El Hajj *et al.,* 2014), Saudi Arabia (Al-Arifi, 2009, Ahmed et al., 2017), Kuwait (Katoue *et al.,* 2014, Awaisu *et al.,* 2018), the United States (Martin & Chisholm, 1999), Nigeria (Udeogaranya *et al.,* 2009), Poland (Swieczkowski *et al.,* 2017), Nepal (Baral *et al.,* 2019), Ethiopia (Tsega *et al.,* 2015) and Cuba (Martinez Sanchez & del Sol, 2016). Lack of space for counselling, time constraints to the provision of pharmaceutical care and poor image of the pharmacist's role in society remained as highly rated barriers to PC provision. Nevertheless, our pharmacy students are enthusiastic about pharmaceutical care and a professional pharmacy career, suggesting that the current pharmacy curricula effectively enhance pharmacy students' positive attitudes toward PC.

Students' preparedness for PC remains challenging. Our students are more prepared for communication aspects. This is consistent with students' high preparedness for the technical aspects of providing counselling to patients. Pharmacists need to possess a wide range of technical skills that are essential for their role in ensuring safe and effective medication use. Interpreting laboratory findings and recommending medication regimens are both crucial steps in the therapeutic decision-making process. Among the technical skills, students are not adequately prepared to evaluate information from laboratory test results or

recommend appropriate drug therapy or drug delivery systems. This lack of preparedness could be attributed to the limited clinical experience, which leaves students feeling unprepared for real-world situations (Khalil *et al*., 2020; Shawaqfeh *et al.,* 2020). Additionally, conventional teaching methods that prioritise memorisation over clinical reasoning and decision-making, combined with a lack of realism in simulation or active learning approaches in case-based learning, can further hinder students' ability to apply theoretical knowledge to practical recommendations (Stewart *et al.,* 2011, Plewka *et al.,* 2023).

The preparedness in administrative aspects is also rated as low among our students. This is perhaps not surprising as the apparent link between administrative skills in pharmaceutical care is not obvious. Pharmaceutical care training is often directed at skills which directly benefit patient outcomes rather than administrative aspects. Effective leaders and managers in PC leverage administrative skills to ensure accurate medication processes and optimal patient outcomes. Hence, the underdevelopment of administrative skills among pharmacists will present a barrier to further advancing their patient care roles (Frederick *et al.,* 2021).

The above finding reflects the need for enhanced training on therapeutic decision-making and pharmacy administrative aspects for pharmacy students. Potential solutions to address technical skills training and students' confidence in therapeutic decision-making should not be limited to strategic approaches such as clinical placements but active learning methodologies such as scenario simulation, human patient simulators, role-playing, modelling, story sharing, skill review sessions, and self-reflection (Lundberg 2008, Bond *et al,* 2012). Engaging students in a variety of these activities allowed students to practice skills safely while benefiting from feedback and reflecting on their own performance. A leadership and management module could be a valuable addition to pharmacy administrative training, but students' lack of appreciation could hinder its application (Boyd *et al.,* 2017). Greater emphasis on the interconnectivity between administrative skills and patient outcomes, as well as greater practice exposure in the course, maybe better strategic approaches to enhance preparedness in administrative aspects.

Students consistently rated themselves highest on the communication aspects. The evolving role of pharmacists demands exceptional communication skills to empower patients to use medications effectively and achieve the best possible health outcomes, which are covered in detail in teaching in our programme. In our programme, the communication skills courses started in Year 2 study. The intensive training, including lectures, workshops, case studies and role play on patient counselling and various aspects of communication of medication-related information, which was assessed through Objective-Structured Communication Examination (OSCE), reflects through findings to have prepared students for interactions with patients.

The importance of integrating pharmaceutical care into pharmacy education and practice is undeniable. Countries such as the UAE, a developed country, encounter distinct hurdles to maintaining robust PC activities while adapting to post-COVID-19 initiatives. (Kharaba *et al.,* 2022a) Gaps such as lack of time, patients' ignorance of the pharmacist's role and lack of acceptable practice model (Kharaba *et al.,* 2022b) remained challenging. Pharmacy students in this region may have fewer opportunities for practical experiences to value and master PC practice. Pharmacy schools can incorporate more active learning experiences to bridge this gap, build students' confidence and prepare students to be future clinical care providers. Simulations and patient interaction opportunities can all help students develop the necessary skills and confidence to thrive in this evolving role (Nusair *et al.,* 2021).

The present study had a few limitations. The findings on perceptions on preparedness on competency areas may not be a true reflection of actual competencies. The all-female sample confined to single institution restricts the generalizability of the findings to the broader pharmacy student population. Nevertheless, it is noteworthy to highlight that many pharmacy schools around the world have a higher percentage of female graduates.

Conclusion

As far as we know, pharmacy students in the UAE have previously been investigated regarding their attitudes and perceived barriers to providing PC. This is the first publication examining pharmacy students' preparedness to provide pharmaceutical care in the UAE pharmacy education system. We recognise a need to evaluate the actual competencies of pharmacy students. While there may be a gap between students' self-reported preparedness and actual skills, these findings provide a valuable foundation for ongoing evaluation. The findings allow exploration of key competencies needed for clinical pharmacists and identify areas for improvement in the curriculum. Specifically, focusing on areas with lower scores, such as administrative aspects, aids educators in

strengthening PC provision in future pharmacy professionals.

Conflict of interest

The authors declare no conflict of interest.

Ethics approval

Fatima College Ethics Committee (FCEC), Ref number FCEC-3-21-22-PHA-1-SF; Participants have given informed consent before taking part.

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