

# Improving pharmacy education at the Public Faculties of Pharmacy in Jordan: Students' experience and expectations

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## Abstract

### Introduction

Pharmacy education and practice have developed rapidly worldwide in the past few years. This has prompted a re-evaluation of pharmaceutical education in Jordan. This study explored final year pharmacy students' experiences and expectations of pharmacy education as a prelude for designing delivery of a revised pharmacy curriculum.

### Methods

A validated and pre-tested questionnaire was administered to final-year students at the two public faculties of pharmacy in Jordan. Data then was coded and statistically analyzed. Responses from open questions were subjected to thematic analysis.

### Results and Discussion

A total of 308 students completed questionnaires from the 2 universities (JU, n=191 and JUST, n=117). Students still mainly relied on classroom teaching and devoted little time to self-directed study. They were receptive to change and offered some suggestions to improve the curriculum. For some of the questions, there was a significant difference between the responses of students at the two universities.

**Keywords:** Curriculum, development, Jordan, pharmacy, pharmaceutical care

## Introduction

### Developments in Pharmacy Education Worldwide

Recently, and with the continued evolution of information technology, a shift has been noticed from the traditional pharmacy education which consisted of didactic, subject-oriented, and knowledge-based teaching (Barzak *et al.*, 2001; Poirier *et al.*, 2007) towards a more modern approach to teaching that depends on problem-based learning (Ross *et al.*, 2007), and the use of high tech facilities and the internet with less focus on the traditional lecturing (Matowe *et al.*, 2003; El-Awady *et al.*, 2006). This also reflects the evolution of pharmacy from a drug-centered to a patient centered profession. Course development is led by individual higher

education institutions, although in most countries it is advised and monitored by government and/or professional bodies. The American Association of Colleges of Pharmacy (AACCP) published a major report in 1993 on outcome goals to facilitate the transformation of curricula to enable practitioners to deliver pharmaceutical care (American Association of Colleges of Pharmacy, 1993). The AACCP initiatives were developed by the Center for the Advancement of Pharmaceutical Education (CAPE), which has continued to consult and advise and whose latest revision of educational outcomes, based on pharmaceutical care, systems management, and public health, was published in 2004 (American Association of Colleges of Pharmacy, 2004).

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In the United Kingdom, pharmacy degree courses underwent a radical change in 1997, with the move from a 3-year bachelor degree in pharmacy to a 4-year master of pharmacy (MPharm) degree (Sosabowski and Ingram, 2003). In addition to requiring accreditation for pharmacy degree courses through the Royal Pharmaceutical Society of Great Britain (RPSGB), UK faculties of pharmacy have been required to follow the 2002 guidelines of the Quality Assurance Agency (QAA) for higher education (Quality Assurance Agency, 2006). These guidelines stipulate that the pharmacy degree establishes a basis of learning that continues throughout the pharmacist's career, including recognition and analysis of problems and planning of strategies for their solution (Sosabowski and Ingram, 2003).

Moreover, The Pharmacy Consortium for Computer Assisted Learning (PCCAL) was established in the UK in 1992 and was comprised of the 16 faculties of pharmacy in UK universities (The Pharmacy Consortium for Computer Assisted learning, 2007). The main objective of this project was to exploit the technological advantages of computer assisted learning to increase the efficiency of teaching and students' access to learning resources.

Similar developments in pharmacy education are being implemented in many countries worldwide (Morteza *et al.*, 2003; van Mil and Schulz, 2006). This pattern is also beginning to emerge in the Middle East, where efforts are being made to update pharmacy curricula and to introduce more appropriate methods of teaching and learning (Matowe *et al.*, 2003; Wazaify *et al.*, 2006; El-Awady *et al.*, 2006).

#### *Pharmacy Education and Professional Practice in Jordan*

In Jordan, pharmacy education is provided by 8 faculties of pharmacy, two of which, The University of Jordan (JU) in Amman and Jordan University of Science and Technology (JUST) in the northern city of Irbid are public. The average number of pharmacy graduates in Jordan per year is around 1000 (748 in 2002-2003, personal communication, The Ministry of Higher Education, Jordan, April 2005).

In general, faculties of pharmacy in Jordan comprise 3 main departments: Biopharmaceutics and Clinical Pharmacy, Pharmaceutics and Pharmaceutical Technology, and Medicinal Chemistry and Pharmacognosy. In addition to the BSc. Pharm program, JU (since 2005) and JUST (since 2000) now offer a 6-year doctor of pharmacy (PharmD) degree program.

In order to graduate with a BSc. Pharm degree in Jordan, students are required to complete 160 credit hours of

university and faculty requirements (at the time this article was written) and 1440 hours of practice training throughout the 5-year pharmacy program in community pharmacies, hospitals, or industry. For the PharmD program, the number of credit hours required is 219. The sixth year of study of the PharmD program is the experiential year during which students spend 14 weeks in community and hospital pharmacies, followed by 8 consecutive 4-week rotations in various medical specialties such as pediatrics, internal medicine, and surgery. This program was designed to meet the increased need for specialized pharmacy services in Jordan and the neighboring countries.

The language of instruction for all pharmacy teaching in Jordan is English. The Faculty of Pharmacy at JU is taking steps in the direction of being internationally accredited, in collaboration with the QAA in the United Kingdom and the ACPE in the USA (Wazaify *et al.*, 2006).

Teaching methodology in Jordan faculties of pharmacy in general combine traditional didactic lecturing with more modern methods of instruction based on interactive discussions, research, and creative thinking. Didactic teaching is supplemented by interactive multimedia teaching techniques such as videotapes, slide shows, and other computer-based instructional material. The establishment of e-learning courses in different areas of pharmacy mainly at the government-sponsored faculties plays a major role in promoting self-learning among students. Examinations in Jordan are a mixture of short-answer questions and multiple-choice questions. Though there are limitations to this method of evaluation, it appears to be the most suitable for such a large number of students, especially in settings where English is not the first language. Oral examinations are also included in formal student assessments. Short reports and presentations are routinely used for assessing students in all 8 Faculties of Pharmacy in Jordan.

The majority of pharmacists (93%) in Jordan work in the private sector. Community pharmacies are the most accessible primary health care facilities in Jordan with over 2000 registered pharmacies distributed throughout the country (Total area: 92,300 km<sup>2</sup>; Inhabitants: 5.611 million, 2004 estimate). However, patients rarely consider community pharmacies as health care facilities. This leads to limited interaction between pharmacists and patients, resulting in a poor public image of community pharmacists. On the other hand, although clinical pharmacy in Jordan, similar to other countries in the region, is still in the embryonic phase of development, so far the patient care-oriented PharmD and Clinical Pharmacy programs have graduated pharmacists who are capable of providing better pharmaceutical care to patients

and improving this image.

As a result of the large number of faculties of pharmacy in this small country, the high number of pharmacy graduates (231 in JU and 219 in JUST in academic year 2005–06), and the competition among universities, the faculties are devoted to acquiring the latest knowledge in pharmacy and are always striving to improve the quality of education. Qualified students are usually offered scholarships to earn doctor of philosophy degrees from the United States and Europe. Many of these students are now faculty members. This has established the need for continuous curriculum development. The first stage of which was to conduct a research to provide baseline data about the current situation at the public universities. This study aimed to explore BSc. Pharm. students' experience and expectations about pharmacy education in the main and oldest two public faculties of pharmacy in Jordan, and to provide information for designing delivery of a revised pharmacy curriculum.

## Methods

A structured questionnaire was developed to investigate student's opinion on a number of issues relating to their respective pharmacy degree course. The questionnaire was designed based on the one used by El-Awady et al. (2006) with certain amendments that would apply to pharmacy education in Jordan. It aimed mainly to determine:

- How many credit hours they have completed to date;
- Whether pharmacy had been the student's first choice as a career, and what was the main reason for choosing the pharmacy degree;
- What subject on the degree they like the best and why;
- How many hours per week they currently spent attending classes doing course-related homework, and pursuing self-directed learning related to the course;
- Which type of teaching they find useful: practical classes, own learning, private lessons and lectures;
- How often they visited the library;
- What methods they used as study aids; and
- What changes they would make if they had an opportunity to change their course, in terms of the subjects taught and the teaching methods used on the course.

All 5<sup>th</sup> year BSc. Pharm. degree students were recruited from

the faculties of pharmacy at the two public universities: The questionnaire was administered at the end of all lecture sessions at both universities during April/May 2006 JU (n=191) and JUST (n=117). In order to avoid duplication, students who had filled the questionnaire in a previous lecture were asked to leave the room. Comparisons could therefore be made between students at the two different universities. Completed questionnaires were retrieved at the time of administration, thereby ensuring a 100% return.

Data from the questionnaire were analyzed using the software program *Statistical Package for the Social Sciences* (SPSS v. 14). Responses from most of the questions were quantifiable. Results were subjected to frequency analysis, non-parametric Mann-Whitney test or cross-tabulation with chi-square analysis, as appropriate. Student responses to open-ended questions about how they would change the course were subjected to thematic analysis. The number of times each theme was cited by students was then recorded.

## Results

A total of 308 final-year BSc. Pharm. students completed questionnaires from the two universities (JU, n=191 and JUST, n=117). Numbers quoted against each table exclude missing cases, where students declined to answer a specific question. The majority of respondents in both universities (n=236, 76.6 %) had completed more than 130 credit hours at the time of the study.

For question 1, "When you were deciding on which degree course to study, was pharmacy your first choice?" 44.2% of students responded "yes." Cross-tabulation and chi-square analysis between students from both universities showed that more JU students (69.9%) had pharmacy as their first choice than JUST students (30.1%; p=0.01). When asked about the main reason for choosing the pharmacy, many themes emerged which could be further grouped into 7 themes as summarized in Table I. More JU students reported choosing Pharmacy because it is a specialty that is "close to Medicine" than their JUST counterparts (p<0.05).

In questions 2-4, students were asked to indicate, on average, how many hours they spent per week on each of the activities specified: being taught by your teachers in lectures, practical classes, tutorials etc; homework, completing course work (for example, writing practical reports, writing essays etc); your own learning related to your degree course (for example, reading text books, journals, internet searches etc). Results are presented in Table II.

**Table II. Time in hours spent by Pharmacy Students at the two universities on Aspects of Learning (n=307)**

	Being taught	Homework	Self-Directed Learning
<b>Mean (± SD)</b>	16.4 (7.4)	10.4 (10.5)	7.4 (8.5)
<b>Median</b>	16	7	4
<b>Mode</b>	15	10	2

The students at both universities were scheduled for about 15 hours of teaching per week and the majority indicated that less time was spent on self learning or doing homework. With regard to homework, students spent a mean of 10.4 (± 10.5) hours per week; however, the actual amount of time spent differed widely among students. Students spent little time per week (mean 7.4 hours) with almost half (46.6%) spending 5 hours or less (Figure 1) on self-directed learning.

Comparison was made of the hours stated by students at the two universities. Data were generally non-parametric; therefore, the Mann-Whitney test was applied to compare data. Results are shown in Table III. There was a significant difference between JU and JUST students with respect to all aspects of comparison. Students of JUST were more likely to spend time being taught at the university than JU students. This may reflect different attitudes toward class attendance between the two universities. On the other hand, JU students claimed to spend more time per week on homework and self-directed learning than their JUST counterparts.

**Table III. Comparison of Average Time Pharmacy Students Spent on Aspects of Learning**

Type of Hours	JU Hours n (SD)	JUST Hours n (SD)	P
<b>Teaching</b>	14.9 (8.8)	18.6 (2.7)	0.000
<b>Homework</b>	11.2 (11.2)	9.1 (9.1)	0.016
<b>Own Learning</b>	8.9 (9.3)	4.8 (6.5)	0.000
JU= University of Jordan; JUST= Jordan University of Science and Technology			

In response to question 5, “on average, how frequently do you visit your university library during term time?” Almost two-thirds of the students indicated they visited the library less than once a week (Table IV). This pattern of use was different between the universities and cross tabulation and chi-square analysis showed that this difference was significant ( $p < 0.001$ ). At JU, the pattern of library use was much less frequent, with more than 75% of students using the library less than once a week. Higher percentages of JUST students used the library on a more frequent basis.

Question 6 asked, “Which of the following methods do you use regularly to help you to study for your degree?” The majority (n=184, 59.7%) of respondents used more than one learning method, most of which (n=140, 45.5%) was the combination of lecture handouts, own notes and textbooks.

**Table I. The main reasons for studying pharmacy as stated by student sample.**

Reason for entering the faculty of pharmacy expressed by students	JU and JUST, No. (%) (n=266)	JU, No. (%) (n=175)	JUST, No. (%) (n=92)
1. A specialty that is close to Medicine (e.g. student unable to study Medicine)*	51 (19.2)	39 (22.4)	12 (13.0)
2. Family related reasons (i.e. this ranged from recommendation to enforcement by a family member or having a pharmacist family member as a role-model)	31 (11.7)	14 (8.0)	17 (18.5)
3. Career opportunities (i.e. pharmacy opens versatile career opportunities from marketing or working to owning a pharmacy)	22 (8.3)	15 (8.6)	7 (7.6)
4. Had no other options because of university entrance procedures	53 (19.9)	32 (18.4)	21 (22.8)
5. Social status of a pharmacist (e.g. postgraduate title, good certificate in our society)	8 (3.0)	5 (2.9)	3 (3.3)
6. Most suitable for girls	10 (3.8)	5 (2.9)	5 (5.4)
7. I like pharmacy (or related subjects like biochemistry, chemistry; pharmacy is a useful blend of sciences)	83 (31.2)	61 (33.3)	25 (27.2)
8. More than one reason of the above	8 (3.0)	6 (3.5)	2 (2.2)
* The only statistically significant difference between the 2 universities occurs in this reason			

Table IV. Frequency of University Library Use (N=304)

	Frequency (%) JU+JUST	Frequency (%) JU	Frequency (%) JUST
At least once a day	18 (5.9)	10 (5.3)	8 (7.0)
A few times a week	38 (12.5)	13 (6.8)	25 (21.9)
Abut once a week	54 (17.8)	19 (10.0)	35 (30.7)
Less than once a week	194 (63.8)	148 (77.9)	46 (40.4)
<b>Total</b>	<b>304</b>	<b>190</b>	<b>114</b>

The preferred methods of learning in both universities are shown in Table 5. Only 8 students out of 308 reported using scientific journals in learning but this was only in combination with other methods. Students at JU used Internet sites and lecture handouts more regularly than students at JUST ( $p < 0.001$ ).

The last question was open-ended and students were invited to comment, on how they would change their degree course if they had the opportunity. They were specifically asked to consider the subjects taught and the teaching methods used in the course. They were also invited to provide other comments. A thematic analysis was performed on the responses received. The initial analysis identified 10 themes relating to subjects taught, 12 themes relating to teaching methods, and 10 themes categorized as general comments. These 32 themes were further grouped into 6 over-arching themes as follows:

1. Make the course more relevant to Pharmaceutical Care and/or Clinical Pharmacy (for example, omitting or decreasing the number of credit hours for some subjects while increasing or adding others) and inclusion of modern subjects (eg. Pharmacogenomics).

2. Orientate the course to improve students' understanding of the subject as well as their knowledge (for example, some subjects should be taught earlier in the 5-year course, study everything about body systems one by one as the case in the Faculty of Medicine-*Compartmental Approach*).

3. Stratify students in the final two years to specialize in certain areas of Pharmacy (eg. clinical, industrial, hospital or community pharmacy).

4. Improve the Exams and Grading system (eg. focus on student self-directed work, assignments and interaction with lectures rather than written exams).

5. Make the course more practical-oriented (for example, include more practical classes, increase field visits to factories etc, upgrade the equipments used in the laboratories).

Modernize teaching methods (for example, increase the use of computer software in teaching, internet and audiovisual technology in teaching, problem-based learning).

## Discussion

Continuous revisions of the curriculum to suit the changing role of pharmacist is always required. However, publications from the Middle-Eastern countries in this regard indicated slow changes that are starting to immerge (Matowe *et al.*, 2003; Morteza *et al.*, 2003; Al-Wazaify and Albsoul-Younes, 2005; Wazaify *et al.*, 2006). Introducing changes in the curriculum was one of the students' main requests in this study. They emphasized the importance of increasing the number of credit hours assigned for Pharmaceutical Care-related subjects in addition to the inclusion of modern subjects like pharmacogenomics. Moreover, they requested more focus on student self-directed work and interaction with lectures rather than written exams.

Table V. Comparison Between JU and JUST Students' Use of Learning Methods.

Study Method	Frequency (%) JU + JUST (n=307)	Frequency (%) JU (n=190)	Frequency (%) JUST (n=117)	Statistical Difference, JU and JUST
Your own notes	18 (5.9)	12 (6.3)	6 (5.1)	NS
Text books	16 (5.2)	11 (5.8)	5 (4.5)	NS
Internet sites	6 (2.0)	5 (2.6)	1 (0.9)	JU > JUST ( $p < 0.001$ )
Lecture handouts	81 (26.4)	66 (34.7)	15 (12.8)	JU > JUST ( $p < 0.001$ )
More than one method	184 (59.9)	96 (50.6)	90 (76.9)	NS

NS= No statistically significant difference

ACPE Standards emphasize “three Cs abilities” in pharmacy graduates: “a good curriculum must graduate pharmacists who are able to *Communicate and collaborate* with various persons in order to engender a *Cooperative team* approach to patient *Care*” (Poirier *et al.*, 2007). This is achievable by incorporating experiential sessions where the pharmacy students are responsible partners in the learning process through nurturing communication, cooperation, and collaboration among the students and faculty.

The three main reasons for selecting pharmacy as a major were either because they liked it as a specialization, having it as their only possible option in a public university through the aforementioned universities entrance procedure or because pharmacy is a specialty close to medicine. These results differ from a recent similar Egyptian study where 76.2 % of students in both private and governmental universities selected pharmacy as their first choice (El-awady *et al.*, 2006). The difference in students’ response is probably reflective of less freedom of choice among Jordanian high school graduates where the procedure of acceptance at the governmental universities is controlled by a single committee that assigns students to universities based on their high school GPA and list of choices. Moreover, including private universities (where students pay to study what they want) in such a study, as in the Egyptian study, would definitely increase the number of respondents in whom pharmacy is their choice.

A disappointing result was the low priority of self-learning. On average, students spent less than half an hour on self directed learning for each hour they spent being taught. This negative attitude towards non-classroom study is indicative of the method of evaluation adopted by both universities.

Evaluation is based on exams that measures students’ retrieval of information of the taught material. Both institutions have not yet adopted a student-centered approach to learning. This conclusion is enforced by students’ reliance on lectures/handouts as well as student’s notes of the lecture more than any other method. The current traditional method of teaching is “coverage oriented” rather than students’ understanding oriented (Daugherty, 2006; Bulatova *et al.*, 2007). Educators of pharmacy students have to balance between the amount of intended knowledge (material) the students should cover and activities and experiences that the students should be going through in order for this knowledge to be properly understood and used in future practice.

In this study, few students used textbooks and internet as sources of information. This highlights the necessity for improving instructional strategies and introduction of new

teaching methods (for example, problem-based learning, use of patient case studies, and student contact with role models in the pharmacy profession including community pharmacists). Such approaches would improve student’s own learning and make them more involved in their education options (Loennechen *et al.*, 2007; Ross *et al.*, 2007).

Moreover, students in this study highlighted the importance of sub-specialization in the pharmacy profession. This has been tried by some faculties of pharmacy around the world and proven constrictive in most cases (Laven, 2002; Taylor *et al.*, 2004; Welty, 2006). It is much easier choice to have a general degree of pharmacy that allows you to work in all pharmacy-fields. However, sub-specialization according to market needs would prove a better choice for most (Sramkova *et al.*, 2004). Moreover, inclusion of a final year project in the curriculum that is practice oriented and in collaboration with practicing pharmacists could prove an important tool of learning and qualifying pharmacy students in a sub-specialty for their future careers (Morteza *et al.*, 2003; Loennechen *et al.*, 2007).

#### *Limitations to the Study*

Although the questionnaire was anonymous, some parts of the study required self-assessment, so there was opportunity for respondents to give false answers in order to appear harder-working students (ie. a social desirability bias). Great care had to be taken in designing the questionnaire; however, students in Jordan are not regularly exposed to evaluative questionnaires and their first language is not English. Consequently, some responses, particularly with respect to estimated hours of study, may have been somewhat exaggerated as evidenced by the large standard deviations. Questionnaires were administered at the end of certain 5<sup>th</sup> year lectures. Some responses to the open questions may have been influenced by the subject of the lecture they had. The responses to the open questions were wide-ranging and thoughtful. It was not difficult to identify clear themes from the data. However, the interpretation of these themes was more difficult and the authors acknowledge that a number of alternative interpretations could be proposed.

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