

Pharmacy students' knowledge and perception about the implementation of pharmaceutical care services in Jordan

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ABSTRACT

Background: The concept of pharmaceutical care was introduced to the literature by helper and strand before around thirty years, they defined it as "the provision of drug therapy for the purpose of achieving definite outcomes that improve a patient's quality of life". Jordan is still moving slowly toward implementing this service which showed numerous health and economic benefits since its implementation.

Objectives: This study aimed to measure pharmacy the knowledge and perception of pharmacy students approaching the completion of their studies towards pharmaceutical care and their readiness to implement it in their practice after graduation.

Methods: An electronic questionnaire was distributed via the internet to pharmacy and doctor of pharmacy students in public and private universities in Jordan. The questionnaire was composed of 35 question and was divided into three sections. Section one measured knowledge, while section two explored respondents' perceptions of pharmaceutical care. The final section collected respondents' demographic details.

Results: A total of 215 respondent took part in the study. The knowledge score of pharmaceutical care among respondents was 45%, although the vast majority of them stated that they completed at least one module regarding pharmaceutical care during their studies. On the other hand, almost 75% of respondents had a positive perception of pharmaceutical care in Jordan. Results showed statically significant differences among students regarding university type and academic year.

Conclusion: Though respondents completed pharmaceutical care courses during their studies, they had low knowledge regarding the term and its implementation. Combining didactic and experiential education in crucial to build proper practice capacities among future pharmacists.

Keywords: Pharmaceutical care; students; pharmacy; knowledge; perception.

1. INTRODUCTION

The history of pharmacy profession has noticed several turning points, in the past, pharmacists were only responsible for preparing medical products in a small scale, after the manufacturing development the scales got

enlarged, in this stage the role of pharmacists changed to compounding, dispensing and labelling preformed medical products (1). However, the most remarkable turning point was the invention of clinical pharmacy by the mid-1960s which adopted a patient oriented practice rather than a product oriented one and allowed pharmacists to interact more with doctors (2).

Despite this drastic change, the introduction of clinical pharmacy concept to the healthcare system was not enough and many outpatients suffered from drug related problems

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that could have been avoidable in a more developed health care system (3). Also, in 1975, Millis report stated that there was a large disparity between the advancement of pharmacotherapy and the level of knowledge regarding the use of therapeutic medications (2). All these factors paved the way for the introduction of the pharmaceutical care concept.

In 1990 the concept of pharmaceutical care was introduced to the scientific literature by helper and strand where it was defined as " the responsible provision of drug therapy for the purpose of achieving definite outcomes that improve a patient's quality of life" (4). Pharmaceutical care service appeared to be beneficial in improving patient adherence and solving drug related problems (5). Also, the application of pharmaceutical care resulted in more favorable scores of health outcomes in many studies (6, 7).

Taking into consideration that pharmacists are easily accessible and require no appointments for consultation (8, 9), this allow them to play a major role in the healthcare system either in treating or preventing diseases as well (10). Currently, more and more countries have authorized pharmacists to prescribe some medications; in the United States for example pharmacists can provide management for dyslipidemia and diabetes for some groups of patients (11).

In Jordan with the introduction of pharmaceutical care modules into the universities pharmacy curriculum and the opening of doctor of pharmacy program and masters of clinical pharmacy program (12), the level of pharmaceutical care knowledge among Jordanian pharmacists was satisfactory but the application of this service was limited (13).

also studies showed that more than half of the Jordanians general public are not familiar with the concept of pharmaceutical care and they perceived that dispensing medications is the major role of the pharmacist (14).

It is important to explore pharmacy students' knowledge about pharmaceutical care and their perceptions regarding it because simply they will be our future pharmacists and to know how to guide our

educational policies to optimize our educational outputs. This study is the first of its kind in Jordan targeting this segment, similar studies were conducted in Saudi Arabia and Qatar where students showed very positive attitudes regarding pharmaceutical care (15, 16). Although these studies did not measure students' knowledge of pharmaceutical care instead the researchers were only concerned with the attitudes, thus, the aim of this study is to assess knowledge and perception of undergraduate students about pharmaceutical care in Jordan.

2. Methods

2.1 Study design, subjects and data collection

This is a cross-sectional survey-based study that targeted students in many different public and private universities in Jordan. Data collection was started in May 2019 to September 2019 so it took around four months to reach our sample size of 215 participants from students who study bachelor degree of pharmacy and who study doctor of pharmacy degree as well. We considered the students in the fourth academic year and higher eligible to enter the study.

The survey was electronic and we made sure that the identity of participants kept anonymous. We stated in the survey that filling it would take approximately 15 minutes. Having been given this information, they were asked about their willingness to participate in the survey.

2.2 Questionnaire design

Following an extensive literature review on the pharmaceutical care in Jordan, a questionnaire was proposed and designed to suit our planned scope of study (15-17). The questionnaire was examined by experts in the field of clinical pharmacy to validate it and was piloted on 50 pharmacy students who were excluded from the study results.

The questionnaire consisted of 35 questions divided in three sections: 1) knowledge of pharmacy student of pharmaceutical care, this part consisted of ten true or false statements about pharmaceutical care to evaluate students' knowledge, 2) perceptions of pharmacy students about the

environment, the qualifications and conditions needed to implement pharmaceutical care correctly and this part was mainly in the form of Likert scale questions, 3) demographics to allow us to compare between participants based on their demographic variations.

The knowledge related part consisted of a quiz that was made to evaluate pharmacy students' knowledge about pharmaceutical care. It consisted of 10 statements, some were true, and the others were false. Pharmacy students were awarded one grade if their answers were correct and zero grade if the answer was false. Finally, a total knowledge score out of 10 was calculated for each pharmacy student.

2.3 Ethical approval

The final version of the questionnaire with full study outline were approved by the research on human being committee of the Institutional Review Board (IRB) at Jordan University of Science and Technology (JUST) (Approval No. 435-2019).

2.4 Data analysis

Following data collection, the survey responses were coded and entered into a customized database using the

Statistical Package for the Social Sciences (SPSS), Version 21.0 (IBM Corp., Armonk, New York, USA). Descriptive results were presented as means and standard deviations for continuous variables and percentages for qualitative variables. An Independent sample t-test was performed to identify factors significantly affecting knowledge scores. All tests were two-tailed. A P-value of <0.05 was considered statistically significant.

3. Results

In this study, we were able to approach only 215 pharmacy students' who are in their final study years who filled the questionnaire and participated in the study. Of the respondents 81.9% (n= 176) were females while 18.1% (n=39) were males. The average age of respondents was 22.9 years; nearly two-thirds of the participants (n= 142) were enrolled in the doctor of pharmacy program and the around the same percentage of students reported that they are studying in public university with 61.4% of them (n= 123) being in the fifth or sixth academic year. Socio-demographic characteristics of the participants are showed in Table 1.

Table 1. Socio-demographic characteristics of the study participants (n= 215)

Parameter	n (%)	Mean (±SD)
Gender	39 (18.1)	
▪ Male	176 (81.9)	
▪ Female		
Age (years)		22.9 (±2.3)
Academic year		
▪ 4 th year or less	83 (38.6)	
▪ 5 th or 6 th year	132 (61.4)	
Current educational program		
▪ BPharm	75 (34.9)	
▪ PharmD	140 (65.1)	
University classification		
▪ Public University	142 (66.0)	
▪ Private University	73 (34.0)	

Regarding students' knowledge of pharmaceutical care, their knowledge score was 45% in the true or false

knowledge evaluating section, which represents unsatisfactory level of knowledge. The lowest three

statements that had correct answers were "Identifying drug therapy problems is a part of the care plan in the pharmaceutical care process", " Any documentation system of drug therapy problems must consist of at least the type of the drug therapy problem and its cause" and " During pharmaceutical care application the pharmacist is

responsible of providing the most effective and the cheapest drug" with 3.3% (n=7), 5.6% (n= 13) and 18.6% (n= 40) correct answers, respectively. Table 2 represents the Assessment section of pharmacy students' knowledge of pharmaceutical care.

Table 2. Assessment of pharmacy students' knowledge of pharmaceutical care (n= 215)

Statements	Correct Answer, n (%)
Pharmaceutical care components can be summarized by obtaining drug related needs and identifying drug therapy problems	192 (89.3)
During pharmaceutical care application the pharmacist is responsible of providing the most effective and the cheapest drug	40 (18.6)
Pharmaceutical care plan must be individualized and be obligatory to clinical pharmacists, not all pharmacists	147 (68.4)
Duplication is an example of unnecessary drug therapy	128 (58.6)
The aim of pharmaceutical care is to restore the patient to his normal physiological functioning	41 (19.1)
Taking the patient medical history is a part of the pharmaceutical care assessment process	208 (96.7)
Identifying drug therapy problems is a part of the care plan in the pharmaceutical care process	7 (3.3)
Any documentation system of drug therapy problems must consist of at least the type of the drug therapy problem and its cause	12 (5.6)
Taking too little dose of the correct drug is a problem in the adherence issues	75 (34.9)
Pharmaceutical care is the same as clinical pharmacy	125 (58.1)
Knowledge score (out of 10), mean (SD)	4.5 (1.3)

Despite this low level of knowledge resulted in the questionnaire, 83.3% of respondents (n= 179) reported that they have already started their mandatory training in community pharmacies also 95.4% of the students (n= 205) stated that they were introduced to pharmaceutical care in the university curriculum in at least one module.

The Simple linear regression analysis for risk factors affecting students' knowledge about pharmaceutical care

represented statistically significant differences with regard to academic year level and type of university (P-values <0.05) but it failed to show significant differences regarding gender, age and academic program (P-values >0.05). Table 3 represents the results of simple linear regression analysis for risk factors affecting students' knowledge about pharmaceutical care.

Table 3. Evaluation of risk factors affecting students' knowledge about pharmaceutical care (n= 215)

Variables	Students' Knowledge Score	P-value
Gender		
▪ Males	4.3 (±1.5)	0.354
▪ Females	4.6 (±1.2)	
Academic years		
▪ 4 th year	4.2 (±1.2)	0.005*
▪ ≥ 5 th year	4.7 (±1.3)	
Academic program		
▪ BPharm,	4.7 (±1.2)	0.081
▪ PharmD	4.4 (±1.3)	
University type		
▪ Public	4.7 (±1.3)	0.011*
▪ Private	4.2 (±1.2)	

*Significant at a P-value <0.05

Regarding students' perceptions about pharmaceutical care, 92.1% of the participants (n= 198) stated that they fully support the concept of pharmaceutical care, they also considered pharmaceutical care as a multistep process aiming to improve patients' quality of life whereas 57.2% of them (n= 123) perceived that pharmaceutical care is just an extension to the currently existing pharmacy services. Around 63% of respondents (n= 135) aim to extend pharmacy services beyond dispensing for developing their profession. Only 29.3% (n= 63) agreed that pharmaceutical care services should be paid. Only 21.9% (n= 47) perceived that pharmaceutical care is the doctors' role while nearly 41% (n= 87) thought that doctors and other health professionals will not support a

pharmaceutical care role for pharmacists. Addressing teaching of pharmaceutical care, 91.6% (n= 197) considered it important for the students and around half of respondents (n= 121) stated that Jordan universities teach pharmaceutical care clearly. Nearly three-quarters of the participants consider themselves able to identify drug related problems in patients. Table 4 addresses the assessment of pharmacy students' perception about pharmaceutical care.

Additionally, around 41% of participants are satisfied with what they were taught of pharmaceutical care at their universities Also, 19.1% (n= 41) presumed that more than half of the pharmacists in Jordan provide pharmaceutical care at their workplace

Table 4. Assessment of pharmacy students' perception about pharmaceutical care (n= 215)

Statements	Strongly Agreed/Agreed n (%)
Pharmaceutical care requires the use of specialized computer software	150 (69.8)
Pharmaceutical care is just an extension of current pharmacy services	123 (57.2)
In pharmaceutical care the pharmacist identifies and manages a patients existing and potential drug-related problems.	184 (85.6)
Pharmacists require a post-graduate qualification to practice pharmaceutical care in Jordan.	163 (75.8)
Pharmaceutical care involves a defined process, all steps of which must be completed in order to provide this service.	191 (88.8)

Statements	Strongly Agreed/Agreed n (%)
The primary aim of pharmaceutical care is to improve the patients' quality of life.	198 (92.1)
All patients taking medicines require pharmaceutical care	167 (77.7)
The future success of pharmacy will depend on payment for the provision of professional services other than dispensing	135 (62.8)
I fully support the concept of pharmaceutical care	198 (92.1)
Pharmaceutical care is really the doctors' role	47 (21.9)
Pharmaceutical care requires major up-skilling of clinical knowledge	190 (88.4)
Doctors and other health professionals will not support a pharmaceutical care role for pharmacists	87 (40.5)
Jordan's universities teach the principles of pharmaceutical care clearly	121 (56.3)
Teaching pharmaceutical care is important for pharmacy students	197 (91.6)
I think that I have the ability to identify drug related problems in patients	160 (74.4)
I consider pharmaceutical care services should not be offered for free	63 (29.3)

4. Discussion

While a study conducted in Jordan showed that applying pharmaceutical care in patients with type 2 diabetes was correlated with improving HbA1c, fasting blood glucose, lipid profile and patient adherence, but still the concept of pharmaceutical care is still in developing stage (18). This fact can be also deduced from viewing the lack of knowledge about pharmaceutical care from the general public (14). Although a study in Jordan on pharmacists revealed that they had a good understanding level of pharmaceutical care concept while the provision itself for this service remains limited (13). Several problems in the healthcare system and educational system may be concluded from these aforementioned facts, also a study on children revealed unsatisfactory level of knowledge with regard to implementing pharmaceutical care on paediatric patients in final year pharmacy students segment (19). Furthermore, AbuRuz et al. demonstrated the effective role of clinical pharmacist in monitoring medications safety and management of chronic kidney disease complications for hospitalized patients (14). Another study in Jordan found that only 23.1% of pharmacists created a therapeutic plan to be included within the patient's permanent record in their pharmacy, in this study pharmacists showed a desire for practicing

pharmaceutical care, however, the application of pharmaceutical care was limited because of lack of pharmacists practice and the rejection of doctors to implement pharmaceutical care (20).

This is the first study conducted on pharmacy students' segment in Jordan to evaluate their level of knowledge about pharmaceutical care and their perceptions with regard to it. The study demonstrates a score of knowledge equals to only 4.5 out of 10, the answers on the ten true or false statements indicates that students were confused in pharmaceutical care steps especially when it comes to identify and resolve drug therapy problems. Nearly 97% of them answered wrongly in a statement classifying "drug therapy problems identification step" in the care plan step in pharmaceutical care.

The answers on the first section also revealed that students in Jordan do not know how to document a drug therapy problem, maybe we can return this to the lack of practical experience on pharmaceutical care among students, although the majority of them reported that they started their 1440 training hours. This fact leads us to question our mandatory training and practices in community pharmacy and investigate the extent of pharmaceutical care application in our community pharmacies.

The level of knowledge of pharmaceutical care appears to be higher in students with higher academic level and those students in public universities rather than private ones. Many explanations may be suggested to justify these findings perhaps the level of knowledge wiring and connection increase while the students proceed in their academic years, also the many factors like the higher competitiveness in public universities may contribute to the increased knowledge score in it.

Regardless of the level of knowledge, students show positive attitudes regarding pharmaceutical care application. The majority of them believed that pharmaceutical care provision is valuable and that the primary goal of pharmaceutical care is improving patients' quality of life. These findings are consistent with other studies conducted in Saudi Arabia and Qatar (15, 16).

More than three-quarters of participants presumed that in order to provide pharmaceutical care the pharmacist must have post-graduate qualification and around 88% of respondents reported that providing pharmaceutical care requires major up-skilling in clinical knowledge, these high percentages for those two questions may indicate that students perceive providing pharmaceutical care as a challenging issue these findings resemble those of the study of pharmaceutical care attitudes in Qatar where 76% of respondents believed that providing pharmaceutical care takes too much time and effort (16)

In our study almost three-quarters of participants perceived themselves able to identify drug related problems in patients while in a study in the United States students rated themselves to have moderate ability in identifying drug therapy problems (21).

Nearly half of the participants only thought that Jordanian universities teach pharmaceutical care principles clearly and around half of the participants indicate that they are not well satisfied with what they had

taught in Jordanian universities about pharmaceutical care. These results highlight the increasing need to develop pharmacy curriculum in Jordanian universities to meet student's expectations which focused more on pharmaceutical care topics and maybe implementing training sections during university studies in order to help students practicing pharmaceutical care under specialists' supervision. It is noteworthy here that lack of previous practicing on pharmaceutical care was reported as the top barrier rendering the implementation of pharmaceutical care in a study conducted on Jordanian pharmacists (13).

This study showed that around 62% of pharmacy students aim to extend their future roles beyond dispensing only and they think that the development of the pharmacy profession will depend on the provision of other pharmaceutical services, perhaps if the statement regarding this point did not include the payment condition the percentage of agreement between students will be higher this assumption could be reasonable when we notice that only 29.3% of the participants agreed or strongly agreed on putting payments on pharmaceutical care services.

One of the major limitations of this study is that findings cannot be generalized and the inherent biases of self-reported questionnaires.

5. Conclusion

Conclusively, pharmacy students showed positive attitudes regarding pharmaceutical care, the participants showed low level of knowledge it despite that the majority of them begun their mandatory pharmacy training, further investigation should be done to figure out the causes of this unsatisfactory level of knowledge and how to solve this problem.

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7. Conflict of interest

The Authors declare that there is no conflict of interest.

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معرفة وتصورات طلاب الصيدلة في الأردن عن خدمات الرعاية الصيدلانية

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ملخص

مقدمة: تم تقديم مفهوم الرعاية الصيدلانية إلى الأدب العلمي قبل حوالي ثلاثين عامًا، وقد عرف على أنه "توفير العلاج الدوائي لغرض تحقيق نتائج محددة تؤدي إلى تحسين نوعية حياة المريض". في الأردن ما زلنا نمشي ببطء نحو تنفيذ هذه الخدمة التي أظهرت العديد من الفوائد الصحية والاقتصادية منذ ظهورها.

الأهداف: هدفت هذه الدراسة إلى قياس مستوى معرفة طلبة الصيدلة في السنة النهائية بمبادئ الرعاية الصيدلانية وتصوراتهم بشأنها في الأردن. الأساليب: تم توزيع استبيان إلكتروني عبر الإنترنت على طلاب الصيدلة و دكتور الصيدلة في الجامعات العامة والخاصة، وتم تقييم معرفتهم بالرعاية الصيدلانية في القسم الأول من الاستبيان، من خلال عشرة جمل اختيارية تتراوح اجابتها بين الصحيح والخطأ، والقصد من القسم الثاني هو تحديد تصورات الطلبة بخصوص الرعاية الصيدلانية بينما يهدف القسم الثالث الى تحديد التركيبة الديمغرافية للمشاركين.

النتائج: أجاب ما مجموعه 215 طالبًا على الاستبيان، وكانت درجة المعرفة بالرعاية الصيدلانية بين الطلاب 45% على الرغم من أن الغالبية العظمى منهم ذكرت أنهم أخذوا مساقًا واحدًا على الأقل فيما يتعلق بالرعاية الصيدلانية في سنوات دراستهم، بالإضافة الى ذلك أظهر 75% من الطلاب تصورات ايجابية مرتبطة بخدمة الرعاية الصيدلانية. أظهرت النتائج وجود فروق ذات دلالة إحصائية بين الطلاب فيما يتعلق بنوع الجامعة والسنة الأكاديمية للطلبة.

الخلاصة: كان مستوى المعرفة غير مرضيًا مما يشير إلى أنه ينبغي للجامعات التركيز أكثر في تدريس مواد الرعاية الصيدلانية فيها وتطبيق تدريب ميداني على مبادئ الرعاية الصيدلانية

الكلمات الدالة: الرعاية الصيدلانية، طلاب الصيدلة، معرفة، الأردن .

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