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Research

A qualitative study on the beliefs and perceptions of inaugural PharmD program graduates

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Abstract

Background There is an increasing need for pharmacists to incorporate more patient care targeting. Consequently, the productivity of pharmacy programs can be enhanced by evaluating the advantages and disadvantages of pharmacy curriculum.

Objectives To assess the beliefs, perceptions, and challenges of the College of Pharmacy –The University of Baghdad PharmD graduates regarding the PharmD program.

Method Qualitative research methodology was implemented. Graduate PharmD candidates were interviewed either in-person or via telephone. The interviews were conducted in a semi-structured format, utilizing a predetermined interview guide that included open-ended questions. Thematic analysis was implemented to analyze the data.

Results A total of 21 in-depth interviews were conducted**.** The participants commonly expressed that the program significantly enhances their clinical proficiency, particularly in hospital settings**.** Valuable clinical skills were acquired through college scientific activities during courses. The participants advocated for the implementation of more scientific activities to enhance the quality of education and endorsed the use of OSCE exam methodologies for all final exams. Their clinical abilities were enhanced by the hospital training course they completed during their senior year. Their clinical knowledge is enhanced through daily interaction with clinical pharmacists. The primary method of enhancing hospital training is through the development of trainer skills. The primary obstacles include the difficulty of the test, the distribution of subjects irregularly, and the intensive summer lectures.

Conclusion The PharmD program effectively prepared the graduate pharmacist for future employment in community pharmacies or hospitals by enhancing their clinical practice abilities. Nevertheless, there is a necessity to enhance the course by reducing the number of non-clinical subjects, enhancing the trainer's training capabilities, and increasing the variety of scientific activities.

Keywords PharmD · Beliefs · Perceptions · Challenges · College of pharmacy · University of Baghdad

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1 Introduction

The Doctor of Pharmacy (PharmD) degree is a professional certification in pharmacy provided by the majority of universities globally. While graduates from the Middle East and Asia are beginning to understand the future of the Pharm D program and its role in career advancement, the graduates from the West are aware of the scope and employment options that arise upon Pharm D degree completion. Notably, the PharmD curriculum is an organized academic program that incorporates therapeutics and clinical experience within its curriculum. It is designed to guarantee that a clinical pharmacist has the therapeutic knowledge and clinical skills necessary to succeed in a patient-centered care environment [1].

Health care systems around the world have transformed continuously to serve the changing needs of societies, and countries were encouraged to constantly develop the pharmaceutical workforce to meet these changes. Therefore, pharmacy education has shifted to offering a Pharm D degree [2].

A multidisciplinary curriculum is required for the PharmD program, which results in pharmacists who possess the mental clarity to distinguish between their role as drug dispensers and their role as providers of pharmaceutical care [3, 4].

Courses and experiences in global health should be more widely available in Pharm D curricula in order to provide pharmacy professionals with the necessary knowledge and skill set to adapt to the growing role of global health professionals [5]. A growing demand for pharmacists to adopt a more "patient-centric" mindset. This is crucial in light of the rapidly growing interest in global health in health professional programs and the need to standardize training results across pharmacy colleges [5, 6].

In Iraq, at the University of Baghdad's College of Pharmacy, the organization began the accomplishment of the Pharm D program in 2017. Participation of students in this program was decided to be voluntary and not mandatory [3]. The curriculum was originally scheduled to last six years, but after approval, it will now only run five years. In addition, the college will provide a five-year bachelor's degree in pharmacy. After the third stage of the program, the curriculum for studying for a bachelor's degree will be different from the curriculum for this program; nevertheless, the first three academic stages (first, second, and third stages) of both courses will be the same. In the academic year 2019–2020, the program's study got underway at the University of Baghdad's College of Pharmacy. Following that, it will be implemented in the remaining pharmacy colleges if the requirements are satisfied in educational hospitals and there are enough individuals with higher degrees from instructors and board certifications in clinical pharmacy [3]. After the third academic stage, the curriculum for studying this program in Iraq will differ from that of studying for a bachelor's degree in Iraq; the first three academic stages (first, second, and third stages) of both courses will remain the same. Professors from the College of Pharmacy, doctors, and pharmacists from the Medical City's Clinical Pharmacy Board Campaign teach the Pharm D program [3].

Only one previous study has been carried out in Iraq to assess the attitudes and ideas of recently admitted pharmacy students during their first year of study [4]. Assessing the student's beliefs and challenges during the early stages of implementing this valuable program could assist policymakers in improving the program and avoiding potential mistakes. Accordingly, the present study assesses the beliefs, perceptions, and challenges of the College of Pharmacy –The University of Baghdad PharmD graduates regarding the PharmD program.

2 Methods

This was a qualitative study. It included face-to-face individual interviews or by a phone call with a recently graduated student from the PharmD program. The interviews were semi-structured using a pre-planned interview guide of open-ended questions with follow-up questions (Table 1). They continued from June to July 2024. All interviews were audio-recorded. The interview guide was structured to thoroughly investigate the participants' perspectives, beliefs, and difficulties encountered while undertaking the PharmD program.

2.1 Setting

The study involved recent PharmD program graduates after their graduation. The researcher interviewed the participants by scheduled phone call. The interviews lasted between 25 and 40 min.

Inclusion criteria graduate of the PharmD program in the University of Baghdad- College of Pharmacy who completed their final year in the program.

Table 1 The interview guide

No	Main questions	Follow-up questions
1	Can you elaborate on the specific benefits and practical experiences you gained from the PharmD program compared to a traditional pharmacy program?	
2	In your opinion, was the balance between the number and types of subjects in the PharmD program optimal for preparing you for clinical practice?	Please explain your reasoning
3	To what extent did you feel the information provided in each subject was sufficient for your current clinical practice needs?	Are there any specific areas where you felt the depth of knowledge could be improved?
4	Beyond the program's existing teaching methods, are there any specific teaching tools or educational approaches (e.g., scientific activities, workshops) you believe would be beneficial to incorporate into the PharmD curriculum?	
5	Can you elaborate on the skills you gained from participating in workshops and conferences?	How did these activities contribute to your knowledge development?
6	From your perspective, how effective was the hospital training component of the program in preparing you for your current role?	What is the effect of daily practicing with clinical pharmacists in their everyday work
7	In your opinion, what factors contribute most significantly to making hospital training a valuable learning experience for PharmD students?	
8	Can you elaborate on the specific challenges you encountered during the theoretical courses or hospital training period?	
9	Based on your experiences, do you have any specific suggestions for improving the PharmD program curriculum?	
10	Considering your experience in the PharmD program, would you recommend it to other pharmacy students?	Why or why not?

Exclusion criteria Any student who refuses to participate or record his answer.

2.2 Participants recruitment

The researcher attempted to incorporate the maximum number of graduates, as there were twenty-five graduates in total. Nevertheless, not all graduated students were approved to participate, as it was optional. The study objective was clarified to the participants who signed up for participation by the researchers. The authors approached all participants and only 21 accepted to join. The authors confirmed that all participants' identities would remain confidential. The interviews conducted with 21 participants ensured theme saturation. The participants' verbal consent was obtained prior to the audio recording of the interviews. The participants were permitted to respond to the English queries in the guide in either Arabic or English in order to surmount any language barriers. The discussion was subsequently verbatim transcribed into English by a bilingual researcher.

2.3 Data collection and analysis

A semi-structured interview questionnaire was employed to collect demographic data, perceptions, benefits, and factors that influence the efficacy of the PharmD program from participants overviews. The data obtained during each interview was documented by one author using the participant's own terms in Arabic to write the response on a specific word document, which was then translated to English. Another author reviewed the Arabic version of the response and the translation to guarantee that the documentation and translation were accurate.

The content was coded by a single researcher using QDA-MINER LITE v2.0.9. Qualitative data categorization was implemented through these codes. Thematic content analysis was implemented to analyze the data that was acquired. Researchers immersed themselves in the transcripts, identifying initial codes that captured key ideas. These codes were then categorized into recurring themes, which were further refined through iterative analysis. The final themes were organized into a coherent narrative, supported by illustrative quotes from the data. To ensure reliability, inter-rater reliability was assessed, and the findings were validated through member checking and peer review.

The researchers for this study were faculty members from the college of pharmacy. One of them has a PhD in clinical pharmacy. The second holds a Clinical Board degree in clinical pharmacy. Two researchers have master's degrees from the clinical pharmacy department. The fifth researcher holds a bachelor's degree in pharmacy science.

The researchers were mindful of their own biases and actively worked to mitigate their influence through rigorous methodological practices, such as inter-rater reliability checks and member checking. By acknowledging the potential limitations of their perspectives, the researchers aimed to ensure the validity and trustworthiness of the findings.

Development of the Interview Guide The interview guide was created iteratively, based on research questions and emerging literature on the topic. The initial draft included broad, open-ended questions intended to elicit rich, detailed responses from the participants. The proposed questions were evaluated by the Scientific Committee of the College of Pharmacy, who provided comments and additions before approving the final form. No, a pilot study was conducted due to the limited size of the target sample. To maintain consistency across interviews, interviewers received extensive training on the study objectives, interview guide, and the value of active listening, questioning, and summarizing. They were also taught in ethical matters such as consent and confidentiality.

Additionally, the authors used a standardized interview process that outlined the order of questions, probing strategies, and the significance of maintaining a neutral and nonjudgmental attitude.

Additionally, all interviews were audio-recorded to assure accuracy and allow for detailed analysis. Transcripts were thoroughly vetted and modified to ensure confidentiality and clarity.

2.4 Ethical approval

The Scientific and Ethical Committee at the University of Baghdad—College of Pharmacy provided ethical approval before starting of data collection. In addition, the authors obtained verbal consent from all participants. Participants were not required to disclose their identities during the interview in order to preserve their confidentiality. The authors employed pseudonyms for the participants in the interview transcription. No incentive was provided for the particpants.

3 Results

A total of 21 in-depth interviews were conducted with pharmacists who had recently completed the PharmD program. Table 1 illustrates that six participants were male and fifteen were female. The mean age of the participants was 23.14 years, with a range of 22 to 25 years. The PharmD program was the subject of study for all participants at the University of Baghdad's College of Pharmacy.

The themes obtained in this study are shown in Table 2.

3.1 Beliefs and perceptions regarding the PharmD program

A majority of the participants reported that the program significantly enhances their clinical proficiency, particularly in hospital settings. Nine graduates reported that the program had a greater emphasis on clinical scientific aspects, while three of them mentioned that the small student population enhanced the teaching process and that the program had the benefit of reducing the focus on non-clinical subjects.

"In contrast to my peers in the Bachelor program, I have gained a significant amount of benefit from this program. This is due to the fact that I spent a significant amount of time in the hospital, where we acquired a wealth of knowledge about the practical aspects of hospital labor and patient care." [Participant 11, Female, 23 years].

3.2 Practical experiences and skill development

Seventeen graduates reported that they had valuable practical experience by exercising their abilities in a hospital setting. Nine individuals indicated that the curriculum teaches useful techniques for efficiently locating necessary information inside references. Eight participants reported that the session enhanced their proficiency in reading patient charts. Three participants determined that the program enhanced their proficiency in creating case presentations using the Subjective–Objective-Assessment-Plan (SOAP) notation, a documentation approach utilized only by healthcare professionals. Furthermore, three individuals concluded that they possessed a genuine understanding of the actual responsibilities held by the clinical pharmacist.

Table 2 Demographic characteristics of the participants

Participant	Gender	Age
Participant 1	Male	23
Participant 2	female	22
Participant 3	female	24
Participant 4	female	25
Participant 5	female	25
Participant 6	Male	23
Participant 7	Male	22
Participant 8	Male	23
Participant 9	Female	23
Participant 10	Female	23
Participant 11	Female	23
Participant 12	Female	23
Participant 13	Female	23
Participant 14	Female	25
Participant 15	Female	22
Participant 16	Female	23
Participant 17	Male	23
Participant 18	Male	23
Participant 19	Female	23
Participant 20	Female	22
Participant 21	Female	23

"Our knowledge and ability to search for accurate information and instructions improved significantly as a result of our increased practice in hospital wards. Additionally, we learned how to calculate precise doses quickly using medical applications, which was not covered in detail during theoretical lectures." [Participant 3, Female, 24 years].

3.3 Sufficiency of the information provided in each subject

More than half of the participants asserted that they were provided with an adequate amount of information regarding each subject. Nevertheless, a third of the participants have determined that certain subjects (gynecology and pediatrics) require development despite the fact that the other subjects are adequate. According to five of them, clinical subjects are the only ones that provide sufficient detail.

"In my perspective, the quantity and variety of subjects we studied adequately prepared us for entering the actual clinical practice in hospitals or community pharmacies. However, it is essential to continuously review and enhance certain information that may differ from real-life practices." [Participant 2, Female, 22 years].

3.4 The skills gained from participating in scientific activities

According to 18 participants, the highly beneficial skills learned from participating in different scientific activities held in the college during the courses were. However, four participants said that not all these activities were beneficial.

"Participation in scientific activities helped me to strengthen my communication skills because I am a shy person around others, but activities with professors in medical centers and hospitals, as well as long-term direct communication with patients, improved my communication skills and reduced my shyness." [Participant 12, Female, 23 years].

"The activities we conducted were highly beneficial due to the moral benefit, which is the sense of being an actual pharmacist, despite the societal misconceptions about the profession of pharmacy, and the sense of benefiting patients, even if it is a simple and straightforward experience."[Participant 6, Male, 23 years].

3.5 Recommendations for program improvement

One of the primary recommendations made by eight participants to enhance the teaching process was to increase scientific activities. In comparison, five participants advocated for the use of OSCE exam procedures for all final exams. Four participants recommended that the morning meeting in institutions be increased in participation. Table 3 contains additional suggestions that three or fewer participants recommended.

"In my view, the OSCE exam was intended to be administered after the completion of each medical ward rather than as a single exam at the end of the course. Consequently, we would have benefited more from this exam, as it would have allowed us to conserve medication doses and examine a greater number of cases." [Participant 3, Female, 24 years].

3.6 Effectiveness of hospital training

Eighteen participants determined that the hospital training course they completed during their final year of study was highly effective in enhancing their clinical skills. According to three participants, clinical skills are significantly enhanced by the scientific information obtained directly from clinical pharmacists or physicians. Nevertheless, five participants reported that the limited education has been more positive for some trainers, and the early morning training negatively impacted their training.

"The hospital training was highly beneficial, and we made a significant and beneficial transition. Prior to the fifth stage, I possessed only theoretical scientific knowledge and lacked experience. However, following the fifth stage, I acquired comprehensive scientific knowledge and 100% experience in the areas of communication, reading the patient's medical history, and comprehending medical conditions." [Participant 6, Male, 22 years].

3.7 Daily practicing with clinical pharmacists in their everyday work

According to seventeen participants, the practical clinical information they acquire through daily practice with clinical pharmacists is enhanced, and three participants report that their ability to discuss clinical information with seniors is enhanced. In spite of this, five participants acknowledge that the advantages are contingent upon the pharmacists who collaborate with them, as not all of them are scientifically sound.

Table 3 Themes and subthemes of the study

1. Beliefs and Perceptions Regarding the PharmD Program	• Perceived clinical relevance, • Overemphasis on non-clinical subjects • Balance between clinical and theoretical content • Perceived effectiveness of teaching methods
2. Practical Experiences and Skill Development	• Hospital training impact on clinical proficiency • Skill development through scientific activities • Case presentation and utilisation of SOAP format • Improved practical skills
3. Challenges Encountered During the Program	• Difficult exams • Intensive summer lectures • Distribution of subjects • Weak training ability of some trainers • Early morning sessions • Curriculum overload
4. Recommendations for Program Improvement	• Increase focus on clinical training • Implement more OSCE exams • Reduce non-clinical subjects • Expand hospital training period • Add first aid training • More scientific activities
5. Effectiveness of Hospital Training	• Positive impact on clinical skills, • Interaction with clinical pharmacists, • Quality of trainers,

"It was a novel experience for me and a challenge, particularly in terms of the topics and issues that we had not previously addressed. However, we gained a deep understanding of them and derived significant benefits. I benefited greatly from the pediatric ward, and I gained a clearer understanding of how we will work in the future in hospitals. Additionally, I acquired the ability to administer and inject TPN." [Participant 4, Female, 25 years].

3.8 Factors that could improve hospital training courses.

Six participants identified the enhancement of the trainer's training abilities as the primary factor that could enhance the hospital training experience. Five participants also advocated direct interaction with clinical pharmacists in their daily activities. The most effective factor, according to four pharmacists, was the availability of clinical cases in the hospital during the training. Other factors are illustrated in Table 3.

"I believe that enhancing the trainer's teaching skills will enhance the method of explanation and the ability to connect it to the clinical cases of illness in the hospital. Additionally, the cases we collected were extremely beneficial to us during the discussion, so I suggest increasing it. Also, I recommend that the number of cases we present be increased to alleviate our fear and instill confidence and courage." [Participant 21, Female, 23 years].

3.9 Challenges encountered during the program

Ten, seven, and four participants, respectively, identified the distribution of subjects in courses, intensive lectures in the summer course, and the difficulty of certain examinations as the primary challenges. Table 3 illustrates additional challenges.

"The third stage was the most challenging for me, as the number of subjects was extremely high and the time before the exam was short. This resulted in a significant amount of pressure, tension, and effort. The fourth stage was satisfactory, with the exception of the summer shift, which was extremely exhausting." [Participant 18, Male, 23 years].

3.10 Suggestions for improving the curriculum of the PharmD program

Seven Participants suggested that the educational program's subjects be determined in order to allow the Participant to know what he will be studying in each course and to reduce the curriculum by eliminating non-clinical subjects.

Five participants recommended that the scientific activity and the period of coexistence with clinical pharmacists be expanded. Other suggestions can be seen in Table 3.

"I recommend the addition of a first aid subject, the elimination or reduction of subjects that are not related to the clinical pharmacy in the third stage to alleviate the pressure, or the extension of the program to six years to distribute the pressure." [Participant 19, Female, 23 years].

3.11 Recommendation of the program for other pharmacy students

The PharmD program was recommended for all students by nine participants. While seven of them recommended it exclusively for students who possess a passion for clinical pharmacy. Nevertheless, only four participants do not endorse it.

"This program is appropriate for all students who aspire to become clinical pharmacists, as the clinical pharmacist serves as a straightforward intermediary between the patient and the physician. This program provides the opportunity to become a successful clinical pharmacist and prepares you in all aspects. I highly recommend it to anyone passionate about this aspect." [Participant 19, Female, 23 years].

"At present, I do not recommend that the student enroll in this program. We are uncertain about our future, including our degree, role in hospitals, and preference for postgraduate studies, given the challenges of our studies and the pressure. Additionally, we are uncertain about whether our work will be in private or teaching hospitals. We have not yet received a response to our inquiries, which is a significant negative." [Participant 1, Male, 23 years].

4 Discussion

A new PharmD program was established by the College of Pharmacy, which will made substantial strides in the enhancement of pharmacy education. This was undertaken in response to the increasing demand for more qualified personnel in the medical field, with a particular emphasis on the pharmacy sector [7]. Nevertheless, further efforts were required to establish and improve clinical pharmacy programs in developing countries in order to ensure that they are beneficial to the broader health care and population [8].

The findings of the current study add to the growing body of knowledge about PharmD education, particularly in the Middle East. By investigating the experiences and perceptions of the first cohort of PharmD graduates, this study sheds light on the program's strengths and weaknesses and identifies areas for development. The study's findings can be used to inform curriculum development, faculty training, and student support services, ultimately improving the region's pharmacy education quality. Furthermore, the findings may have broader implications for international pharmacy education, emphasizing the importance of tailoring educational programs to the changing needs of the healthcare landscape.

Most PharmD students enhance their practice competencies while studying, compared to bachelor's degree students. The majority of PharmD students agree that their skills and practice improve during their residency in the hospital. After pharmacy practice, students are choosing to spend residency training to hone their practical abilities, competency, and confidence. The majority of the study participants preferred that the curriculum must be decreased by canceling non-clinical subjects Pakistan has initiated a universal PharmD program, yet concerns have surfaced about the curriculum's shortcomings. Improvements should be encouraged to add clinical and therapeutic courses to make the PharmD program in Pakistan more patient-centered (9). Focusing on clinical topics and patient care can greatly enhance students' understanding of their role in healthcare and improve their skills related to patient-centered practice.

The primary obstacles encountered during the courses were the extensive number of subjects, the stress of studying, and the difficulty of certain examinations. Similar to the challenges mentioned in Indonesia and Malaysia, the tension associated with studying for numerous examinations were the primary obstacles facing students [9, 10]. The college could mitigate the impact of these difficulties by reducing the amount of non-clinical topics and examinations. By investigating the challenges encountered during the program, such as difficult exams and trainer quality, the study identifies areas for improvement to improve the program's overall effectiveness. For example, the curriculum could be revised to better balance theoretical and practical components, and faculty development programs could be implemented to improve teaching and mentoring.

The majority of students (18 out of 21) reported that the hospital training course they underwent in their final year significantly improved their clinical skills. Just like a previous study result in Japan, that assessed pharmacy students' satisfaction with long-term practical training programs at hospital and community pharmacies and how these programs

benefitted communication skills. where the majority of students are content with the extensive practical training they receive in hospitals, which in turn enhances their communication abilities [11]. The majority of PharmD students found that their hospital training really enhanced their clinical skills. Similar to study in Iraq the graduate pharmacist was well-prepared for future hospital job by the hospital training course [12].

The current study highlights the value of hospital training in developing clinical proficiency. By analyzing graduates' experiences, it is possible to identify specific areas where hospital training can be improved, such as increasing rotation length, providing more structured learning opportunities, and encouraging interprofessional collaboration.

During the final year of the PharmD program, students participated in a period of internship with clinical pharmacists at a hospital. This internship aimed to enhance the students' practical skills and competencies. The majority of participants in the present study reached the conclusion that this collaboration was exceedingly efficient in enhancing their understanding. The results were consistent with the findings of a study conducted in Bangladesh, which indicated that hospital pharmacists need to have a minimum of one year of practical experience in a reliable hospital, in addition to a strong theoretical background, in order to offer care for both in-patients and out-patients [13]. The significance of hospital training was also examined in a study conducted in Canada, which revealed that while 23% of students were dissatisfied with theoretical subjects, the majority of students placed a high value on hospital training and therapeutics over other subjects such as pharmaceutical sciences [14]. This finding is consistent with the findings of the current study.

The primary challenges that Iraqi PharmD must surmount in order to accomplish their objectives include the stress of studying, the difficulty of specific exams, the large number of subjects, and the in-depth lectures that occur during the summer course. In the previous study conducted in Iraq, it was found that 80% of PharmD students were dissatisfied with the quality and quantity of subjects in their first year of the course. This was due to the fact that there were numerous subjects in the courses, and only a few were considered valuable. Consequently, the stress levels of the students were exacerbated [4]. The stress levels of PharmD students were also assessed in a prior study conducted in the United States, which revealed that they were exceedingly high. [15] In India, the privatization of education, the availability of numerous courses without a clear understanding of their roles and responsibilities, a lack of qualified instructors, and exorbitant course costs present significant challenges for pharmacy students [16]. Six of the twenty-one students who participated in this study identified the primary factor that could improve the hospital training experience as the improvement of the trainer's instructing abilities. Indeed, a study conducted in Iowa City discovered that students' connections to exceptional preceptor performance could result in enhanced preceptor training, development, and recruitment [17].

In this study participants advocated for the use of OSCE exam procedures for all final exams. As what found in the study in Jordon the pharmacy students and examiners agreed that the OSCE exam is an effective and preferable clinical assessment tool of knowledge of the students [18]. This would inform policy makers of the importance of implementing the OSCE examination for students' clinical knowledge and communication skills. Development and learning processes.

The results of the present study showed that most participating increase science activities as an enhancement to the classroom process. This is very close to that observed using different teaching approaches for example how simulation-based learning affects students in pharmacy Pharm D demonstrated a notable increase in the performance of clinical skills [19]. Peer-assisted learning (PAL) is the gold standard in medical education worldwide the didactic and practical skills have improves [20]. Because scientific activity helped them to improve their confidence and develop their technical skill as well as their teaching experience grew.

To effectively incorporate graduation research into the final stage of a PharmD program, it's important to provide students with a structured framework that encourages them to engage in clinical topics and patient care. As in the study in the USA a brief introduction to the clinical research environment gave pharmacy students an understanding of the clinical sciences and careers in research [21]. Students will not only deepen their understanding of clinical pharmacy and patient care but also develop critical research and analytical skills.

Conclusion: The PharmD program effectively prepared the graduate pharmacist for future employment in community pharmacies or hospitals by enhancing their clinical practice abilities. Nevertheless, there is a necessity to enhance the course by reducing the number of non-clinical subjects, enhancing the trainer's training capabilities, and increasing the variety of scientific activities. The insights gained from this study can inform the development of a more comprehensive and relevant PharmD curriculum. The study highlights the importance of well-trained and experienced faculty in guiding PharmD students. The findings emphasize the importance of interprofessional education and collaboration between pharmacists and other healthcare professionals. This can be achieved through joint training programs, collaborative research projects, and shared clinical experiences.

Recommendation: It is imperative to implement long-term competency monitoring for the graduation cohort. It is advisable to conduct an annual survey of recent pharmacy graduates to identify professional competency changes.

Promoting the expansion of hospital training hours. Boost the quantity and quality of hospital educators who are qualified. Finally, incorporating research methodology into their curriculum to improve their capacity to conduct research, a skill that is indispensable for their future careers.

Author contributions The study was conceptualized and designed by the first author, Samer Imad Mohammed, who also developed the interview guide. The other authors Mohammed Yawuz Jamal, Sara Asaad Kadhim, Nisreen Jumaah Jebur were actively involved in the data collection process, contributed to the writing of the manuscript, and participated in the final revision of the work. The last author, Dania Abdalameer Jaffar, assumed responsibility for transcribing the audio recordings into text format. The transcribed text was subsequently reviewed and validated by the other team members to ensure accuracy and consistency in the final textual representation.

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Data availability The data that support the findings of this study are not openly available due to privacy concerns for study participants. Access to the data can be requested from the corresponding author upon reasonable justification and with appropriate arrangements to ensure data confidentiality.

Declarations

Ethical approval and consent to participate The Scientific and Ethical Committee at the University of Baghdad—College of Pharmacy provided ethical approval before starting data collection. Participants were not required to disclose their identities during the interview in order to preserve their confidentiality. The authors employed pseudonyms for the participants in the interview transcription. Rewards were not distributed to the participants. All methods were carried out in accordance with relevant guidelines and regulations.

Informed consent All participants provided verbal informed consent prior to participation.

Competing interests The authors declare no competing interests.

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