



## Research Article

## Are Newly Graduated Pharmacists Competent to Perform Adequately in Hospitals? A Qualitative Study

Zahraa Murtadha Nassrullah<sup>1</sup> , Ali Azeez Al-Jumaili<sup>2,3,4\*</sup> 

<sup>1</sup> Department of Pharmacy, Kerbala Health Directorate, Kerbala, Iraq; <sup>2</sup> Department of Clinical Pharmacy, College of Pharmacy, University of Baghdad, Baghdad, Iraq; <sup>3</sup> Department of Public Health, School of Medicine, University of California, Davis, CA, USA; <sup>4</sup> College of Pharmacy, University of Iowa, IA, USA

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## Abstract

**Objectives:** To assess the qualifications and performance of newly graduated pharmacists and explore factors that affect their performance in public hospitals. **Methods:** This qualitative study included face-to-face, semi-structured interviews with hospital practitioner pharmacists. It was conducted between March and May 2023 in Kerbala province, Iraq. The participating pharmacists were selected purposefully because they had three or more years of work experience at governmental hospitals. The audio-recording interviews were transcribed. Thematic analyses were used to generate themes and subthemes from the interviews. **Results:** Twenty-seven hospital pharmacists participated in this study. The study found that there are several factors that have a negative impact on the performance of newly graduated pharmacists, including college-related and hospital-related factors. Education factors include classic methods of college teaching and the inadequate qualifications of new colleges. Hospital features, including inadequate qualifications for continuous medical education, tools and resources, can also impact pharmacist performance. Additionally, the overwhelming number of pharmacists negatively impacts their training and qualifications. **Conclusions:** Greater emphasis should be placed on enhancing the pharmacists' practical skills. Close and integrated collaboration between the Ministry of Higher Education and the Ministry of Health is pivotal to enhancing the performance level of prospective pharmacists in hospitals. Finally, controlling the number of admitted students to pharmacy colleges is critical to providing them with adequate training.

**Keywords:** Competency, Hospital pharmacists, Iraqi pharmacists, Performance, Qualitative study.

### هل الصيادلة المتخرجون حديثاً مؤهلون لأداء مناسب في المستشفيات؟ دراسة نوعية

#### الخلاصة

**الأهداف:** تقييم مؤهلات وأداء الصيادلة حديثي التخرج واستكشاف العوامل التي تؤثر على أدائهم في المستشفيات العامة. الأساليب: تضمنت هذه الدراسة النوعية مقابلات وجها لوجه وشبه منظمة مع صيادلة ممارسين في المستشفى. تم إجراؤها بين آذار وأيار 2023 في محافظة كربلاء، العراق. تم اختيار الصيادلة المشاركين عن قصد لأن لديهم ثلاث سنوات أو أكثر من الخبرة العملية في المستشفيات الحكومية. تم نسخ مقابلات التسجيل الصوتي. تم استخدام التحليلات المواضيعية لتوليد مواضيع رئيسية ومواضيع فرعية من المقابلات. **النتائج:** شارك سبعة وعشرون من صيادلة المستشفيات في هذه الدراسة. اتضح أن هناك العديد من العوامل التي تؤثر سلباً على أداء الصيادلة حديثي التخرج، بما في ذلك العوامل المتعلقة بالكلية والمستشفيات. تشمل عوامل التعليم الأساليب الكلاسيكية للتدريس الجامعي والمؤهلات غير الكافية للكليات الجديدة. يمكن أن تؤثر ميزات المستشفى من حيث المؤهلات غير الكافية للتعليم الطبي المستمر والأدوات والموارد على أداء الصيدلي. بالإضافة إلى ذلك، يؤثر العدد الهائل من الصيادلة سلباً على تدريبهم ومؤهلاتهم. **الاستنتاجات:** ينبغي التركيز بشكل أكبر على تعزيز المهارات العملية للصيادلة. يعد التعاون الوثيق والمتكامل بين وزارة التعليم العالي ووزارة الصحة أمراً محورياً لتعزيز مستوى أداء الصيادلة في المستشفيات. كما يعد التحكم في عدد الطلاب المقبولين في كليات الصيدلة أمراً بالغ الأهمية لتزويدهم بالتدريب الكافي.

\* **Corresponding author:** Ali A. Al-Jumaili, Department of Clinical Pharmacy, College of Pharmacy, University of Baghdad, Baghdad, Iraq; Email: [ali.baraak@copharm.uobaghdad.edu.iq](mailto:ali.baraak@copharm.uobaghdad.edu.iq)

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## **INTRODUCTION**

Hospital pharmacists play a crucial role as members of the multidisciplinary team who improve patient outcomes by promoting rational and cost-effective use of medications [1,2]. As a result, they have a unique and intricate set of knowledge, abilities, attitudes, and practices that they have acquired through both a curriculum and training, with durations that vary between universities and between nations [3]. The profession of pharmacy practice has shifted from its traditional function of dispensing and compounding to one that provides direct patient care, such as treatment management, disease prevention, and the enhancement of public health [1,4]. Maintaining a high level of clinical knowledge does not make pharmacists competent practitioners; how they apply this knowledge in conjunction with other skills determines their competence [3]. For example, as the practice changed, pharmacy administrators expressed concerns about the readiness of entry-level pharmacists to work in hospitals; hence, many pharmacy schools have updated their curricula to provide students with better clinical knowledge. However, not all newly graduated pharmacists are adequately prepared to work in hospitals because these modifications are not entirely practice-based [5]. In a sequential manner, it has been observed that numerous professional organizations and boards of pharmacy in developed nations have undertaken the task of updating or publishing a comprehensive set of professional competencies. These competencies aim to outline the essential practical skills required from pharmacists in their profession at hospitals such as the Accreditation Council for Pharmacy Education (ACPE) and the American College of Clinical Pharmacy (ACCP) [6,7]. In Iraq, pharmacy graduates must complete a three-year Ministry of Health (MOH) medical residency program. The first rotation period requires pharmacists to work as “intern-pharmacists” in public teaching hospitals. The MOH then assigns them to rural public health centers. After completing the residency, students receive the designation “practitioner-pharmacist,” which grants them a part-time private employment license. Most pharmacists learn useful pharmaceutical knowledge in residency and enhance their practicing skills [8,9]. Many studies have been done in Iraq on pharmacists' challenges, problems, and satisfaction with their jobs, but none have assessed their competencies for performance and the factors that affect it. This qualitative study will shed light on the obstacles that hospital pharmacists faced while they were striving to improve their performance and enhance their profession. Quantitative studies are unable to obtain the real current status, so in-depth interviews are necessary. We can provide recommendations to health officials and to the Higher Ministry of Education to improve the current status of pharmacy student training. In Iraq, with the growing number of graduated pharmacists over the last two

decades, it has become necessary to evaluate their competencies and level of performance in hospitals. To assess the current competencies of hospital pharmacists, particularly newly graduated pharmacists, this study aims to explore practitioner hospital pharmacists' perspectives on the qualifications and performance of newly graduated pharmacists and dive into factors that affect their performance in public hospitals.

## **METHODS**

### *Study design and setting*

This qualitative research was conducted in Kerbala's public hospitals. It utilized semi-structured, audio-recorded interviews with open-ended queries. The interviews were carried out at the institutions during the period of March to May 2023.

### *Participants and sampling strategies*

In this study, two methods of sampling were used: purposive and snowballing. Initially, the researcher used the purposive technique to target pharmacists in public hospitals with adequate experience. In addition, the researcher used a snowball strategy, which included asking participants about additional potential pharmacists who were interested in participating and meeting the inclusion criteria. The study recruited pharmacists with  $\geq 3$  years of experience working at governmental hospitals in Kerbala province. Several characteristics were reported, including gender, position, job experience, qualifications, and departments within hospitals.

### *Procedure*

Semi-structured in-person interviews with open-ended questions were conducted with hospital pharmacists by the researcher (a pharmacist with 13 years of practice experience). The interviews were conducted at their workplaces and took between 30 and 60 minutes. The interviews were audio-recorded. The interview questions were administered in English, while the answers could be either in English or Arabic to overcome the language barrier. The recorded audio was transcribed verbatim. Finally, bilingual researchers translated the transcripts into English. The interview guide was developed from an extensive literature review and consultations with experts (experienced pharmacists). The interview guide was piloted with a few pharmacists. After the saturation point had been reached, the interviews were stopped.

### *Ethical consideration*

The study proposal was approved by the local Scientific Committee of the College of Pharmacy, University of Baghdad, College and also by the Center of Training and Research in Kerbala Health Directorate, the Iraqi Ministry of Health. All

participants were informed about the study objectives at the beginning of the interview. Before the interviews were conducted, verbal permission was obtained from the participants. Participation was voluntary, and audio recording was optional. To maintain participant anonymity, the interviews were unidentified (e.g., the interview did not include the participants' names). The participants received no reward.

**Thematic data analysis**

The qualitative data obtained from the interviews was analyzed using thematic analysis. The researcher gathered qualitative data from the participants' responses to develop themes. The researchers followed Braun and Clarke's (2006) six steps for thematic analysis. These steps include becoming familiar with

the data (the answers), making initial codes, looking for themes, evaluating themes, defining and labeling themes, and writing the report [10].

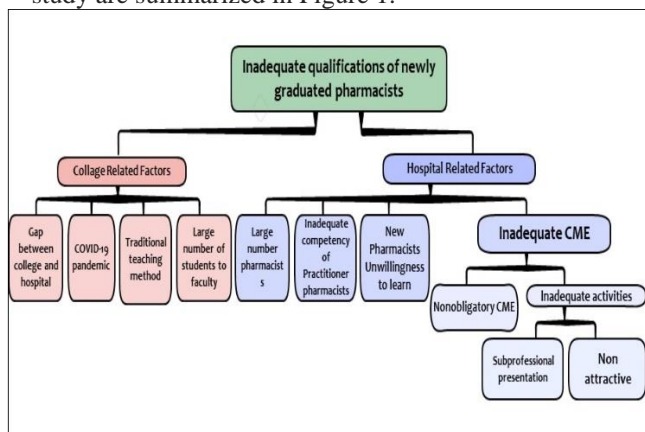
**RESULTS**

Twenty-seven pharmacists (18 males and 9 females) from five public hospitals (Imam Al-Husain Medical City, Imam Al-Hasan Al-Mujtaba, Al-Hindiya, Kerbala for Children, and Obstetrics and Gynecology) were interviewed. Their years of experience ranged from 4 to 22 years. Table 1 shows the demographic characteristics of the participating pharmacists. Most interviewees (24 out of 27) in this study stated that there is a noticeable decline in the level of performance of pharmacists with each new graduate.

**Table 1:** The Professional characteristics of the participating pharmacists

Code	Gender	Years of experience	Scientific degree	Position
Ph. 1	Female	4	Bachelor	Clinical pharmacist of women's, children's, and preterm infant ward
Ph. 2	Female	13	Master	Manager of antibiotic resistance control unit
Ph. 3	Female	9	Bachelor	Supervision of clinical pharmacists
Ph. 4	Male	5	Bachelor	Pharmacist of Intensive Care Unit
Ph. 5	Male	8.5	Bachelor	Technical Department manager
Ph. 6	Male	6	Bachelor	Drug store manager, Pharmacy and Therapy Committee manager
Ph. 7	Male	4	Bachelor	Drug store manager
Ph. 8	Male	4	Bachelor	Clinical pharmacy unit officer
Ph. 9	Male	5	Bachelor	Drug store manager
Ph. 10	Female	8	Bachelor	Oncologic unit manager
Ph. 11	Male	7	Master	Training and research unit manager
Ph. 12	Female	10	Bachelor	The Operations Division manager, Needs assessment committee manager.
Ph. 13	Female	9	Master	Urgent Inventory Committee
Ph. 14	Male	13	Bachelor	Clinical pharmacists' leader
Ph. 15	Male	20	Bachelor	Outpatient pharmacy manager
Ph. 16	Female	22	Bachelor	Quality Unit manager
Ph. 17	Male	20	Bachelor	Drug store manager
Ph. 18	Male	21	Bachelor	Inpatient pharmacy manager
Ph. 19	Male	4	Bachelor	Head of the Procurement Committee
Ph. 20	Male	11	Bachelor	Outpatient pharmacy manager, leader of purchasing committee.
Ph. 21	Female	5	Bachelor	Outpatient pharmacy
Ph. 22	Male	15	Master	Quality Unit Manager
Ph. 23	Female	9	Bachelor	Director of the pharmacy division
Ph. 24	Male	17	Bachelor	Drug store employee
Ph. 25	Male	5	Bachelor	Manager of outpatient pharmacy
Ph. 26	Male	5.5	Bachelor	Outpatient pharmacy employee
Ph. 27	Male	7	Bachelor	Manager of drug stores

The main themes and subthemes extracted from this study are summarized in Figure 1.



**Figure 1:** The main themes and subthemes obtained from participants. CME; continuous medical education.

"We note that the scientific level of newly appointed pharmacists is declining from year to year." (Ph. 2). "Most new pharmacists have a poor scientific level that does not qualify them to work in hospitals, especially in critical wards like the intensive care units or emergency department. (Ph. 4). The study revealed several factors that affect newly graduated hospital pharmacists' performance. These are focused on two main themes: insufficient training while studying at the pharmacy schools and later inadequate training within the hospital. This theme indicates that there is insufficient training in practical skills during the years of studying in pharmacy schools. It is further subdivided into four subthemes, which summarize the factors that hinder students from receiving adequate practical training. These are: 1) the large gap between theory at college and practice at the hospital; 2) the

COVID-19 pandemic and its impact on the training of pharmacy students; 3) the traditional method of education; and 4) the large number of students per faculty (low faculty/student ratio). Many pharmacists (22) revealed that there is a big difference between the practical reality in the hospital and what was studied in college. *"Studying pharmacy in college through books is different from the actual work. We studied for the exam only"* (Ph. 13). *"Even the lessons that are supposed to have practical applications inside the hospital are long and boring theoretical lectures"* (Ph. 5). Seventeen out of 27 participants stated that electronic teaching during the COVID-19 pandemic denied the students access to onsite training. *"The newly graduated pharmacists, notably those who studied online, have a lack of practical skills to an unimaginable degree because they have never seen patients' files or drug administration methods. They probably had two years of electronic teaching during the COVID-19 pandemic"* (Ph. 8). Most participating pharmacists (24 of 27) agreed that the traditional method of teaching that most colleges follow is not helpful in practical clinical settings. *"Unfortunately, until now, the method that is adopted by pharmacy schools is purely theoretical and not relevant to hospital reality"* (Ph. 5). *"Students have to study and memorize unrealistic concepts and rare diseases that have no relevance to practical reality."* (Ph. 11). All pharmacists confirmed that there is an inverse relationship between the huge number of students and their level of training. They also complained about the high acceptance rates (with low requirements) of pharmacy schools as well as the inability of these schools to train these large numbers adequately. Newly opened pharmacy schools do not have an adequate number of faculty members. *"During the hospital training course, it is anticipated that one preceptor should serve every five students, but currently there are 50 or 100 students per preceptor. I wonder how students can get benefits under such conditions."*(Ph. 11). *"High school graduates with low qualifications can enter private pharmacy schools as long as they can pay the fees."* (Ph. 15). *"Newly opened colleges accept modest GPA averages at the expense of scientific qualification."* (Ph. 16). The second main theme was the inadequate training of pharmacists within the hospital itself after graduation. Most of the interviewees mentioned that the hospital also cannot provide a suitable environment to train all newly graduated pharmacists. This theme included four subthemes, which summarize the factors that hinder the training process in the hospital. These are: (1) the large number of newly graduated pharmacists; (2) the inadequate competency of practitioner pharmacists; (3) the lack of trainee pharmacists' willingness to learn; and (4) the inadequate continuing medical education by the hospitals. Most of the interviewees (20 out of 27) stated that the hospital cannot accommodate this large number of newly graduated pharmacists within it.

Additionally, the large number of graduates due to a large number of pharmacy schools (>60) made it more difficult to control their training by the practitioner pharmacists. *"With the significant increase in pharmacist numbers, the most important challenge for the practitioner pharmacist is how these numbers benefit when they have no work to do or place to sit in?"* (Ph. 2). On the other hand, 13 interviewees confirmed the incompetence of practicing pharmacists in terms of training new pharmacists. *"We also suffer from the lack of a culture of guidance and training among many practitioner pharmacists who are supposed to play this essential role"* (Ph. 2). *"Only 50% of practicing pharmacists play their role in educating and training trainee pharmacists"* (Ph. 18). This study also found that there is a lack of willingness among new pharmacists to learn and develop their practical skills. *"In the last week's seminar, out of 250 pharmacists in the hospital, only 15 attended. This is not called a problem, but rather a disaster"* (Ph. 6). *"Current generations of pharmacists do not have the willingness to learn. 45–50% pay attention to the scientific activities, while the rest do not attend"* (Ph. 4). Twenty-one out of 27 interviewees stated that CME's scientific activities are not fully informative and don't meet pharmacists' requirements. *"The CME lectures sometimes are not interesting and are not presented professionally."* (Ph. 8). *"There is no training course in the hospital that covers the management of warehouses and provides the pharmacists with the fundamentals of working in a drugstore"* (Ph. 24). *"I wish that the attendance of pharmacists to the CME's lectures was compulsory... I wish we could force them to attend, but we cannot"* (Ph. 10). This study concluded with many recommendations obtained from experienced participating pharmacists so that subsequent generations of pharmacists can improve their qualifications (Table 2).

## DISCUSSION

In Iraq, several studies have been conducted about the challenges that pharmacists face in their profession, appraising the role of pharmacists in preventing medication errors and the degree to which they are satisfied with their profession [11–15]. However, to the best of our knowledge, no study focused on the performance of pharmacists themselves. In the last two decades, there have been more private pharmacy schools, more graduated pharmacists, as well as e-learning during the COVID-19 pandemic. Thematic analysis of this study revealed that newly graduated pharmacists' performance is inadequate. It provided a broad spectrum of pharmacists' perspectives on the factors that affect pharmacists' performance. They were classified into factors associated with inadequate training by pharmacy schools and those related to inadequate hospital training. The findings of this study reveal a decline in the competencies of pharmacists

over time. It is in agreement with the study conducted in Kuwait [16]. A study in Lebanon evaluated pharmacists' competence and indicated the lowest scores were in fundamental knowledge and drug administration methods [5]. Enhancing the competence of hospital pharmacists is essential to establishing a

solid base for their professional development, which in turn plays a significant role in promoting organizational goals. The critical and unstable state of Iraq has significantly impacted pharmacy education over the past few decades, which has resulted in many changes there.

**Table 2:** The recommendations of the participating pharmacists

Theme/Subtheme	Recommendations	Selected interviewees' comments
Pharmacy school: Update the traditional teaching method	Revise the curriculum of pharmacy colleges with more attention to clinical skills. Improve the cooperation between the Ministry of Health and Ministry of Higher Education	<i>"The college curriculum should emphasize on actual clinical skills rather than traditional and theoretical topics."</i> (Ph. 16) <i>"In my view, correcting the situation in health institutions should start at the Ministry of Higher Education"</i> (Ph.15). <i>"It is preferable that the preceptors be affiliated with or at least have previous experience in the Ministry of Health because they should be familiar with the work environment and the required information"</i> (Ph. 12) <i>"Twinning every college of pharmacy with a hospital in the same governorate will improve pharmacy student training."</i> (Ph. 20) <i>"The period of hospital training and its efficiency should be given priority for students"</i> (Ph. 7)
Pharmacy school: Fill the gap between college and hospital	Add another course of hospital training to the curriculum  Encourage the development of pharmacy specialties	<i>"One hospital training course does not add much; we need real intensive hospital training for a long time"</i> (Ph. 14). <i>"When pharmacists specialize in a specific field, they tend to be creative and more productive because they are not distracted".</i> (Ph. 13) <i>"A graduate pharmacist should have a specialization from the College of Pharmacy, for example, in stock management, clinical pharmacy, or other patient-oriented specialties"</i> (Ph.5) <i>"There should be examinations for pharmacists before appointment to grant the pharmacy license; it is not right to put them in hospitals immediately after graduation".</i> (Ph. 18) <i>"Because the Ministry of Health cannot accommodate more pharmacists, the number of private pharmacy schools must be reduced."</i> (Ph. 11) <i>"Because of the noticeable lack of competency among graduates of private pharmacy colleges, these schools must be closely observed and guided."</i> (Ph. 22)
Pharmacy school: Suitable number of newly accepted students	Impose a universal exam after graduation to grant the pharmacy license  Limit opening of more pharmacy schools  Establishing strict procedures to ensure the scientific credibility of private pharmacy schools	<i>"Those who provide CME must be professional and very skilled so they can deliver information in a useful, easy, and not boring way."</i> (Ph. 5) <i>"Following graduation, pharmacists must complete a one-year program that prepares them to work in hospitals".</i> (Ph.21) <i>"The period between the student's graduation and their appointment must be used for training to be qualified for work in hospitals"</i> (Ph. 4). <i>"We hope that pharmacists will strive to develop their scientific skills by their will, not compulsion, because science is developing, especially in the medical field."</i> (Ph. 16) <i>"Pharmacists must improve and update their knowledge, by using phone apps that provide easily accessible clinical information"</i> (Ph. 1). <i>"There should be a continuing pharmacy education unit within the hospital with strict measures by the Pharmacy Division to improve the scientific level of pharmacists"</i> (Ph. 12) <i>"In my opinion, imposing obligatory methods to encourage pharmacists attending scientific lectures is very effective in improving their performance level."</i> (Ph. 23)
Hospital: Upgrade CME	Activate and enforce CME by providing professional scientific and practical activities  Conducting a comprehensive pre-appointment training course to improve pharmacists' clinical and management capabilities	<i>"To expand the role of a growing number of pharmacists, they can be engaged in the follow-up of patient's antibiotic stewardship."</i> (Ph. 8) <i>"Practicing pharmacists must provide mandatory training courses for newly appointed pharmacists; these courses must be practical, technical, and directed properly to give a positive reflection on the work environment"</i> (Ph. 8).
Hospital: Enhance pharmacists' willingness to learn	Pharmacists must be incentivized to improve their capabilities  Phone applications can improve hospital clinical pharmacists' performance  Enforce obligatory CME  Expanding the role of hospital pharmacists	
Hospital: Promote the role of practitioner pharmacists	Activating the role of practitioner pharmacists	

Many experienced pharmacists left the country due to unstable conditions. The practitioner pharmacists in this study expressed a feeling of shock when they entered the hospital for the first time. Especially when they are required to complete their tasks but cannot reconcile the previously learned information with real

practice in the hospital. They also emphasized the importance of focusing on the practical aspects of pharmacy education in a manner that promotes pharmacists' ability to perform their duties within hospitals. This finding agrees with an Iraqi study that revealed that pharmacy teaching in Iraq is still

characterized by a traditional lecture approach that is content-oriented for a large number of students in the session hall [17]. The main focus of education should switch from the fundamentals of science to clinical and integrated training that needs to use active-learning methods to give pharmacy graduates more advanced and practical skills. Instead of passively listening to lectures, active-learning methods teach the material in a way that encourages interaction. This helps students develop social communication and problem-solving skills that are essential for pharmacists to effectively perform their professional duties [18]. One review explains that many educational games can facilitate the delivery of information to the students of pharmacy schools; they can assist in conveying and reinforcing taught material [19]. This study identified another obstacle to which new pharmacists were exposed, namely a lack of experience with practical skills as a result of the electronic education that occurred during the COVID-19 pandemic. This is in agreement with two studies conducted in Iraq that revealed the extent of the impact of the sudden transition of pharmacy education from traditional to distance learning and the students' experience of the hybrid-education model at the University of Baghdad, which explain the challenges that faculty and students faced in education practically skilled-based sessions [20,21]. During the semesters of Spring 2020 and Fall 2021, and in response to the COVID-19 pandemic, all educational programs were abruptly switched to distance education within a few weeks [20]. This sudden transformation confused both teaching staff and students. In particular, practical training in hospitals is required for pharmacy students in their 4<sup>th</sup> and 5<sup>th</sup> stages, and while all hospitals have implemented health isolation policies due to COVID-19 infections at that time; thus, the COVID-19 pandemic had a negative impact on students' education, particularly hospital training. This study summarized the negative impact of a large number of both students and graduated pharmacists on how well they can receive proper training in their colleges first and in hospitals thereafter. The hospital's capacity cannot provide the suitable conditions and environment to train and supervise all of them by practicing (experienced) pharmacists. The assessment of the number of employed pharmacists provides an interesting and occasionally complicated picture of the pharmacist's role in hospitals [22]. Actually, a large number of private and governmental pharmacy schools were founded in Iraq in the last two decades (>60) [23,24], leading to a 195.5% increase in graduated pharmacists within six years (from 2013 to 2018). These substantial growth rates have not been accompanied by studies evaluating pharmacy practice environments [9,25]. pharmacy schools have been attractive to high school graduates to secure the appointment of graduating pharmacists by governmental institutions. In fact, the number of admitted students and graduating pharmacists is greater

than the need for governmental healthcare settings [26]. In 2023, a huge number (5757) of newly graduated pharmacists were appointed in Iraqi public hospitals [27]. In the US, there are worries about a possible excess of pharmacists because of the growing number. The National Center for Health Workforce Analysis (NCHWA) in the US conducted an analysis in 2018 that expected there would be more than 18,000 pharmacists than needed in 2030 [28]. Another study conducted in the UK and the U.S. revealed that the number of pharmacy schools has expanded by approximately 50% over the previous decade, whereas the United Kingdom workforce modeling has predicted a significant future oversupply of pharmacists [29]. The study participants emphasized the importance of CME and recommended making it mandatory for pharmacists to keep up with the latest medical updates and therapeutic protocols. These findings agreed with a previous Iraqi study, which demonstrated that the level of pharmacist education was not up to the expected standard and emphasized the critical need to implement pharmaceutical education in hospitals, similar to other developing countries [30]. According to the results of a recent study conducted in India, pharmacists also need further education in technical skills and social interpersonal communications [31]. Another Nigerian study indicated that pharmacists should be encouraged to do research to improve their professional competence and health care [32]. A multi-country study conducted in the Arab world also suggests that pharmacy education must receive more attention to better prepare pharmacy graduates for the dynamic global changes in pharmacy practice [12]. According to experienced pharmacists, new pharmacists exhibit a lack of interest in participating in scientific activities. They believe that learning new knowledge is not helpful in their daily practice. The others are the incentives that hardworking pharmacists receive in their work, appreciation for their efforts, and the quality of continuing medical or pharmaceutical education, which includes the extent to which the scientific activities are applicable in practice and the competence of those who deliver these activities. Likewise, a study in Kuwait indicated that pharmacists need adequate education and training to provide direct care to patients [16]. This study emphasized the need to expand the role of pharmacists in hospitals to include several duties such as clinical, patient counseling, medication safety follow-up, reporting adverse drug reactions, medication procurement, and administration. Hospital pharmacists in Iraq exert routine pharmaceutical care, which has not been expanded over the last two decades [11]. Some studies have shown the missing role of pharmacists in the COVID-19 pandemic [33]. On the contrary, a global study conducted in nine countries found that pharmacists played an important role in controlling the COVID-19 pandemic [34]. The interest of pharmacists in developing their skills and informing healthcare

providers would significantly contribute to overcoming many of the obstacles they face within hospitals. The most important of which is improving communication between pharmacists and other healthcare practitioners, including nurses [35]. Additionally, hospital pharmacists need to attract the administration's attention to their essential work resources, such as computers, adequate pharmacy rooms, suitable vehicles for shipping medicines, and others. One national study suggests that phone drug applications would be helpful for daily hospital pharmacy practice [13]. Other Iraqi studies assessed the impact of hospital pharmacist intervention on different clinical aspects, including medication safety and dosing [13,36,37].

## Conclusion

The performance level of newly graduated pharmacists in hospitals is suboptimal. Their skills need to be evaluated and enhanced. Several factors impact the level of this performance, including college-related and hospital-related factors. Education factors include the method of teaching in colleges and the qualifications of these colleges. Hospital features such as the qualifications for continuous medical education, tools and resources can also impact pharmacist performance. Close and integrated collaboration between the Ministry of Higher Education and the Ministry of Health is pivotal to enhancing the performance level of prospective pharmacists. Finally, controlling the number of admitted students to pharmacy colleges is critical to providing them with adequate training.

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## Conflict of interests

No conflict of interests was declared by the authors.

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## Data sharing statement

Supplementary data can be shared with the corresponding author upon reasonable request.

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