

Familiarity and Attitude toward Pharmacovigilance among Pharmacy Academics in Jordanian Universities: A Cross-Sectional Study

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ABSTRACT

Background: Awareness of pharmacovigilance among pharmacy academics increases the students and graduated pharmacists' knowledge and skills in reporting adverse drug reactions (ADRs).

Purpose: The aims of this study are to assess the level of awareness about pharmacovigilance among pharmacy school academics in Jordan and to explore the current pharmacovigilance education, from the academics' point of view.

Method: A paper-based 24-item questionnaire was distributed in eight schools of pharmacy that accepted to participate.

Results: The questionnaire was completed by 87 pharmacy academics. Most participants were familiar with the concept of pharmacovigilance (79.3%) and the majority (96.5%) agreed to implement ADR reporting in the school curriculum. Despite this positive attitude, only 26.4% of participants had previously attended a workshop about pharmacovigilance and 36.8% were able to educate the students on how to report ADRs.

Conclusion: Pharmacy school academics in Jordan have a good familiarity and positive attitude about pharmacovigilance. However, the inclusion of topics about detecting, preventing, and reporting ADRs to the current school curricula is recommended.

Keywords: Adverse drug reactions, Pharmacovigilance, Pharmacy education.

1. INTRODUCTION

The safe use of medicines is a high requisite in the healthcare world, so the science of pharmacovigilance has emerged [1]. The World Health Organization defines pharmacovigilance as “*the science and activities relating to the detection, assessment, understanding and prevention of adverse effects or any other drug related problems*” [2]. Since adverse drug reactions (ADRs) are well known to cause morbidity and mortality or are associated with a lack of efficacy, overdose, abuse, or misuse, the reporting of ADRs is the cornerstone of

pharmacovigilance activity. Studies have shown that ADRs are responsible for large numbers of hospital admissions [3-6]. In the United States, more than 100,000 annual deaths are attributed to serious adverse drug reactions [6]. In the UK, about 6.5% of hospital admissions are reported to be due to an ADR, and the overall mortality was 0.15% [4]. On the other hand, underreporting of ADRs is a real problem within pharmacovigilance. For instance, only 6% of all drug reactions are thought to be reported [7]; the main reason for underreporting is “not knowing” how to report [7,8].

Only one study assessed pharmacists' knowledge and attitudes toward ADR reporting in Jordan [9]. However, the results suggested that pharmacists have insufficient knowledge about pharmacovigilance and the reporting of

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ADRs. In addition, the study concluded that educational programs in the reporting process are necessary.

It is known that the level of knowledge regarding ADR reporting might be a significant factor that affects pharmacists reporting ADRs. Studies have demonstrated how education in pharmacovigilance can enhance ADR reporting. Of particular interest is a Danish study, which showed how through adequate training, pharmacy students can greatly improve the detection and reporting of ADRs by pharmacists [10].

Numerous studies have been done to evaluate the knowledge about ADR reporting and pharmacovigilance among students in different countries. These studies showed that the students have insufficient knowledge about ADR reporting and pharmacovigilance [10-14]. However, the awareness of pharmacovigilance among pharmacy academics can increase the students' knowledge and skills in reporting ADRs, but whether this observation has been captured within pharmacy academics was not investigated in Jordan. Studies have focused on the practicing pharmacists within the community as well as students, but not the academics. Therefore, the aims of this study are to assess the level of awareness about pharmacovigilance among pharmacy school academics and to explore the level of pharmacovigilance education provided to undergraduate pharmacy students in Jordan from the point of view of academics.

Method

A cross-sectional survey was conducted to obtain data relating to the familiarity, awareness, and attitudes toward pharmacovigilance at Jordanian schools of pharmacy between February 2017 and March 2017 in the second term of the academic year 2016-2017. The ethical approval to conduct the present study was obtained from Isra University (1/11/16).

The questionnaire was written in the English language (the teaching language at Jordan Universities) and was designed by the authors after extensive literature review

on pharmacovigilance education. The draft questionnaire was tested for its face and content validity. Three independent members from the school of pharmacy assessed the relevance and clarity of the questionnaire and the ease of reading and understanding. The final version of the questionnaire was piloted among ten responses prior to launching.

The questionnaire consisted of 24 questions divided into three sections. The first section collected the demographic data of the respondents. The second section consisted of six questions and evaluated the respondent's familiarity with the definition of pharmacovigilance and policy in Jordan. The answer of each question was either yes or no, and a yes answer represented a familiarity with all questions. The last section explored the attitude toward pharmacovigilance teaching. It consisted of 5-item Likert scale questions from 1 (strongly disagree) to 5 (strongly agree). Strongly agree and agree answers for each question were considered as having a positive attitude for the respondent towards pharmacovigilance teaching.

After gaining the school ethical approval (1/11/16) to carry out the study, an invitation letter was sent to all Jordanian universities that provide a pharmacy program. The questionnaire was then distributed manually to the academics in Jordanian schools of pharmacy. Schools which accepted to participate in the study were visited once during the study period. All members who had either Masters or PhD degrees and who were available at the time of the school visit were invited to take part in the survey. Respondents were assured of the anonymity of the study and participation to the study was voluntary, i.e., completion and return of the questionnaires by the participants implied their consent. Our inclusion criteria were (1) Pharmacy academics in a pharmacy school in Jordan, (2) a PhD or Master degree holder, and (3) a staff member. Our exclusion criteria were (1) Lab supervisors even if they were master degree holders and (2) academics in the pharmacy schools whose major was not pharmacy.

Data Analysis

The data was analyzed using SPSS software version 19.0. Descriptive statistics were used to determine the mean and standard deviation (SD) for continuous variables and percentage for qualitative variables. The relationship between demographics (age, gender, education level, site of work, current position, specialty, and pharmacy practicing) and academics' familiarity with pharmacovigilance was assessed using the chi-square test. A P value of less than 0.05 was considered statistically significant.

Results

Demographics

Invitation letters were sent to all universities that offer

undergraduate pharmacy programs in Jordan (total = 14). Eight universities out of the approached universities accepted to take part in the present study with total responses of 87 pharmacy school members. The total number of academics in the participated universities was 280 members and each pharmacy school member available at the time of the school visit was asked to fill out the questionnaire delivered by hand with a response rate of 31.1%.

The demographic characteristics of the respondents are shown in Table 1. The majority of participants were aged between 35 and 44 years, and the average years of teaching were 8.1 years. In this study, females accounted for 63.1% (n = 53) of participants.

Table 1: Demographic characteristics of the study sample (n=87)

Parameter	Result (Mean ± SD) (Number (%))
<i>Age; N (%)</i>	
25-34 years	26 (29.9%)
35-44 years	43 (49.4%)
45-54 years	12 (13.8%)
≥55 years	6 (6.9%)
<i>Gender; N (%) Missing=3</i>	
Male	31 (36.9%)
Female	53 (63.1%)
<i>Educational level; N (%)</i>	
PhD	68 (78.2%)
Masters	19 (21.8%)
<i>Site of work; N (%)</i>	
Public university	39 (44.8%)
Private university	48 (55.2%)
<i>Total years of teaching experience</i>	8.09±7.46
<i>Current position; N (%)</i>	
Professor	9 (10.3%)
Associate professor	9 (10.3%)
Assistant professor	50 (57.5%)
Instructor, teaching assistant	19 (21.8%)
<i>Specialty; N (%)</i>	

Parameter		Result (Mean ± SD) (Number (%))
	Pharmaceutical science	33 (37.9%)
	Medicinal chemistry	17 (19.5%)
	Pharmacognosy	5 (5.7%)
	Clinical pharmacy	31 (35.6%)
<i>Pharmacy practicing; N (%)</i>		
	Yes	55 (63.2%)
	No	32 (36.8%)

Pharmacy School Academics' Familiarity Regarding Pharmacovigilance and ADR Reporting

Of the responding pharmacists, 87.4% heard about pharmacovigilance and 79.3% were aware about the exact definition of pharmacovigilance. Only 26.4% of the participating pharmacists attended a workshop about

pharmacovigilance. About half of the participants did not know about the presence of pharmacovigilance centers in Jordan and an official standardized form for reporting adverse drug reactions (43.7% and 49.4%, respectively). The results are presented in Table 2.

Table 2: Teaching fellows' knowledge toward pharmacovigilance concept and policy

Question	No. of respondents (%)
Have you heard about the concept of pharmacovigilance? (yes)	76 (87.4%)
Do you know the definition of pharmacovigilance? (yes)	69 (79.3%)
Have you ever had a course or attended a workshop about pharmacovigilance? (yes)	23 (26.4%)
Do you know that there is a pharmacovigilance center in Jordan? (yes)	38 (43.7%)
Do you know that whether there is an official standardized form for reporting adverse drug reactions in Jordan? (yes)	43 (49.4%)
Do you have sufficient knowledge to educate the students how to report adverse drug reactions to the relevant authorities in Jordan? (yes)	32 (36.8%)

No significant correlation was found between familiarity with the pharmacovigilance concept and policy among pharmacy academics in the Jordanian universities and age, gender, educational level, or current position. However, knowing about the official standardized form for reporting adverse drug reactions in Jordan had statistically significant differences between different specialties (pharmaceutical science, medicinal chemistry, pharmacognosy, and clinical pharmacy; $p = 0.005$). Clinical pharmacists showed the best awareness between specialties as shown in Table 3. The

answers of the remaining questions on pharmacovigilance familiarity were not statistically significantly different between academics' specialties.

Academics who work at public universities showed higher frequencies of familiarity regarding the presence of pharmacovigilance centers in Jordan and the ADR reporting form compared with pharmacists at private universities (p value = 0.01 and 0.04, respectively). The results are shown in Table 3.

Table 3: Comparison of pharmacovigilance knowledge between different specialties of teachers and different sites of work

Questions*	Pharmaceutical science (N=33) N (%)	Medicinal chemistry (N=17) N (%)	Pharmacognosy (N=5) N (%)	Clinical pharmacy (N=31) N (%)	P value†	Public universities (N=39) N (%)	Private universities (N=48) N (%)	P-value‡
Have you heard about the concept of pharmacovigilance? Yes	27(82%)	15(88%)	5(100%)	28(90%)	0.60	37(95%)	39(81%)	0.06
Do you know the definition of pharmacovigilance? Yes	24(73%)	12(71%)	5(100%)	27(87%)	0.30	31(79%)	38(81%)	0.87
Have you ever had a course or attended a workshop about pharmacovigilance? Yes	8(24%)	4(24%)	1(20%)	9(29%)	0.95	13(33%)	10(21%)	0.19
Do you know that there is a pharmacovigilance center in Jordan? Yes	12(36%)	5(29%)	2(40%)	19(61%)	0.12	23(59%)	15(31%)	0.01‡
Do you know that there is an official standardized form for reporting adverse drug reactions in Jordan? Yes	15(45%)	3(18%)	3(60%)	22(71%)	0.005‡	24(62%)	19(40%)	0.04‡
Do you have sufficient knowledge to educate the students how to report adverse drug reactions to the relevant authorities in Jordan? Yes	10(30%)	3(18%)	3(60%)	15(48%)	0.10	18(46%)	14(29%)	0.10

*Question answers were either Yes or No.

†Significant when P value < 0.05

‡Significantly different

Table 4 shows that pharmacists who had experience in the practice of pharmacy at community or hospital pharmacies have higher degree of sufficient information

to educate the students on how to report adverse drug reactions than pharmacists who did not have experience in pharmacy practice (p value = 0.008).

Table 4: Pharmacovigilance knowledge between practiced and not practiced pharmacists

Questions*	Practiced (N=55) N (%)	Not practiced (N=32) N (%)	P value†
Have you heard about the concept of pharmacovigilance? Yes	50(91%)	26(81%)	0.19
Do you know the definition of pharmacovigilance? Yes	46(84%)	23(72%)	0.13
Have you ever had a course or attended a workshop about pharmacovigilance? Yes	16(29%)	7(22%)	0.46
Do you know that there is a pharmacovigilance center in Jordan? Yes	20(36%)	18(56%)	0.08

Questions*	Practiced (N=55) N (%)	Not practiced (N=32) N (%)	P value†
Do you know that there is an official standardized form for reporting adverse drug reactions in Jordan? Yes	29(53%)	14(44%)	0.41
Do you have sufficient knowledge to educate the students how to report adverse drug reactions to the relevant authorities in Jordan? Yes	26(47%)	6(19%)	0.008‡

*Question answers were either Yes or No.

†Significant when P value < 0.05

‡Significantly different

Pharmacy School Academics' Attitude toward Pharmacovigilance Teaching

Table 5 includes attitudes of pharmacy school academics in Jordan toward pharmacovigilance teaching. Only two academics disagreed with the necessity to include pharmacovigilance as a core topic in pharmacy education and teaching pharmacy students how to report ADRs (2.4%). The majority of the participating academics (87.2%) either agreed or

strongly agreed that the pharmacist has the responsibility toward ADR reporting. Fifty-seven academics (66.3%) claimed that pharmacy students can perform ADR reporting during their clerkship. A significant difference (P = 0.031) was found in responses according to current academic positions of the academics. Only 17.7% (n = 15) of the academics either agreed or strongly agreed that the topic of pharmacovigilance is well covered at pharmacy schools currently.

Table 5: Attitudes of pharmacy school teaching fellows in Jordan toward pharmacovigilance teaching (n=87)

Questions	Strongly disagree N (%)	Disagree N (%)	Neither agree nor disagree N (%)	Agree N (%)	Strongly agree N (%)	Age	Gender	Position	Specialty	University type	Practiced	P- value†					
Pharmacovigilance should be included as a core topic in pharmacy education, missing=2	0(0%)	2 (2.4%)	4 (4.7%)	32 (37.6%)	47 (55.3%)	0.436	0.432	0.676	0.663	0.452	0.687						
The topic of pharmacovigilance is well covered in current pharmacy school curricula, missing=2	6 (7.1%)	25 (29.4%)	39 (45.9%)	14 (16.5%)	1 (1.2%)	0.997	0.455	0.832	0.759	0.607	0.222						
Pharmacists more than other health care professionals hold the responsibility toward adverse drug reactions reporting, missing=1	0 (0%)	3 (3.5%)	8 (9.3%)	39 (45.3%)	36 (41.9%)	0.392	0.128	0.837	0.251	0.704	0.595						
Information on how to report adverse drug reactions should be taught to pharmacy students prior to graduation, missing=1	0 (0%)	2 (2.3%)	1 (1.2%)	42 (48.8%)	41 (47.7%)	0.052	0.569	0.269	0.793	0.459	0.502						
Pharmacy students can perform adverse drug reactions reporting during their clerkship, missing=1	0 (0%)	6 (7%)	23 (26.7%)	38 (44.2%)	19 (22.1%)	0.061	0.683	0.031*	0.437	0.758	0.404						

†Significant when P value < 0.05

*Significant difference

Discussion

This is the first study that assessed the level of awareness about pharmacovigilance among academics in Jordanian schools of pharmacy and explored the level of pharmacovigilance education provided to pharmacy students in their undergraduate study, from the point of view of academics. Previous studies in the Middle East including Jordan targeted either healthcare professionals (i.e., doctors, nurses, and pharmacists) or students but not academics [15-19].

The results of the study showed that the majority of pharmacy academics has good familiarity and awareness about the pharmacovigilance concept and policy. They heard about the pharmacovigilance concept (87.4%) and were aware about the exact definition of pharmacovigilance (79.3%). This finding is similar to the results of previous studies conducted among healthcare professionals (Abdel-Latif and Abdel-Wahab, 2014; Almandil, 2016) where they found that pharmacists rather than other healthcare professionals had a good knowledge and awareness of pharmacovigilance and ADR concept [20, 21].

Suyagh, *et al.* (2015) studied the pharmacovigilance awareness among Jordanian pharmacists in the community and hospitals [9]. However, their results were in contrast to our results. They found that the majority of community and hospital pharmacists have insufficient awareness and poor knowledge about pharmacovigilance. This variation in knowledge may be explained by the differences in the respondents' type; that is, in the current study, the respondents were academics in the pharmacy schools who are always in direct contact with the recent knowledge. Moreover, the former study was carried out four years ago, and since then the familiarity of the concept of pharmacovigilance has spread among healthcare professionals.

Abu Hammour *et al.* (2017) also found that most healthcare professionals were not aware of the concept of pharmacovigilance [22] while Mukattash *et al.* (2018)

specified the lack of knowledge about pharmacovigilance and ADR reporting among pediatricians [23].

This study found that a quarter of the participating academics had attended a workshop about pharmacovigilance (26.4%) whereas the results from Suyagh *et al.* (2015) were only 8.2% of practicing pharmacists in Jordan had attended pharmacovigilance workshops [9]. This may be due to the interest of academics more than others toward workshops and training programs in different pharmacy topics.

More than half of the participants did not know about the presence of pharmacovigilance centers in Jordan and an official standardized form for reporting ADRs. This is similar to the results of Suyagh *et al.* (2015) and Abdel-Latif and Abdel-Wahab (2014) which showed that most pharmacists were not aware of the availability of legal provisions that provide pharmacovigilance activities, i.e., 63.1% and 75%, respectively [9,20].

To the best of our knowledge, this is the first study to compare the degree of pharmacovigilance familiarity among pharmacy academics in Jordanian universities with other variables such as age, gender, educational level, site of work, current position, specialty, and pharmacy practicing. The present study found no significant correlation between familiarity with pharmacovigilance concept and policy and age, gender, educational level, and current position. Nevertheless, clinical pharmacists showed the best awareness of the different specialties regarding knowledge of the presence of pharmacovigilance centers in Jordan ($p = 0.005$). This is because of the nature of the practice of clinical pharmacists in health care settings where they have frequent and regular interactions with health care professionals, contributing to better and safer medical care for patients [24].

Pharmacists who work at public universities showed higher frequencies of awareness about the presence of pharmacovigilance centers in Jordan and the ADR reporting form compared with pharmacists at private

universities (p value = 0.01 and 0.04, respectively). One of the reasons is that most public universities in Jordan have their own teaching hospital. Thus, pharmacists are always exposed to the practice of reporting ADRs. Another reason could be that one of the pharmacovigilance centers in Jordan is located in a pharmacy school at one of the public universities.

Interestingly, pharmacists that had experience in the practice of pharmacy at a community or hospital pharmacy have higher degree of sufficient information to educate the students on how to report ADRs than pharmacists who did not have experience in the practice of pharmacy (p value = 0.008). This finding was expected since practiced pharmacists might have the chance to experience ADR reporting during their work.

This study shows that pharmacy schools provide inadequate coverage about pharmacovigilance from the point of view of academics and ADR reporting in their undergraduate curricula, suggesting that a comprehensive curriculum related to pharmacovigilance should be considered and implemented.

Almost all of the academics (92.9%) agreed (and strongly agreed) that pharmacovigilance should be included as a core topic in pharmacy education, and 96.5% agreed (and strongly agreed) that there is a need to teach pharmacy students how to report ADRs prior to graduation. This finding was also noticed in the Abu Hammour study (2018) that found that despite the low level of awareness about pharmacovigilance among healthcare professionals, the majority believed in the necessity of reporting ADRs [22]. Meeting this need will require schools to provide guidance and training programs on ADR reporting protocol.

There was a significant difference in the mean scores of the ability of pharmacy students to perform ADR

reporting during their clerkship between different academic positions where instructors who supervise clinical clerkships and training rotations and teaching assistants believed that the current students are not capable of reporting ADRs. Their opinion is based on their role as preceptors for students; they are usually present with students during training in hospitals.

The vast majority of academics (87.2%) agreed (and strongly agreed) that the pharmacist is the most important healthcare professional to report ADRs. These findings are consistent with the results for healthcare professionals in other studies [24-27].

The sample size of the study was relatively small which limits the generalizability of the findings. Another limitation was the close ended and insufficient number of questions that assessed the actual knowledge about pharmacovigilance among participants. However, we can judge that the present study can be the base for a comprehensive large-scale study to evaluate the actual knowledge and attitudes toward pharmacovigilance among academics in Jordan.

Conclusion

Although the study showed that pharmacy school academics in Jordan have good familiarity with the pharmacovigilance concept and definition, there was insufficient knowledge about the availability of pharmacovigilance centers and reporting protocol. However, with the agreement of the majority of participants, we recommend adding topics in pharmacovigilance and the methods of detecting, preventing, and reporting ADRs to the current pharmacy school curricula.

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مدى إلمام والموقف الأكاديمي للصيدلة في الجامعات الأردنية تجاه اليقظة الدوائية: دراسة مقطعية

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ملخص

المقدمة: يزيد الوعي باليقظة الدوائية بين أكاديمي الصيدلة من معرفة الطلاب وخريجي الصيدلة ومهاراتهم في الإبلاغ عن التفاعلات الدوائية الضارة.

الغرض: تهدف هذه الدراسة إلى تقييم مستوى الوعي حول اليقظة الدوائية بين الأكاديميين في كليات الصيدلة في الأردن وتقييم التعليم الحالي لموضوع اليقظة الدوائية من وجهة نظر الأكاديميين.

الطريقة: تم توزيع استبيان ورقي مكون من 24 فقرة على ثمان كليات للصيدلة أبدت موافقتها بالمشاركة. **النتائج:** تم إكمال الاستبيان من قبل 87 أكاديمياً للصيدلة. كان معظم المشاركين على دراية بمفهوم اليقظة الدوائية (79.3%) ووافقت الغالبية (96.5%) على تطبيق تقارير التأثيرات السلبية للأدوية في المناهج المدرسية. على الرغم من هذا الموقف الإيجابي، كان 26.4% فقط من المشاركين قد حضروا سابقاً ورشة عمل حول اليقظة الدوائية و36.8% تمكنوا من تثقيف الطلاب حول كيفية الإبلاغ عن التفاعلات الدوائية.

الخلاصة: الأكاديميون في كلية الصيدلة في الأردن لديهم معرفة جيدة وسلوك إيجابي حول اليقظة الدوائية. ومع ذلك، يوصى بإدراج موضوعات حول الكشف عن التفاعلات الدوائية الضارة ومنعها والإبلاغ عنها في المناهج الدراسية الحالية.

الكلمات الدالة: التفاعلات الدوائية الضارة، اليقظة الدوائية، التعليم الصيدلاني.

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