



Research Article

The PharmD Students' Beliefs, Perceptions, and Challenges Regarding their First Year in the PharmD Program: A Qualitative Study

Ameen Harith Hussain¹, Hawra Ali Hussain¹, Samer Imad Mohammed^{1*} 

¹ Department of Clinical Pharmacy, College of Pharmacy, University of Baghdad, Baghdad Iraq

Received: 15 May 2023; Revised: 18 June 2023; Accepted: 20 June 2023

Abstract

Background: The beliefs of pharmacy students in their curriculum may be critical to the success of medical education and the development of global health competences. **Objective:** To assess the beliefs, attitudes, and obstacles of PharmD students at the College of Pharmacy, University of Baghdad, during their first year in the newly adopted PharmD program. **Method:** In-depth qualitative interviews were conducted using flexible probing approaches. A sample of fourth-year PharmD students from the University of Baghdad's College of Pharmacy was selected using a purposive sampling method. The gathered data was analyzed using a thematic content analysis approach. **Results:** 40% of participants applied for the program because they believed it would improve their chances of finding work in the future. The majority of participants complained about the difficulties of the first course, citing the numerous themes as their greatest issue. Two individuals (13%) said the benefits were minor, while 40% said the subjects' difficulty allowed them to adapt and study faster and more efficiently. Six of the fifteen participants thought the information they were given was inadequate. Furthermore, more than half of the participants said the practical aspect was insufficient. Moreover, half of those polled advised decreasing organic chemistry because they thought it was superfluous. Sixty percent are hopeful about the future of PharmD in Iraq and believe that if it is well organized, it will be successful. **Conclusion:** Despite some challenges during the first year of the program, most participants are hopeful about the future of PharmD in Iraq and believe that it will be successful if it is well organized.

Keywords: PharmD program, Challenges, Curriculum, Students' beliefs, Students' perceptions.

معتقدات طلاب دكتور صيدلة وتصوراتهم وتحدياتهم فيما يتعلق بعامهم الأول في برنامج دكتور صيدلة: دراسة نوعية

الخلاصة

الخلفية: قد تكون معتقدات طلاب الصيدلة في مناهجهم الدراسية حاسمة لنجاح التعليم الطبي وتطوير الكفاءات الصحية العالمية. **الهدف:** تقييم معتقدات ومواقف وعقبات طلاب دكتور صيدلة في كلية الصيدلة بجامعة بغداد خلال عامهم الأول في برنامج دكتور صيدلة المعتمد حديثا. **الطريقة:** أجريت مقابلات نوعية متعمقة باستخدام مناهج سبر مرنة. تم اختيار عينة من طلاب السنة الرابعة دكتور صيدلة من كلية الصيدلة بجامعة بغداد باستخدام طريقة أخذ العينات الهادفة. تم تحليل البيانات التي تم جمعها باستخدام نهج تحليل المحتوى المواضيعي. **النتائج:** تقدم 40% من المشاركين بطلب للحصول على البرنامج لأنهم يعتقدون أنه سيحسن فرصهم في العثور على عمل في المستقبل. واشتكى غالبية المشاركين من الصعوبات التي تكثفت الدورة الأولى، مشيرين إلى المواضيع العديدة باعتبارها أكبر قضاياهم. وقال شخصان، 13%، إن الفوائد كانت طفيفة، في حين قال 40% إن صعوبة الأشخاص سمحت لهم بالتكيف والدراسة بشكل أسرع وأكثر كفاءة. يعتقد ستة من المشاركين الخمسة عشر أن المعلومات التي حصلوا عليها غير كافية. علاوة على ذلك، قال أكثر من نصف المشاركين إن الجانب العملي غير كاف. نصح أكثر من نصف الذين شملهم الاستطلاع بتقليل الكيمياء العضوية لأنهم اعتقدوا أنها غير ضرورية. ستون في المئة متفائلون بشأن مستقبل دكتور صيدلة في العراق ويعتقدون أنه إذا كان منظما بشكل جيد، فسيكون ناجحا. **الاستنتاج:** على الرغم من بعض التحديات خلال السنة الأولى من البرنامج، فإن معظم المشاركين متفائلون بشأن مستقبل دكتور صيدلة في العراق ويعتقدون أنه سيكون ناجحا إذا كان منظما بشكل جيد.

* Corresponding author: Samer I. Mohammed. Department of Clinical Pharmacy, College of Pharmacy, University of Baghdad, Baghdad, Iraq; Email: samer.jameel@copfarm.uobaghdad.edu.iq

Article Citation: Hussain AH, Hawra Ali Hussain HA, Mohammed SI. The PharmD students' beliefs, perceptions, and challenges regarding their first year in the PharmD program: A qualitative study. *Al-Rafidain J Med Sci.* 2023;4:102-108. doi: <https://doi.org/10.54133/ajms.v4i.124>

© 2023 The Author(s). Published by Al-Rafidain University College. This is an open access journal issued under the CC BY-NC-SA 4.0 license (<https://creativecommons.org/licenses/by-nc-sa/4.0/>).



INTRODUCTION

A Doctor of Pharmacy (PharmD) is a professional doctorate degree known as a clinical doctorate, a term only used in health professions. The professional doctorate degree emphasizes practice competencies, which differ from an academic doctorate [1]. The development of the PharmD program granted pharmacists increased privileges and responsibilities. Many hospitals, for instance, have granted their clinical pharmacists' certain prescribing privileges, enabling them to assume more significant roles and deliver more cost-effective and comprehensive care [2]. Medical education institutions must adopt a new training program to provide clinical pharmacists and prepare board-certified clinical pharmacists as specialists capable of keeping up with advances in all medical fields [3,4]. In 2017, planning began for the implementation of the PharmD program at the University of Baghdad's College of Pharmacy. Student participation in this study was determined to be voluntary and not obligatory [5]. In the planning, the duration was set at six years, but after approval, the duration of the program has been reduced to five years, and the college will also award a bachelor's degree in pharmacy that lasts five years. The curriculum for studying this program will differ from that for studying a bachelor's degree after the second stage, meaning that the first two academic stages (the first and second stages) for both studies will be identical. The study of the program began at the College of Pharmacy, University of Baghdad, in the academic year 2020–2021. After that, if the conditions are met in educational hospitals and there are sufficient numbers of holders of board certificates in clinical pharmacy and holders of higher degrees from instructors, it will be applied to the remaining pharmacy colleges [5]. The global perceptions of PharmD students regarding their program were not exhaustively investigated [6]. Pharmacy students view global health competencies as extremely important, but they recognize their deficiencies in this area. The current burden of global health education in surveyed institutions relies on the individual student experience instead of curriculum support [6]. No prior study has been conducted in Iraq to evaluate the beliefs and perceptions of newly established pharmacy students regarding their first academic year in the program. This study assesses the beliefs, perceptions, and challenges of College of Pharmacy, University of Baghdad PharmD students regarding their first year in the program.

METHODS

Study design and sampling

Qualitative, in-depth interviews with flexible probing techniques were carried out. Fourth-stage PharmD

students at the College of Pharmacy, University of Baghdad, were interviewed. Purposive sampling methods were used. Each participant identified as a potential respondent was individually asked for verbal consent after being informed about the study's purpose and procedures. The point of relative saturation determined the sample size in this study concerning the issues being discussed, which looked to be the point at which there was nothing more to learn and repetition occurred.

Inclusion criteria

Fourth-stage PharmD students in the College of Pharmacy, University of Baghdad, who completed their first year in the program and are interested in participating in the current study.

Data collection

A semi-structured interview questionnaire was used to elicit participants' demographic data, perceptions, benefits, challenges, and factors affecting the quality of the PharmD program. Interviews were conducted for 15–20 minutes per participant between November and December 2022. The original interview was conducted in Arabic, and the responses were conveniently rendered in English. The obtained data during each interview was documented by writing the response on a specific piece of paper using the participant's own words in English. The main researchers, with their supervisor, coded the content using QDA MINER LITE v2.0.9. These codes were used for the qualitative data sorting. A thematic content analysis approach was used to analyze the obtained data.

Ethical approval

Ethical approval was obtained from the Scientific and Ethical Committee at the College of Pharmacy, University of Baghdad. In addition, verbal consent was obtained from all the participants.

RESULTS

A total of 15 interviews with fourth-year PharmD students were done. Although there were 25 PharmD students in the College of Pharmacy, only 15 were chosen because this number had achieved saturation. Six men and nine women took part in the study. The ages of the participants ranged from 20 to 23 years, with a mean age of 20.8 years. Table 1 shows the themes discovered in this study, as well as the percentages of each subtheme.

The reason for choosing PharmD

According to Table 1, six of the participants (40%) chose the PharmD program because they thought it

Table 1: The themes and subthemes of the study

Theme	Subthemes	Percentage
The reason and aim for choosing PharmD	Better chance for future job	40
	Their expertise will be essentially needed in Iraq.	20
	Concentrate on clinical pharmacy.	40
	A new and interesting challenge	33.3
Opinions on 1 st year of the PharmD program	1 st -course difficulty	80
	The high number of subjects	40
	The program was successful.	60
	The program needs more organization.	26.7
Benefits and experiences obtained	Improved the practical side of the student	33.3
	Hospital training ability	6.7
	Improve the student learning skills.	40
	Give a better chance to interact with patients and doctors.	13.3
	Little or no experience	13.3
Thoughts on the type and quantity of subjects	Only a few subjects are good and necessary	60
	Contain some unnecessary subjects.	53.3
	High quantity of lectures	80
Opinion on the information that was received	Adequate	40
	Inadequate	46.7
	Variable	13.3
The most beneficial subject you learned	Pharmacology	20
	Community Pharmacy	53.3
	Communication skills	33.3
	pathophysiology	26.7
	Professional pharmacy practice	33.3
Opinion about the practical portion	Contain unnecessary parts	26.7
	Not adequate	53.3
	The facilities and equipment are bad.	33.3
	Adequate practice	33.3
	Variable opinion	20
Opinions about the teaching staff	Very good	60
	Variable	40
Challenges faced	No defined syllabus	20
	Unorganized schedule	26.7
	The high number of subjects in the first course	86.6
	Poor communication skills I have	6.7
	Living away from my family	6.7
Suggestions for improving the program.	Define the syllabus	26.7
	Solve the problems encountered	13.3
	Evaluate activity, not only grade.	6.7
	Reduce/shrink organic chemistry	53.3
	Focus on the practical and clinical parts.	26.7
	Make the program six years.	6.7
	Remove pharmacognosy	6.7
Future of PharmD in Iraq	Good future	60
	Not clear future	20
	Failure of the program	13.3

would give them a better chance of finding a job in the future, considering that they would be PharmD graduates. Moreover, many of them chose it because it is a new and interesting challenge, in addition to the fact that it focuses on clinical pharmacy and not organic chemistry. "I chose this program because there

are not that many clinical pharmacists in our hospitals, and there are a lot of BPharm graduates, so our hospitals need more clinical pharmacists, which means there would be a higher chance of employment for me as a PharmD graduate" [male, 21 years].

Opinion on 1st year of PharmD

When asked about their opinion of the first year of the PharmD program, most of the participants complained about the difficulty of the first course due to the many subjects, which made it a very difficult and stressful course. However, most of them think it would be a successful program overall if it was more organized, as shown in Table 1. "Honestly, the first course lacked organization, which made it very difficult and stressful due to the large number of subjects, but the second course was much better" [female, 21 years].

Benefits and experiences gained

Although two participants (13%) said the benefits were little to none, 40% said the subjects' difficulty made them adapt to harder work. They could study faster and become better students as a result. "I gained a lot of new information and knowledge, but I also learned how to study under pressure and use my time more efficiently" [female, 21 years]. "I learned how to study more difficult subjects in less time" [male, 20 years].

Thoughts on the type and quantity of subjects

As shown in Table 1, almost none of the participants are satisfied with the type and quantity of subjects. The majority think that the quantity was a lot, and most think there are unnecessary subjects. "I felt great pressure due to the large number of subjects and lectures given to us; I feel like some subjects could have been reduced as some of their content is unnecessary, like organic chemistry" [female, 20 years].

The information received

As shown in Table 1, the participants' answers conflicted when asked whether the information they received was adequate, as seven of them said it was inadequate and six said it was adequate. "I believe that the information I received in the subjects regarding clinical pharmacy was adequate, while the information in subjects like organic chemistry was either inadequate or unnecessary to begin with" [male, 21 years].

Most beneficial subject

As shown in Table 1, there were varying answers to the subject that the participants thought was the most beneficial, as most had more than one answer. However, it is interesting to note that none mentioned organic chemistry. The reasoning behind their choice varied according to their needs, as some of them already had good communication skills; therefore, they preferred subjects related to clinical pharmacy,

while others that faced problems interacting with patients preferred developing their communication skills. "I personally benefited the most from the clinical pharmacy and pharmacology subjects, as they proved useful in the summer training, and I did not have a hard time in the pharmacy as I already knew most of the drugs thanks to those subjects" [male, 20 years].

Opinion on the practical portion and the facilities

As shown in Table 1, when asked whether the practical portion was adequate, more than half of the participants said it was inadequate, owing to the fact that they did not find it useful. However, one-third found it adequate. However, one-third said the facilities and equipment are not at the required level. "The experiments and subjects studied were repetitive and could not help us gain practical experience." [female, 20 years]. "The types of equipment are old and not at the required level" [male, 21 years].

Opinions about the teaching staff

As shown in Table 1, more than half the participants praised the teaching staff and said they were very good at explaining and giving information and played a big role in trying to make the program successful. However, six participants (40%) had variable opinions, and they stated that some of the teaching staff were better than others, but they agreed that they did their best. "Honestly, the majority of the teaching staff were excellent and did their best to simplify things for us. However, they could not do much because the syllabus was the problem; the syllabus should be more organized for it to be more beneficial" [male, 22 years].

Challenges faced

As shown in Table 1, most participants complained about the number of subjects in the first course and said that it was the biggest challenge they faced due to its difficulty and the stress it caused. Less than a third of the participants said that one of the challenges was the unorganized schedule, which led to confusion and uncertainty about what lectures they had the next day. Four participants also said that, in addition to other challenges, they did not know the syllabus in advance, which they thought was stressful and challenging, as they did not know what they would study and were later surprised by many subjects. "There were many subjects in the first course, and it was very unorganized and still is. We did not and still do not know the subjects of the next course, which is very stressful for the student." [Male, 20 years]. "To be honest, the biggest challenge I faced was the lack of time to study all the lectures due to the huge number of subjects" [female, 21 years].

Suggestions to improve the program

The participants had many suggestions, as shown in Table 1; more than half suggested reducing organic chemistry as they found it unrelated to the course. Four participants (26.70%) suggested defining the syllabus in advance before the start of the year so the students knew what they would study. Four other participants suggested increasing the focus on clinical subjects to improve their skills and information and generate more experienced clinical pharmacists. Some students hoped that their problems would be heard and solved more often. "In my opinion, reducing the organic chemistry subject and increasing the focus on clinical pharmacy will help to reduce the pressure on students and also generate skillful clinical pharmacists" [male, 21 years].

The future of the PharmD program in Iraq

As shown in Table 1, more than half of the participants (60%) are positive about the future of PharmD in Iraq and think it will succeed if it is more organized. Two participants think the program is a failure because they think there is no future for clinical pharmacists in our hospitals. Three participants said that the PharmD program's future is unclear and that the following years will determine if it succeeds. "I think the future is very bright because there are not a lot of clinical pharmacists in our hospitals, and their expertise is much needed." [female, 23 years]. "The PharmD program is successful in Middle Eastern and developed countries, and it should be successful in Iraq if it is organized correctly." [male, 20 years].

DISCUSSION

This study is the first to assess the perception, benefits, challenges, and factors influencing the quality of the PharmD program for students in Iraq. The participants had a few different answers to their reasons for entering the PharmD program. A previous study at the University of Jordan reported that 71.9% of 192 undergraduate PharmD students at that university said they enrolled in the PharmD program to have better employment prospects [7]. This is similar to the results of the current study, in which 40% of participants said they joined for the exact same reason: a better job opportunity. Another 40% said that they chose it because it focuses on clinical pharmacy subjects instead of organic chemistry, as they find organic chemistry excessive and irrelevant, which is different from the results of a study at Julius Maximilian University in Germany, which concluded that German pharmacy students consider organic chemistry to be highly important for their future studies and to some degree relevant for their latest jobs [8]. This might result from differences in the curriculum between the two countries, which should be considered and might

necessitate possible future modifications to the syllabus. One-third of the participants chose it because it was a new experience and challenge for them. Similar to a study done at the University of Saskatchewan, Canada, in which a larger percentage of undergraduate PharmD students were either neutral or unsatisfied with their program than those who were happy [9], in the current study, the majority of participants expressed dissatisfaction towards the first course of the first year of the program. They reasoned that they had too many subjects and too little time to study them and did not benefit as much as they should have. However, many of those participants who were unsatisfied with the first course said that the second course was much better organized and there was a lot less pressure on them, and that is why more than half of the participants (60%) felt that the program could be a success if it were organized correctly. Less than half of the participants indicated that the main benefit and experience gained from their first year was their improved learning ability because they had to study many lectures under a lot of stress and time pressure. Furthermore, one-third of the participants believe they improved much on the practical side, mainly due to their newly gained knowledge and improved counseling skills. Similar to a study done at the University of Jordan that assessed PharmD students' perceptions towards a clerkship, in which there was low satisfaction regarding the content, quality, and quantity of the material [10], the present study showed that the majority of participants (80%) are not satisfied with the quality and quantity of subjects either. This could be attributed to the high number of subjects in the first course, as mentioned earlier, and because the students only found a few subjects beneficial and necessary, more than half of them felt that some subjects were unnecessary, especially the organic chemistry subject. Regarding whether the information the students received was adequate or not, the participants had different answers, as almost half of them believed that the information was adequate. Another 40% felt it was inadequate, while a few (13.30%) failed to give a clear answer. Interestingly, according to a previous study that explored the opinions of fifth-year pharmacy students at the University of Baghdad's college of pharmacy regarding the hospital training course, the majority of students stated that the hospital training course provides adequate information. This can be attributed to the University of Baghdad's College of Pharmacy's updated curriculum [11]. However, the diversity in answers in the current study regarding the adequacy of the information results from some satisfaction with some subjects and simultaneous dissatisfaction with others. Prior studies reveal that some questions were raised regarding the inadequacies within the curriculum of a newly introduced PharmD program in Pakistan, which were said to be the result of curricula

that are devised by highly non-technical personnel who have no idea about clinical pharmacy or pharmacy practice [12]. When asked which subject they thought would be the most beneficial, many students gave more than one response; nonetheless, more than half the students thought community pharmacy was the most beneficial, followed by one-third for both communication skills and professional pharmacy practice. These results indicate that students prefer subjects that make them better at their job in the pharmacy by improving their knowledge and counseling skills rather than subjects that are not always useful in the pharmacy. This is consistent with a study done in Canada in which both students and pharmacists identified therapeutics and patient counseling as critical focal points for the program [9]. The present study shows that one-third of the participants thought that the practical portion was adequate. However, there was general dissatisfaction regarding the practical portion, as more than half of the participants found it inadequate, one-third complained about the laboratories and equipment, and a few participants felt that there were many unnecessary parts. This result is concerning and requires further investigation as to why so many students did not find the practical portion useful. However, it could be the result of repetitive experiments as well as the impracticality of some lectures. This result is consistent with one study, which concluded that pharmacy graduates at a university in Sweden felt that lab experiments were less useful than lectures and seminars [9]. Regarding the opinion of the students towards the teaching staff, many of the participants (60%) believed that the teaching staff was very good, which is consistent with a study conducted at the University of Iowa that found that 64.5% of their pharmacy and PharmD students believed that preceptors served as role models of essential attitudes and skills in practice [13]. However, other participants (40%) had variable opinions, as they thought most of the teaching staff were good but some were not at the required level. Some participants thought that some subjects were too unmotivated, and the lecturer could not do much. An overwhelming majority of students (80%) expressed that the biggest challenge they faced was the huge number of subjects in the program's first course, which resulted in significant stress and a lack of time to study and comprehend the lectures. This is consistent with the findings of a study that evaluated the stress levels of third-year PharmD students at a particular university in the United States and concluded that these students reported relatively high levels of stress and that the majority of the stress was linked to the curriculum and examinations [14]. Another challenge for some participants (26.7%) was the unorganized schedule; another 20% complained about the lack of a defined syllabus before the beginning of the year. Both of these challenges could

be overcome with better organization and more communication with the students. More than half of the participants suggested either reducing or completely removing the organic chemistry subject, and a few participants (26.7%) suggested that the main focus should be on the clinical subjects, which is somewhat consistent with one study that suggests pharmacy curriculum should be revised regularly to fulfill main national needs, which can be more helpful to produce competent pharmacists [15]. Other participants made other suggestions, like defining the syllabus in advance to make it clearer for students. Almost two-thirds of the participants are optimistic about their careers and the program's future in Iraq, as they feel that clinical pharmacists are essential for our hospitals. This result is consistent with a study conducted at the University of Jordan in which more than half of their pharmacy and PharmD students were optimistic regarding the future of pharmacy as a profession [16]. However, a few participants (13.30%) believe the program is a failure because they feel there is not much difference between themselves and B. Pharm. graduates. Less than a quarter of the participants are uncertain about the program's future in Iraq since it has only recently been implemented, and they do not know what to expect. Notably, after the completion of the first year of the program, a comprehensive review was conducted, and several amendments were proposed and submitted to the Iraqi Ministry of Higher Education, which, if approved, could correct many of the negative aspects mentioned by the students.

Conclusion

Most participants are optimistic about the future of the PharmD program in Iraq and believe it will be successful if it is better organized, even though they encountered some difficulties during the program's inaugural year. Identifying the weaknesses in this newly established program can play a crucial role in assisting the student and ensuring the program's success.

Conflicts of interest

There are no conflicts of interest.

Funding source

The authors did not receive any source of fund.

Data sharing statement

All data are available upon reasonable request to the corresponding author.

REFERENCES

1. Pierce D, Peyton C. A historical cross-disciplinary perspective on the professional doctorate in occupational therapy. *Am J Occup Ther.* 1999;53(1):64-71. doi: 10.5014/ajot.53.1.64.
2. Gums JG. Changing the direction of clinical pharmacy outside the United States: time to step up. *Pharmacotherapy.* 2013;33(2):122-125. doi: 10.1002/phar.1247.
3. Rasheed JI, Abbas MH. Implementation of a clinical pharmacy training program in Iraqi Teaching Hospitals: Review article. *Iraqi J Pharm Sci.* 2017;21(1):1-5. doi: 10.31351/vol21iss1pp1-5.
4. Mohammed SI, Dawood EB, Abaas IS. Perceptions and attitudes of community pharmacists towards patient counseling and continuing pharmacy education programs in Iraq. *Iraqi J Pharm Sci.* 2019;28(2):30-36. doi: 10.31351/vol28iss2pp30-36.
5. Starting Pharm D Program in the College of Pharmacy, University of Baghdad. College of Pharmacy, University of Baghdad. 2017 [cited 2023 Apr 13]. Available from: <https://copharm.uobaghdad.edu.iq/?p=630>
6. Eneh P, Steeb DR, Cope R, Gim S, Northrop EF, Brearley AM, et al. Students' perceptions of global health competencies in the doctor of pharmacy (PharmD) curriculum. *Curr Pharm Teach Learn.* 2020;12(5):531-538. doi: 10.1016/j.cptl.2020.01.012.
7. Abdelhadi NN, Wazaify M, Darwish Elhajji FW, Basheti IA. Doctor of pharmacy in Jordan: Students' career choices: Perceptions and expectations. *J Pharm Nutr Sci.* 2014;4(3):213-219.
8. Wehle S, Decker M. Perception of the relevance of organic chemistry in a German pharmacy students' course. *Am J Pharm Educ.* 2016;80(3):40. doi: 10.5688/ajpe80340.
9. Taylor J, Mansell H, Perepelkin J, Larocque D. Ranking of curricular content by pharmacy students and community pharmacists. *Pharmacy (Basel).* 2022;10(4):71. doi: 10.3390/pharmacy10040071.
10. Almuqdad A, Yousef AM, Masoud Z, Majdalawi K, Al-Hadeed H, Kalabani R. An innovative teaching strategy for the outpatient clerkship program at Jordan university hospital a comprehensive approach to faculty development program. *Indian J Pharm Educ Res.* 2016;50(2):215-224. doi:10.5530/ijper.50.2.1.
11. Mohammed S, Alhilali D, Mubder N. Perception, benefits, and factors affecting the quality of hospital training course for pharmacy students: A qualitative study with recently graduated pharmacy students. *Open Access Maced J Med Sci.* 2022 Oct 23;10(E):1801-1806. doi: 10.3889/oamjms.2022.10819.
12. Jamshed S, Babar ZU, Masood I. The Pharm D degree in developing countries. *Am J Pharm Educ.* 2007;71(6):125. doi: 10.5688/aj7106125.
13. Young S, Vos SS, Cantrell M, Shaw R. Factors associated with students' perception of preceptor excellence. *Am J Pharm Educ.* 2014;78(3):53. doi: 10.5688/ajpe78353.
14. Marshall LL, Allison A, Nykamp D, Lanke S. Perceived stress and quality of life among doctor of pharmacy students. *Am J Pharm Educ.* 2008;72(6):137. doi: 10.5688/aj7206137.
15. Murtaza G, Ahmad M, Iqbal M, Khan SA, Ejaz M, Yasmin T. Pharmacy education and practice in Pakistan: A guide to further development. *Hacettepe Univ J Fac Pharm.* 2010;30(2):139-156.
16. Mukattash TL, Nuseir KQ, Biltaji E, Jarab AS, Alefan Q. Students' perceptions of pharmacy as a specialization and their future career, a cross sectional study of final year pharmacy students in Jordan. *Jordan J Pharm Sci.* 2015;8(3):195-205.