

Trends in drug information education in different first-professional degree pharmacy programmes in the Arabian Gulf region

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Abstract

Objectives: Pharmacists play an essential role in providing reliable drug information. This puts pressure on pharmacy schools to enhance teaching to prepare students who are competent in contemporary drug information activities. This study aimed to characterise trends in drug information education in countries of the Arabian Gulf.

Methods: All pharmacy schools in the Arabian Gulf region were identified from the International Pharmaceutical Federation (FIP) Official World List of Pharmacy Schools and included in this study. Deans of pharmacy schools, heads of pharmacy practice departments or course coordinators were identified *via* the schools' websites and sent an electronic survey addressing drug information education (developed according to consensus-driven drug information education objectives).

Results: Twenty-four schools of pharmacy were identified for inclusion and contacted to participate in the study. Fifteen schools replied with a completed survey (response rate of 63%). Didactic drug information courses were provided in all of the schools surveyed, with more than half of those schools providing it in Year 4 of the programme. Experiential training was a required rotation in 57% of the schools surveyed. Less than half of drug information instructors in the region had completed any postgraduate training in drug information.

Conclusion: Drug information education in schools of pharmacy in countries of the Arabian Gulf is continuing to evolve. More emphasis has to be placed on transitioning teaching from the university to experiential rotations in order to complete the drug information learning cycle for students, from theory to practice.

Keywords: *Arabian Gulf, Drug Information, Experiential Training, Pharmacy Education.*

Introduction

The emergence of the pharmacist's role in patient care in different practice settings has expanded significantly in recent years (Kenreigh & Wagner, 2006). Providing drug information, or medicines information, is one of the core components of pharmacy practice (Ghaibi, Ipema & Gabay, 2015). Advances in the provision of high-quality, evidence-based healthcare have created an increased demand on pharmacists to meet the drug information needs of healthcare professionals and the public as a whole (Wang *et al.*, 2006). This demand puts the pressure on pharmacy schools and/or residency programmes to enhance their teaching techniques. This includes but is not limited to: skills for critical evaluation of medical literature, and incorporating some information management skills for the practice of contemporary medicine (Slawson & Shaughnessy, 2005). This makes it crucial for schools of pharmacy to prepare pharmacy

students to develop a higher level of competence and training in contemporary drug information activities, including application of a systematic approach when handling an enquiry, appropriate documentation methods, and use of high quality drug information resources as well as some skills in information management (American College of Clinical Pharmacy, 2000; Slawson & Shaughnessy, 2005; Kenreigh & Wagner, 2006;).

The Gulf Cooperation Council (GCC) was formed in 1981 and includes the following Arabian Gulf countries: Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and the United Arab Emirates (UAE), who all share similar economic, socio-political, cultural and religious backgrounds. The first college of pharmacy was established in 1959 in King Saud University, Riyadh. The majority of the pharmacy education in the GCC is provided through government-funded colleges. All pharmacy schools in the GCC offer their degree

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programmes in the English language, and are available to both genders (Alwazaify *et al.*, 2006; Sarheed *et al.*, 2014; Alhamoudi & Alnattah, 2018). The recent growth of pharmacy schools in the GCC offering a multitude of undergraduate pharmacy degrees (baccalaureate only, masters of pharmacy only, mixed baccalaureate and master of pharmacy/doctoral, doctoral only) has developed inconsistencies in the provision of drug information education (Kheir *et al.*, 2008; Aljadhey *et al.*, 2017). Additionally, while some schools of pharmacy in the region are seeking international accreditation, most schools rely on national accreditation, and the evolution trajectory and speed is not the same in all countries. Hence standardisation of pharmacy curricula is difficult to attain, let alone content of individual courses in those curricula.

Inconsistencies in drug information education has been recognised by educators worldwide. In 1991, when different pharmacy degrees were offered by schools of pharmacy in North America, a group of researchers in the United States (US) at the College of Pharmacy, University of New Mexico organised an invitational conference to define a set of objectives for didactic and experiential drug information instruction for schools of pharmacy to guide faculty members in developing drug information curricula or revising existing courses (Troutman, 1994). Seventeen objectives were produced by Troutman mainly covering: using a systematic approach to resolve drug information requests, communication skills (written/verbal), literature search and critical evaluation, biostatistics, sources of drug information (including computerised sources), detection, evaluation and reporting of adverse drug reactions, description of the drug approval process, knowledge of the role of drug information in development of policies, and application of drug information to patient care situations.

One report that surveyed drug information curricula among colleges of pharmacy within the US based on Troutman's objectives showed that drug information curricula varied in terms of the content and the number of courses provided (Wang *et al.*, 2006). Another survey of US colleges of pharmacy, in 2005, found that 89% of first professional pharmacy degree programmes required at least one didactic drug information course and 36% required two courses (Cole & Berensen, 2005). In the United Kingdom, a 2016 survey reported that 50% of undergraduate pharmacy degree programmes have input from pharmacists practicing in medicine information centres (Beswick & Wills, 2016). The input varies between universities, with teaching in the final year of the programme being the most common. Tuition is delivered *via* large group lectures, small group teaching, project support and supervision, and work-based experience. However, there is little in the literature describing drug information curricula in developing countries. Therefore, this study aimed to characterise pharmacy programmes standards and trends in drug information education in the countries of the GCC.

Methods

A cross-sectional descriptive study that used a self-administered online survey was conducted from September 2015 to April 2016. Ethical approval was granted from the Ethical Review Committee at the Health Sciences Centre, Kuwait University, Kuwait. For the purposes of this paper, a pharmacy school was defined as any pharmacy faculty, college, school, or program that offered one or more types of university degrees in pharmacy. While there are diploma programmes in some GCC countries, this study was restricted to pharmacy degree programmes only. The first professional degree to practice was defined as the degree offered by a pharmacy school that was designed to meet national entry to practice requirements for pharmacists. Experiential training is defined as practical training in the field (*e.g.*, community or hospital pharmacies) for the purpose of meeting the degree (*vs.* licensure) requirements.

Questionnaire development and validation

The questionnaire used in this study was based on a previous version used by Wang *et al.* (2006). The original questionnaire was modified and adapted to be more specific to regional universities, after obtaining permission from the principal author. The first draft of the questionnaire was peer-reviewed by the research group and the questionnaire was piloted by two drug information course coordinators from two different universities from two different countries. Modifications to the questionnaire were made based on the comments and suggestions of the participants of the pilot study. The final web-based survey consisted of 33 questions divided into: a) demographics of respondents and participating universities; b) details about drug information education at their universities; c) qualifications of the drug information course instructors and preceptors at their institutions; d) details about the laboratory sessions used in drug information education; e) importance of individual subject matters in the drug information course content; f) content and organisation of the drug information experiential training at each institution; and finally, g) confirmation of the participants' agreement to be contacted and notified of the results of this study. The consensus guidelines developed by Troutman (1994) which addressed didactic and experiential subject matters to be included as part of an ideal drug information curriculum for an entry level pharmacy degree programme, were used to assess the content of drug information courses evaluated in this study.

Study participants

Websites from all pharmacy schools in the Arabian Gulf region were retrieved from the FIP Official World List of Pharmacy Schools and investigated (FIP, 2018). Deans, heads of pharmacy practice departments or drug information course coordinators were identified from the schools' websites and emails were sent out containing a

link to the web-based questionnaire. Participants who had not responded within four weeks were sent a follow-up email, and two further follow-up emails were sent to non-respondents at 12 weeks and at 24 weeks.

Participants' responses were tracked and managed by Qualtrics survey platform (Qualtrics (QSP), Provo, UT, USA) and data was analyzed using IBM SPSS Statistics for Windows (IBM Corp., Armonk, N.Y., USA).

Results

Twenty-eight schools of pharmacy in the Arabian Gulf region were retrieved from the FIP Official World List of Pharmacy Schools (FIP, 2018). Two schools of pharmacy were excluded as their contact details were not available on their websites, and a further two were excluded as repeated technical difficulties were faced when submitting a "Contact Us" form *via* their website. Twenty-four schools of pharmacy were contacted to participate in the study, 15 completed the survey (giving a response rate of 63%). This included: seven schools from Saudi Arabia, three from the Sultanate of Oman, three from the UAE, one from Qatar, and one from Kuwait.

a) Demographics of respondents

Most of the respondents identified themselves as a drug information instructor (n=7, 47%) or drug information course coordinator (n=6, 40%). Others identified themselves as either a director of drug information centre (n=1, 7%), or a drug information pharmacist (n=1, 7%). The academic titles of respondents varied: assistant professor (n=4, 27%), associate professor (n=3, 20%), and professors (n=3, 20%). Table I shows the programme degrees offered at participating schools of pharmacy and the number of years their pharmacy programmes have been offered.

Table I: Undergraduate degrees offered by participating universities and the number of years their pharmacy programmes were offered

Pharmacy degree offered*	Number of universities
B.Pharm. only	7
B.Pharm. and M.Pharm.	2
M.Pharm. only	1
M.Pharm. and Pharm.D.	1
Pharm.D. only	3
Number of years pharmacy programmes offered*	
5-10	10
>10	4

*One respondent was from a drug information centre which was affiliated with the university hospital rather than the academic institution

b) Drug information education

All responding institutions reported that a didactic drug information course is offered in their pharmacy curriculum except in one institution where the respondent's drug information centre was affiliated with the university hospital and not their academic institution. A didactic drug information course was either given as a separate course (n=10, 71%), integrated within another course (n=3, 21%), or integrated throughout the professional curriculum (n=1, 7%).

More than half of the respondents indicated that the didactic drug information course is offered in professional pharmacy Year 4 (n=9, 64%). Five institutions (33%) offered a didactic drug information lecture in more than one professional year. The five most common topics were systematic approach to handling drug information requests, drug literature evaluation, statistics, sources of information (*e.g.*, tertiary/secondary/primary, investigational/orphan drugs, pharmaceutical industry, government, professional agencies, poison centres), and formal instruction on finding and/or evaluating internet resources. Most schools have a formal policy to reinforce drug information concepts through various assignments in other courses (n=9, 64%). All respondents reported that the drug information course is a required component of the pharmacy curriculum, however, one institution offered this course as an elective. All respondents reported a required textbook for the drug information courses. The 'Drug Information: A Guide for Pharmacists' by Malone was the most required textbook (Table II).

Table II: Required textbooks for didactic drug information teaching

Book title	Author	N (%)*
Drug information: A guide for pharmacists	Malone, P., Kier, K.	4 (26.7)
Drug information services handbook	Collins, E., Lazarus, H.	2 (13.3)
AHFS drug information	American Society of Hospital Pharmacists	1 (6.7)
Basic and clinical Biostatistics	Dawson, B.	1 (6.7)
British National Formulary	British Medical Association and Royal Pharmaceutical Society	1 (6.7)
Emergency Toxicology	Gupta, S.K.	1 (6.7)
Oman National Formulary	Ministry of Health, Oman	1 (6.7)
Pharmacoepidemiology	Strom, B., Kimmel, S., Hennesy, S.	1 (6.7)
Pharmacotherapy: A Pathophysiologic Approach	Dipiro, J.	1 (6.7)
Toxicology	Doull, J., Casarett, B.	1 (6.7)

*Percentages in this table do not total to 100% as a few participants reported more than one text book.

c) *Qualification of drug information course instructors and preceptors*

The primary drug information course instructor was a full-time faculty member in 12 institutions (80%), or a guest lecturer from a hospital setting (n=2, 13%). All primary drug information course instructors, except two, held a postgraduate degree. Seven instructors (47%) had also completed a postgraduate residency or fellowship training specialising in drug information.

d) *Laboratory sessions*

All respondents indicated that a laboratory or recitation component is included in their didactic drug information course, however, the number of laboratory hours per week and their location varied. One-third of respondents had one hour per week (n=5, 33%) for this activity. Others had either two hours per week (n=4, 27%), or three hours per week (n=3, 20%) devoted for a laboratory or recitation component. Only two respondents indicated that the number of hours per week differed according to the course with which the didactic drug information lectures is integrated. The laboratory or recitation component setting was different in different institutions: five institutions offered this in a laboratory (33%), four in a drug information centre (27%), two in a classroom (13%), one in a computer laboratory (7%), and one in a professional skills laboratory (7%). The average number of students in each laboratory or recitation section was 21-25 students (n=7, 47%), or 16-20 students (n=5, 33%). An equal number of institutions indicated that their laboratory or recitation section is usually led by one or three facilitators (n=5, 33%). Others were led by two facilitators (n=2, 13%). Smaller sections were led by one facilitator, and larger sections were led by more than six facilitators. The activities covered in the laboratory or recitation sections of the didactic drug information courses are presented in Table III.

Table III: The activities covered in the laboratory or recitation sections of the didactic drug information courses listed with the most frequently covered activity at the top

Activity*	N (%)
Literature evaluation	14 (100)
Answering questions	13 (93)
Adverse drug reactions	8 (57)
Journal club	7 (50)
Monograph preparation	4 (29)
Research project	4 (29)

*Some reported other activities such as electronic databases, application of evidence in clinical practice *via* case discussions, and preparing drug bulletins.

e) *Importance of individual subject matters in the drug information course content*

Respondents indicated which subject areas were covered in their drug information course curriculum and ranked those subjects according to importance (Table IV).

Table IV: Ranking of subject areas covered in drug information course curricula, with the mean importance score as indicated by respondents

Ranking	Topics covered in course	Mean importance score*
1	Drug literature evaluation	1.55
2	Ethical/legal issues	1.56
3=	Statistics	1.64
3=	Evidence-based medicine	1.64
5=	Systematic approach to handling drug information requests	1.67
5=	History and philosophy of drug information services	1.67
7=	Personal library development – keeping current	1.71
8=	Formal instruction on finding and/or evaluating internet resources	1.73
9=	Sources of information (e.g. tertiary/secondary/primary, investigational/orphan drugs, pharmaceutical industry, government, professional agencies, poison centres)	1.91
10=	Formal instruction on computer database information retrieval (e.g. Micromedex, Medline, IPA)	2.00
10=	Adverse drug event management	2.00
12	Drug policy management (e.g. formulary, drug use evaluation, target drugs/therapeutic interchange)	2.22
13	Quality assurance in drug information	2.33
14	Drug approval process	2.63

*Based on a scale of 1 to 4 on which 1 = very important and 4 = not important

f) *Experiential training*

A drug information experiential training is offered in ten institutions either as a required rotation (n=8, 57%), or an elective (n=2, 14%). The remaining four (29%) institutions (all offering B.Pharm. degrees) reported that they do not offer any experiential rotation due to the lack of faculty resources and reported that their students develop drug information skills through laboratory experience, portfolios, formal drug information consults, or through other advanced pharmacy practice experience rotations.

The duration of the drug information experiential rotations was not found to be consistent in all institutions. Rotations ranged from two to six weeks if it is a required rotation or four to six weeks if it is an elective rotation. Some institutions had a drug information rotation as part of their hospital's structured practical experience programme (SPEP) over a two-year period. The tasks covered in the drug information experiential rotation are presented in Table V.

Table V: Tasks covered in the drug information experiential rotations

Task	N (%)*
Answering questions	10 (100)
Advanced literature searching	10 (100)
Advanced literature evaluation	9 (90)
Preparation of monographs	8 (80)
Journal club	8 (80)
Adverse drug reactions management	8 (80)
Research project	5 (50)

*A total of ten schools reported they provided an experiential drug information rotation

The study participants reported that the primary drug information preceptors for the drug information experiential rotations at their schools of pharmacy had the following degrees: B.Pharm., post-baccalaureate Pharm.D., entry-level Pharm.D., non-traditional Pharm.D., or Ph.D. More than a third of the respondents also reported that the drug information preceptors for the drug information experiential rotations had completed postgraduate residencies or fellowships in drug information (n=6, 40%).

Different drug information rotations were reported to be offered to students in different institutions. This included industry, hospital, managed care, academia, and drug information or poison control centres. However, the location of the primary practice site of the drug information experiential rotation was in hospital (n=10, 67%), at the university (n=4, 27%), pharmaceutical industry (n=3, 20%), or poison control centre (n=2, 13%).

Institutions that do not currently offer a separate didactic drug information course or drug information experiential rotations (n=4, 27%) indicated that there are plans to add these components to their pharmacy curriculum in the future.

Discussion

Many global initiatives have outlined the importance in the provision of reliable and genuine drug information to patients and healthcare providers (Hameen-Anttila, 2015), including FIP, (FIP, 2008), the American Society of Health-System Pharmacists (Ghaibi, Ipema & Gabay, 2015) and the Finnish Medicines Agency (FIMEA, 2012). Numerous studies have been conducted in North America to describe the content of drug information teaching in pharmacy curricula (Kirschenbaum & Rosenberg, 1984; Davis and Kruce, 1994; Mullins *et al.*, 1995; Wang *et al.*, 2006). No studies have been published in the Arabian Gulf or the Middle East regarding this subject, and to the authors knowledge, this study is the first in the region to characterise pharmacy programmes standards and trends in drug information education and training in the countries of the Arabian Gulf region by comparing various content of didactic and experiential drug information practice training in first-professional pharmacy degree programmes.

Currently, pharmacy schools in the GCC provide a variety of entry-level pharmacy degree programmes. The authors find that the timing of this study is particularly important as pharmacy education in the region has been undergoing significant curricular revisions in the past decade that focus on the development of skills and knowledge necessary for the delivery of competent patient care (Kheir *et al.*, 2008; Aljadhey *et al.*, 2017), therefore, harmonisation of first professional degree to practice programme standards, as well as having clear educational outcomes, and minimum competencies to practice could help to reduce the inter-country variation that currently exists.

Didactic drug information courses covering topics suggested by Troutman (1994) were a required course provided by all participating universities in this study, regardless of what first degree their programmes offered, however the method of delivery of didactic courses varied. This variety of delivery methods can be explained by the fact that universities in the GCC provide a multitude of entry-level pharmacy degrees - with some programmes lasting for five years (B.Pharm. or M.Pharm.) and others for seven years (Pharm.D.). A study conducted in the US by Wang *et al.* (2006) also reported that 100% of participating universities did provide didactic drug information courses in their entry-level Pharm.D. programmes, however an earlier study by Davis and Krucke (1994), which incorporated different first degree programmes, showed that 70% of entry-level bachelors' programmes provided didactic drug information as an elective course only.

Course content found by respondents to be very important to be included in the curriculum was: drug literature evaluation, ethical/legal issues, statistics, evidence-based medicine, history and philosophy of drug information services, systematic approach to handling drug information requests, personal library development - keeping current, and formal instruction on finding and/or evaluating internet resources and sources of information. The authors acknowledge that the position

or title of the respondent may have influenced their opinions regarding the importance of drug information skills. However, most of the respondents identified themselves as either a drug information instructor (47%), or drug information course coordinator (40%). Wang *et al.* (2006) reported a comparable list of very important topics to be covered in the didactic courses.

The results showed that less than half (47%) of the primary drug information course instructors had completed postgraduate residencies or fellowship training specialising in drug information. This highlights the need for the growth of more advanced practitioners in the region. Many important initiatives are currently being taken by educators in the region, including establishing more residencies and fellowship programmes, establishing centres for innovation in pharmacy education, improving the model of pharmacy practice in community pharmacies in the region and establishing an association for pharmacy schools in gulf countries (Kheir *et al.*, 2008).

Laboratory sessions were provided by all responding universities as part of their didactic drug information content. However, laboratory sessions duration and location varied. A study published by the School of Pharmacy, University of Southern California described their library's educational programme on drug information for Pharm.D. students. They reported that library programmes, run by trained librarians, could support the increasingly complex progression of drug information retrieval, evaluation, organisation, application, and communication (Wood, Morrison & Oppenheimer, 1990). This could also be a potential site for in-school drug information laboratory sessions for schools that do not have enough practice sites.

With the increase in the accessibility of drug information, pharmacy students not only need to be equipped with the skills and knowledge to be capable in searching and critically evaluating medical literature, but also have to be able to adapt the findings into specific clinical situations. Practice experience (or experiential training) objectives suggested by Troutman (1994) were found to be engrained in most pharmacy programmes in the study, as a required rotation. Experiential training allows students to test their preparedness and acts as a transition from fully supervised laboratory sessions in the university to more complex, partially supervised sessions in real practice sites. Only four universities did not provide any drug information experiential training in their curricula – these were found to be all entry-level bachelors' programmes. The study by Wang *et al.* (2006) had reported that the majority of schools with a didactic drug information content lacked a required experiential drug information component in their curricula.

Limitations

One of the limitations of this study was the inefficiency of some university websites. Contact forms were either

not working, or no contact emails were provided. Moreover, nine schools of pharmacy did not respond to the survey. It is possible that non-respondents did not offer drug information education in their curricula, which may have affected the survey's results. Additionally, the cross-sectional nature of this study represented one point in time, and therefore, does not reflect any changes in drug information education in the participating universities over time. Another limitation of this study was that it was not designed to assess specific outcomes of students' drug information skills and knowledge, nor did it assess the status of drug information residency programmes or formal drug information services offered by colleges of pharmacy. Future work could look at characterising drug information rotations in post-baccalaureate Pharm.D. or residency programmes in different countries in the region. The authors do acknowledge that this study is not representative of all schools of pharmacy in the Arabian gulf region, as many of them are not registered on the FIP's Official World List of Pharmacy schools and therefore were not included in the study (FIP, 2018).

Conclusion

Pharmacy education and pharmacy practice in countries of the GCC is continuing to evolve, as is the case worldwide. All participating schools provided didactic drug information education; however, the method of delivery varied, with the majority providing separate drug information courses to their students, and a few had drug information concepts integrated into other courses.

Although all schools provided didactic drug information education at some point in their programmes, there seemed to be inconsistency in the experiential training provided at schools of pharmacy in the GCC. Pharmacy students should be trained to be more responsible and accountable for providing information to healthcare professionals or patients (supervised by preceptors), and this would complete their drug information learning cycle, from theory to practice.

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