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The future of pharmaceutical care in Malaysia: Pharmacy students' perspectives

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Abstract

Objective: To investigate the attitudes of pharmacy students toward pharmaceutical care (PC), perceptions of their preparedness level and barriers to the provision of PC in Malaysia.

Methods: A cross-sectional study conducted on third and fourth-year pharmacy students of International Islamic University Malaysia (IIUM). The main instrument used was standard Pharmaceutical Care Attitudes Survey (PCAS) with minor modifications for local suitability. A pilot study conducted and reliability and validity of the modified instrument assessed. SPSS, version 21 was used for data analysis.

Results: Reliability coefficient computed to be 0.897. The total number of students was 227. Overall the response rate was 95.05%. Interestingly, all the student pharmacists reported a positive attitude towards the practice of PC. Most student pharmacists stated good perceptions of preparedness towards the provision of PC with the overall mean scores rating of 3.0. The majority agreed on the importance of all PC activities and perceived that lack of physicians' trust/ confidence in the pharmacists' abilities is a major barrier to providing PC in Malaysia.

Conclusion: Pharmacy students reflected positive attitudes and perceptions towards PC. Students felt favourable in practicing clinical PC activities rather than administrative ones. Lack of physicians' trust or confidence in the pharmacists' abilities was identified as a major barrier to the implementation of PC. This can be improved through better use of inter-professional education which is a first step in generating collaborative practice-oriented workforce.

Keywords: *Attitude, Malaysia, Perception, Pharmaceutical Care, Pharmacy Students*

Introduction

The pharmaceutical care (PC) concept is defined as a process involving identification, resolution, and prevention of drug-related problems with the main objective of achieving positive outcomes for patients (Hepler & Strand, 1990). Nowadays, the roles of pharmacists evolve from being product oriented towards more patient focused (Chua *et al*., 2012). Over the last few years, the pharmacy profession has experienced a shift towards PC (Binos *et al*., 2011). This change requires proper preparation for future pharmacist to provide PC services which include but not limited to providing patient counselling, document information on the drug-related problems, contribute towards healthcare teams, recommend drug therapy followed by crafting and monitoring therapeutic plans (Ried *et al*., 2002). In response to this shift, pharmacy schools started to provide pharmaceutical care education for students, preparing them for professional roles in future practice settings. These roles advocate appropriate direction towards patient care and counselling, focused drug use evaluation, optimised drug selection, and responsibility for patient outcomes (Hepler & Strand, 1990). They began to integrate the knowledge and skills necessary for PC provision in their study plans using different educational tools. Assessment of the effects of such educational tools on improving students' attitude towards PC provision explored the overall positive effect in improving attitudes towards professional duty, especially after experiencing clinical clerkships' activities (Ubaka *et al*., 2012).

According to the American Society of Health-System Pharmacists (ASHP) guidelines on a standardised method of PC, the pharmacist's acceptance of his or her responsibility for patient's therapeutic outcomes is the primary core of PC. Many identified roles of future pharmacists describe the commitment of pharmacists towards this type of responsibility. These roles can be translated into practice to design therapeutic regimens, monitor the regimen's effects, revise the prescribed regimen in response to any changes in patient's condition, and document the results (ASHP, 1996).

The fundamental relationship in PC is that patients give their trust to the healthcare providers and the providers give their commitment by accepting responsibility towards their patients. Therefore, it is all about pharmacists' professional responsibilities to ensure safe, efficacious and accurate drug therapy outcome (Morak *et al*., 2010). Furthermore, PC also involves pharmacist working closely with other healthcare professionals (El Hajj *et al*., 2014).

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There are several issues related to PC service such as insufficient time to provide PC, most likely due to a lesser number of pharmacists in the professional setting. Moreover, lack of pharmacist's self-confidence to counsel the patient is one of the barriers in introducing PC services in hospital settings. Another barrier is the lack of professional skills to communicate effectively with other healthcare team members especially doctors. Overcoming these issues is imperative to achieve the main purpose of PC for which the pharmacists need to upgrade their expertise and knowledge about drugs followed by the provision of patient-oriented care (Tumkur *et al*., 2012).

Pharmacy education in Malaysia is responsible for the preparation of future healthcare providers who are qualified to perform most of the PC functions. Five public universities among a total of about twenty universities have contributed to offer accredited four-year pharmacy programmes recognised by the Pharmacy Board of Malaysia. International Islamic University Malaysia (IIUM) is one of the main public universities that have started to offer an undergraduate pharmacy programme since 2002.

According to the current structure of practice experiences offered to undergraduate pharmacy students, Kulliyyah of Pharmacy, IIUM, students are exposed to structured practice experiences like community pharmacy postings, hospital visits, medication therapy adherence clinics (MTAC), and home medication review (HMR) programmes at aged care facilities. These are specialised PC services offered by the Malaysian Ministry of Health for patients having non-communicable diseases. Also, the four-year pharmacy programme has six-week clinical clerkships in the final professional year. Both MTAC and HMR exposures supported with six-week clinical clerkships augmented practice experiences and are classified as advanced PC activities. Students are expected to demonstrate a full understanding of the essentials of providing PC regarding attitude, professionalism, communication and evidence-based clinical knowledge.

The current research attempts to explore and assess the actual impact of the PC education provided at Kulliyyah of Pharmacy, IIUM, in the hope of helping future Malaysian pharmacists to accept their responsibility as PC providers.

The current research approached both pre-final (third) and final (fourth) year pharmacy students in exploring their attitudes towards PC. Their perceptions towards preparedness to provide PC services and perceived importance of various PC activities followed by their opinion about the barriers to the provision of PC in Malaysia was also explored. The current research helped in identifying areas of potential improvements in pharmacy academia and acts as a platform for students' constructive feedback. Students' feedback constitutes a principal part of improving the overall education process. This type of feedback is of importance when educational activities are structured to achieve proper integration between pharmacy teaching and pharmacy practice.

Previously published studies discussed the idea of students' perspectives towards PC (Lawrence *et al*., 2004; Al-Arifi, 2009; Katoue *et al*., 2014) but to the best of our knowledge, the findings of these studies do no comprehensively replicate in Malaysian settings. The objectives of the current research are to give an insight into the views and recommendations regarding the following areas:

- How to provide more focused PC education;
- How to augment professional preparation of student pharmacists for better competency skills at the beginning of their future pharmacy careers;
- How to achieve better integration between education and practice.

Methodology

Study population

The study population for this study involved third and fourth-year pharmacy students of IIUM. Participation for the students was voluntary, and strict anonymity maintained. The study was approved by the Dean, Kulliyyah of Pharmacy, IIUM, Kuantan, Pahang, Malaysia.

Study design

A descriptive, cross-sectional study involving third and fourth-year pharmacy students was conducted at Kulliyyah of Pharmacy. The questionnaire was based on the standard Pharmaceutical Care Attitudes Survey (PCAS), introduced in the United States of America (USA) (Chisholm & Martin, 1997) and is considered a validated instrument for measuring students' attitudes towards PC (Martin & Chisholm, 1999). The current research used the recently developed version of PCAS that has been used to explore students' perspectives towards PC education in Kuwait (Katoue *et al*., 2014). The permission to use the study instrument was sought from the researchers in Kuwait. The questionnaire is divided into five sections. The first section relates to information about sociodemographic characteristics of the respondents. The second section includes the assessment of students' attitudes towards PC. Students' perceptions of their readiness to provide various PC services is described in the third section. The fourth section explores students' opinions regarding the importance of the various PC activities. The last section is to identify potential barriers in providing PC services from the students' perspectives. Minor modifications made to the questionnaire by adding new five items to the first section, delete one item from the second section, remove two items from the third section and finally two new statements added to the last section. All modifications made were to make the questionnaire more representative for the current research.

A pilot study was conducted to validate the acceptance and suitability of the survey to our target group involving

students from both the third and fourth year. Students who participated in the pilot study were excluded from the final research. The modified version of the questionnaire reported having Cronbach alpha of 0.897

Survey administration

Student pharmacists were briefed about the aims of the study. The participation of students was completely voluntary and maintaining confidentiality was guaranteed as no name and matriculation number was taken. All responses were taken anonymously. The survey was administered to the third and fourth-year pharmacy students of Kulliyyah of Pharmacy, IIUM. Questionnaires were distributed to the fourth year pharmacy students after they had finished one short quiz examination, whereas the third year pharmacy students were approached in their hostel.

Statistical analysis

Data were subjected to Statistical Package for the Social Sciences (SPSS), version 21 for descriptive and inferential analysis. The presentations of students' responses were computed mainly as frequency, percentages, and means and standard deviations (SD). The differences in the responses of the two different years was also measured using Mann-Whitney test. Statistical significance accepted at a *p*-value of lower than 0.05.

Results

Over the seven-week study period, a total of 227 pharmacy students were approached, and 211 successfully responded. The response rate was 93.75% for third-year students and 98.94% for fourth-year students. In total, the overall response rate was 95.05%.

Study population

In this study, 56.9% and 43.1% were third-year and fourth-year pharmacy students respectively. Respondents were aged between 21 to 26 years, with a mean age of 23 years. The demographic characteristics of the respondents summarised in Table I.

General Attitudes towards PC

Pharmacy students' attitude towards PC are presented in Table II. The majority of the students agreed for all aspects of PC provision and the value of PC. All mean values are above 3.0 which is the midpoint of the scales. The attitude regarding the value of PC practice and PC to improve patients' health obtained the highest mean score of 4.6.

Perceptions of the preparedness level to be PC providers

Students' perceptions of the preparedness to provide PC in Malaysia is reflected through Table III. The current research explored the perception of the preparedness towards PC provision with four aspects; technical, psychosocial, communication, and management. Within the technical aspect, student pharmacists showed good perception towards the provision of counselling to patients and/or caregivers about the proper use and effects of medicines (mean 3.5) followed by evaluation of patient information obtained from history and assessment (mean 3.4). Interestingly in the management aspect, student pharmacists reflected a lesser mean score of 2.6 in the context of development and implantation of a pharmacy inventory (stock) control system for the distribution and administration of medications. The overall mean score in all the four aspects was 3.1 which is greater than the midpoint of the average scale.

Opinions about the barriers to the provision of PC

Students' opinions about the barriers to the provision of PC in Malaysia are shown in Table IV. Regarding barriers, there are four main obstacles which attain the mean score of either 4 or slightly more than 4. The prominent issues are a lack of support from administration (mean 4.0), lack of teamwork among the healthcare members (mean 4.0), lack of physicians' trust/ confidence in the pharmacists' abilities (mean 4.1), and lack of acceptance of the role of pharmacists by the physician (mean 4.1).

Opinions on the importance of different PC activities

Student's opinions about the different PC activities in Malaysia are shown in Table V. The majority of the students rated PC activities as 'important' or 'very important'. All the mean scores are above 2.5 which is the midpoint of the scale. The most important perceived competency was explaining to patients what they should know about their medications in an understandable way (mean 3.8). However, performing limited physical exams, *e.g.* measuring blood pressure, heart rate and BMI was rated as the least important PC activity (mean 3.3)

Comparative analysis of students' responses between two different years of study

Comparison between the two different academic years regarding their responses in all the sections is shown in Figure 1. A significant difference (p=0.03) was noted between both study groups regarding their attitudes towards PC, perceptions of the preparedness to provide PC (p=0.03) and opinions on different PC activities (p=0.02). Fourth-year students have higher mean score than third-year students in all sections except their opinions about barriers to the provision of pharmaceutical care slightly differ from third-year students.

Table I: Demographic characteristics of student pharmacists

Items		Frequency	Percentage
Age (n=211)	21-23	196	92.9%
	24-26	15	(7.1%)
Gender (n=211)	Female	144	(68.2%)
	Male	67	(31.8%)
Marital status (n=211)	Single	204	(96.7%)
	Married	7	(3.3%)
Nationality (n=211)	Malaysian	211	(100%)
	Non-Malaysian	0	(0%)
Educational level (n=211)	3rd year pharmacy student	120	(56.9%)
	4th year pharmacy student	91	(43.1%)
Experiential training in pharmacy (n=210)	Yes	118	(55.9%)
	No	92	(43.6%)
In case of experiencing training in pharmacy setting (n=118)	Community pharmacy	66	(55.9%)
	Hospital pharmacy	40	(33.9%)
	Industrial pharmacy	1	(0.8%)
	Others	11	(9.3%)
Duration of experiential setting training in pharmacy (n=118)	< 2 months	96	(81.4%)
	> 2 months	22	(18.6%)
Preferred future pharmacy setting (n=211)	Community pharmacy	82	(38.9%)
	Hospital pharmacy	94	(44.5%)
	Polyclinic pharmacy	4	(1.9%)
	Industrial pharmacy	31	(14.7%)

Table II: Pharmacy students' attitudes towards pharmaceutical care (n=211)

Items	Frequency (%)					Mean (SD)
	1 Strongly Disagree n (%)	2 Disagree n (%)	3 Neutral n (%)	4 Agree n (%)	5 Strongly Agree n (%)	
All pharmacists should perform pharmaceutical care.	2 (0.9%)	0 (0%)	7 (3.3%)	53 (25.1%)	149 (70.6%)	4.64 (0.64)
The primary responsibility of pharmacists in all health care settings should be to prevent and resolve medication- related problems	2 (0.9%)	0 (0%)	4 (1.9%)	66 (31.3%)	139 (65.9%)	4.61 (0.62)
Pharmacists' primary responsibility should be to practice pharmaceutical care	1 (0.5%)	1 (0.5%)	11 (5.2%)	64 (30.3%)	134 (63.5%)	4.56 (0.66)
Pharmacy students can perform pharmaceutical care during their experiential training (placements)	3 (1.4%)	2 (0.9%)	33 (15.6%)	84 (39.8%)	89 (42.2%)	4.20 (0.84)
I think the practice of pharmaceutical care is valuable	1 (0.5%)	1 (0.5%)	0 (0%)	63 (29.9%)	146 (69.2%)	4.67 (0.55)
Providing pharmaceutical care takes too much time and effort	12 (5.7%)	37 (17.5%)	75 (35.5%)	60 (28.4%)	27 (12.8%)	3.25 (1.06)
I would like to perform pharmaceutical care as a pharmacist practitioner	1 (0.5%)	0 (0%)	15 (7.1%)	87 (41.2%)	108 (51.2%)	4.43 (0.66)
Providing pharmaceutical care is professionally rewarding	1 (0.5%)	1 (0.5%)	10 (4.7%)	74 (35.1%)	125 (59.2%)	4.52 (0.65)
I feel that pharmaceutical care is the right direction for the profession to be headed	1 (0.5%)	0 (0%)	20 (9.5%)	100 (47.4%)	90 (42.7%)	4.32 (0.68)
I feel that the pharmaceutical care movement will benefit pharmacists	1 (0.5%)	0 (0%)	12 (5.7%)	92 (43.6%)	106 (50.2%)	4.43 (0.64)
I feel that the pharmaceutical care movement will improve patients' health	1 (0.5%)	0 (0%)	4 (1.9%)	66 (31.3%)	140 (66.4%)	4.64 (0.54)
I feel that practicing pharmaceutical care would benefit my professional career as a pharmacy practitioner.	1 (0.5%)	0 (0%)	13 (6.2%)	78 (37%)	119 (56.4%)	4.49 (0.65)

Table III: Pharmacy students' perceptions of their preparedness to provide pharmaceutical care (n=211)

Items	Frequency (%)					Mean (SD)
	1	2	3	4	5	
Technical Aspect						
Recommend appropriate drug therapy for a specific patient	10 (4.7)	75 (35.5)	69 (32.7)	26 (12.3)	31 (14.7)	2.9 (1.1)
Evaluate patient specific pharmacotherapeutic regimens to prevent or resolve medication-related problems.	15 (7.1)	74 (35.1)	61 (28.9)	34 (16.1)	27 (12.8)	2.9 (1.1)
Determine the appropriate drug delivery system or drug product for a specific patient	8 (3.8)	55 (26.1)	73 (34.6)	45 (21.3)	30 (14.2)	3.1 (1.1)
Recommend medication doses and dosage schedules for a specific patient.	36 (17.1)	61 (28.9)	53 (25.1)	34 (16.1)	27 (12.8)	2.9 (2.4)
Identify and collect all information needed to prevent or resolve a medication-related problem.	7 (3.3)	50 (23.7)	67 (31.8)	54 (25.6)	33 (15.6)	3.3 (1.1)
Evaluate clinical laboratory test results for a specific patient.	20 (9.5)	44 (20.9)	68 (32.2)	50 (23.7)	29 (13.7)	3.1 (1.1)
Calculate and evaluate drug pharmacokinetic properties for a specific patient.	26 (12.3)	72 (34.1)	53 (25.1)	36 (17.1)	24 (11.4)	2.8 (1.2)
Evaluate information obtained from the patient's history and assessment	3 (1.4)	37 (17.5)	73 (34.6)	60 (28.4)	38 (18.0)	**3.4 (1.0)**
Make reasonable assumptions and/or draw reasonable conclusions when data is incomplete	20 (9.5)	74 (35.1)	68 (32.2)	30 (14.2)	19 (9.0)	2.7 (1.1)
Provide counselling to patients and/ or caregivers about the proper use and effects of medications	6 (2.8)	34 (16.1)	64 (30.3)	60 (28.4)	47 (22.3)	**3.5 (1.1)**
Recommend methods to seek optimal patient compliance	8 (3.8)	42 (19.9)	70 (33.2)	55 (26.1)	36 (17.1)	3.3 (1.1)
Monitor and document the safety and efficacy of a therapeutic plan for a specific patient	17 (8.1)	60 (28.4)	65 (30.8)	33 (15.6)	36 (17.1)	3.1 (1.2)
Document information related to the identification, resolution or prevention of drug- related problems	12 (5.7)	62 (29.4)	61 (28.9)	44 (20.9)	32 (15.2)	3.10 (1.2)
Overall						**3.1 (1.1)**
Psychosocial aspects						
Identify the appropriate information and create a solution or decide a course of action for a problem or situation	14 (6.6)	74 (35.1)	62 (29.4)	43 (20.4)	18 (8.5)	2.8 (1.1)
Contribute opinions and information appropriately during the health care team decision-making process	15 (7.1)	59 (28.0)	67 (31.8)	46 (21.8)	24 (11.4)	3.0 (1.1)
Promote public awareness of health and diseases	3 (1.4)	36 (17.1)	59 (27.9)	58 (27.5)	55 (26.1)	**3.8 (3.6)**
Use data and computers in professional practice	15 (7.1)	36 (17.1)	55 (26.1)	64 (30.3)	41 (19.4)	**3.4 (1.1)**
Overall						**3.3 (1.7)**
Communication aspects						
Communicate information from the patient's medical record to other health care professionals.	10 (4.7)	58 (27.5)	73 (34.6)	48 (22.7)	22 (10.4)	3.1 (1.1)
Communicate information from the patient's medical record to the patient	11 (5.2)	44 (20.9)	87 (41.2)	38 (18.0)	31 (14.7)	3.2 (1.1)
Identify and collect all information needed to respond to an information request from another health care professional using appropriate resources and technology	16 (7.6)	55 (26.1)	70 (33.2)	46 (21.8)	24 (11.4)	3.0 (1.1)
Respond to an information request from a patient	11 (5.2)	59 (28.0)	69 (32.7)	43 (20.4)	29 (13.7)	3.1 (1.1)
Overall						**3.1 (1.1)**
Management aspects						
Evaluate, select, and purchase pharmaceuticals, medical equipment devices and supplies	35 (16.6)	66 (31.3)	52 (24.6)	35 (16.6)	23 (10.9)	2.7 (1.2)
Develop and implement a pharmacy inventory (stock) control system to distribute and administer medications	45 (21.3)	62 (29.4)	48 (22.7)	33 (15.6)	23 (10.9)	**2.6 (1.2)**
Manage the operation and resources of a community, or other pharmacy practice sites to optimally serve the needs of patients	27 (12.8)	66 (31.3)	55 (26.1)	40 (19.0)	23 (10.9)	2.8 (1.2)
Participate in the development and implementation of drug use evaluations and formulary service	31 (14.7)	61 (28.9)	57 (27.0)	43 (20.4)	19 (9.0)	2.8 (1.2)
Overall						**2.7 (1.2)**
Overall scale mean (for all competency items)						**3.1 (1.3)**

Abbreviations: SD, standard deviation.
1= poor; 2= average; 3=good; 4=very good; 5=excellent.

Table IV. Opinions about barriers to the provision of pharmaceutical care (n=211)

Statement	Frequency (%)					Mean (SD)
	1	2	3	4	5	
Lack of time to provide pharmaceutical care	2 (0.9)	17 (8.1)	37 (17.5)	110 (52.1)	45 (21.3)	3.8 (0.88)
Inadequate staffing, *e.g.* deficient number of pharmacy technicians to help with dispensing	1 (0.5)	14 (6.6)	39 (18.5)	94 (44.5)	63 (29.9)	3.9 (0.89)
Pharmacists being physically distinct from patient care area	5 (2.4)	20 (9.5)	58 (27.5)	95 (45.0)	33 (15.6)	3.6 (0.94)
Lack of private counselling area, space or inappropriate pharmacy layout	3 (1.4)	14 (6.6)	47 (22.3)	94 (44.5)	53 (25.1)	3.8 (0.92)
Inadequate computer system/ software	2 (0.9)	22 (10.4)	47 (22.3)	79 (37.4)	61 (28.9)	3.8 (0.99)
Inadequate computer training personnel	2 (0.9)	18 (8.5)	50 (23.7)	76 (36.0)	65 (30.8)	3.8 (0.98)
Organisational obstacles: *e.g.* lack of support from administration	2 (0.9)	7 (3.3)	48 (22.7)	77 (36.5)	77 (36.5)	4.0 (0.90)
Absence of healthcare policy for pharmacists' patient care role	5 (2.4)	13 (6.2)	57 (27.0)	88 (41.7)	48 (22.7)	3.7 (0.95)
Deficient clinical knowledge of pharmacist practitioners	5 (2.4)	21 (10.0)	39 (18.5)	93 (44.1)	53 (25.1)	3.8 (1.00)
Deficient communication skills of pharmacist practitioners	7 (3.3)	30 (14.2)	39 (18.5)	91 (43.1)	44 (20.9)	3.6 (1.06)
Lack of financial compensation for the activities that are related to patient care	2 (0.9)	21 (10.0)	57 (27.0)	90 (42.7)	41 (19.4)	3.7 (0.92)
Inadequate pharmaceutical care training	6 (2.8)	11 (5.2)	39 (18.5)	101 (47.9)	54 (25.6)	3.8 (0.94)
Inadequate continuing professional education of practitioners	8 (3.8)	14 (6.6)	53 (25.1)	91 (43.1)	45 (21.3)	3.7 (0.99)
Lack of physicians' trust/ confidence in the pharmacists' abilities	3 (1.4)	6 (2.8)	39 (18.5)	74 (35.1)	89 (42.2)	4.1 (0.91)
Lack of acceptance of role of pharmacists by the physician	2 (0.9)	9 (4.3)	39 (18.5)	77 (36.5)	84 (39.8)	4.1 (0.91)
Lack of confidence in communication with the physician	5 (2.4)	19 (9.0)	48 (22.7)	91 (43.1)	48 (22.7)	3.7 (0.98)
Lack of teamwork among the healthcare members	7 (3.3)	6 (2.8)	41 (19.4)	82 (38.9)	75 (35.5)	4.0 (0.98)
Lack of patient interest	18 (8.5)	31 (14.7)	58 (27.5)	62 (29.4)	42 (19.9)	3.3 (1.20)

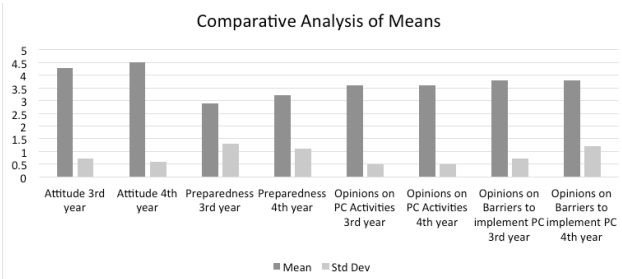
Abbreviations: SD, standard deviation.
1=Strongly Disagree; 2=Disagree; 3=Neutral; 4=Agree; 5=Strongly Agree.

Table V: Opinions on the different pharmaceutical care activities (n=211)

Items	Frequency (%)				Mean (SD)
	1	2	3	4	
Identify expected therapeutic outcomes (goals) of drug therapy.	0 (0)	1 (0.5)	63 (29.9)	147 (69.7)	3.7 (0.47)
Select parameters of patient care to monitor efficacy and safety of drug therapy.	0 (0)	5 (2.4)	65 (30.8)	141 (66.8)	3.6 (0.52)
Provide follow-up services for drug therapy, e.g. monitoring response to therapy.	0 (0)	5 (2.4)	64 (30.3)	142 (67.3)	3.7 (0.52)
Perform limited physical exams, *e.g.* measuring blood pressure, heart rate, BMI…*etc*.	4 (1.9)	28 (13.3)	85 (40.3)	94 (44.5)	3.3 (0.76)
Access clinical laboratory parameters (tests) records.	0 (0)	17 (8.1)	90 (42.7)	104 (49.3)	3.4 (0.63)
Discuss patient case with physician.	0 (0)	6 (2.8)	86 (40.8)	119 (56.4)	3.5 (0.55)
Interview patients.	1 (0.5)	6 (2.8)	70 (33.2)	134 (63.5)	3.6 (0.57)
Access to patient medical records.	0 (0)	3 (1.4)	46 (21.8)	162 (76.8)	3.7 (0.46)
Recommend dose adjustments.	1 (0.5)	6 (2.8)	61 (28.9)	143 (67.8)	3.6 (0.56)
Provide complete drug therapy information.	0 (0)	1 (0.5)	54 (25.6)	156 (73.9)	3.7 (0.45)
Have accurate updated information on all medications currently taken by patient.	1 (0.5)	3 (1.4)	36 (17.1)	171 (81.0)	3.8 (0.47)
Have accurate updated information on OTCs.	1 (0.5)	5 (2.4)	67 (31.8)	138 (65.4)	3.6 (0.55)
Assess patients' needs for review of drug therapy.	0 (0)	5 (2.4)	69 (32.7)	137 (64.9)	3.6 (0.53)
Assess patients' needs for drug therapy monitoring.	0 (0)	3 (1.4)	63 (29.9)	145 (68.7)	3.6 (0.50)
Assess patients' needs for advice on lifestyle modifications.	1 (0.5)	4 (1.9)	73 (34.6)	133 (63.0)	3.6 (0.55)
Undertake review of drug therapy as part of regular ward rounds.	0 (0)	7 (3.3)	82 (38.9)	122 (57.8)	3.5 (0.56)
Provide counselling on medicines use and side effects.	0 (0)	4 (1.9)	44 (20.9)	163 (77.3)	3.7 (0.47)
Provide counselling on lifestyle modifications.	0 (0)	5 (2.4)	53 (25.1)	153 (72.5)	3.7 (0.50)
Monitor compliance with medicines.	0 (0)	4 (1.9)	37 (17.5)	170 (80.6)	3.7 (0.45)
Monitor side effects of medicines.	0 (0)	1 (0.5)	41 (19.4)	169 (80.1)	3.8 (0.41)
Recommend changes after review or monitoring of drug therapy.	1 (0.5)	1 (0.5)	56 (26.5)	153 (72.5)	3.7 (0.49)
Communicate with other members of health care team.	0 (0)	3 (1.4)	64 (30.3)	144 (68.2)	3.6 (0.50)
Communicate with patients effectively.	0 (0)	5 (2.4)	49 (23.2)	157 (74.4)	3.7 (0.50)
Detect and respond to nonverbal cues.	2 (0.9)	12 (5.7)	90 (42.7)	107 (50.7)	3.4 (0.64)
Listen to patients effectively.	0 (0)	6 (2.8)	52 (24.7)	153 (72.5)	3.7 (0.51)
Explain by using words that are easy to be understood by patients.	0 (0)	3 (1.4)	33 (15.6)	175 (83.0)	3.8 (0.42)

Abbreviations: SD, standard deviation.
1=Unimportant; 2=Somewhat important; 3=Important; 4=Very important.

Figure 1: Comparative analysis of means of different years



Discussion

Pharmacy schools are responsible for providing pharmaceutical care education to future pharmacists with the aim of getting them ready for future professional roles related to patient care. However, students may get frustrated because of the potential improper harmonisation between what they were taught and with what they should perform in real life settings (Lawrence *et al*., 2004). Thus, it is imperative to study PC education from students' perspectives using a multifaceted questionnaire to explore the real perceived attitudes, opinions and barriers to providing PC services.

The current research aimed to involve students from two different years despite the differences regarding exposure to various types of PC services. This allows for getting clearer views about the actual effect of diverse PC educational activities provided throughout the two years of our undergraduate pharmacy programme. Most respondents showed a positive attitude towards the concept of PC with a significant difference noticed between the two study cohorts. This difference represented the positive effect of advanced PC services on the attitudes of final-year students. This finding that reflected the positive attitudes towards the concept of PC is consistent with several similar studies conducted in the Saudi Arabia, Qatar, and Nigeria (Al-Arifi, 2009; Udeogaranya *et al*., 2009; El Hajj *et al*., 2014; Bacha & El-Gergawi, 2016; Sanchez & Bermúdez *et al*., 2016).

The above findings showed that the current study respondents acknowledged the value of PC practice and the role of the pharmacist as PC provider. On the other side, this finding reflected the effectiveness of IIUM pharmacy curriculum in establishing overall students' understanding towards the concept of PC. Pharmacy curriculum should not only focus on providing students with knowledge but also enhancing their capabilities and preparing them for the professional practice environment (Bond & Cone, 2012). Consequently, advanced and practical training on various PC services is required for graduate students who might be more likely to assume an active role in offering PC during their professional practice (Tsega *et al*., 2015).

The preparedness of the respondents towards PC was assessed and measured with regards to four aspects: technical, psychosocial, communications, and management. Most of the respondents had highest rated perceptions to promote public awareness of health and disease. They had the least rated preparation to develop and implement a pharmacy inventory (stock) control system to distribute and administer medications. It is observed that our respondents' participation in an activity that involves community service and health screening has positively affected their overall perception of their readiness to play a similar role in future professional practice. In contrast, although the current curriculum has introduced pharmacy management and administration as core study courses, it seems that more focused and experiential learning initiatives are needed to refine future pharmacists more qualified towards their administrative responsibilities and as well as their clinical duties. This result seems to be comparable with other studies in Kuwait and USA (Scott, Friesner & Miller, 2010; Katoue *et al*., 2014).

Regarding our students' opinions towards various activities related to PC, the study results showed that respondents preferred activities that related to patient education and counselling, especially those concerned with enhancing patient understanding by using simple expressions and plain language. On the other hand, PC activities involving basic physical examination measures like taking blood pressure, heart rate, *etc*. are the least important PC activities as per our respondents. This finding is consistent with the parallel students' views regarding the involvement of pharmacists in such activities, perceived to be done by physicians for a long time (Katoue *et al*., 2014). This also reflects the need for innovation in the type of PC services to which students will be exposed, allowing them to think out of the classical frame of PC practice. Also, there may be a need for raising students' confidence to be involved in diverse PC activities using creative training with relevant clinical scenarios in a simulated patient environment (Pharmaceutical Care Laboratory), already implemented in many pharmacy colleges (Bond & Cone, 2012).

The lack of physician's trust/confidence in the pharmacists' abilities identified as one of the most significant impediments to implementation of various PC activities. This finding is consistent with another USA study that revealed the need for an established, trusting relationship between the pharmacist and physician to achieve better communication while performing their professional roles (McGrath *et al*., 2010). The existence of a communication gap between pharmacists and doctors in daily clinical practice has been identified (Aburuz, Al-Ghazawi & Snyder, 2012). In response to this finding, IIUM Kulliyyah of Pharmacy should consider a greater focus on the communication skills of students through providing various inter-professional teaching and clinical experiences at earlier stages so that the students can experience working in an inter-professional team. In this context, many suggestions were raised to enhance inter-professional education such as promoting dialogue and exchange, discussing professional roles and overlaps, and addressing causes of friction so that students can find common ground through learning. This consensus should be based on the clear understanding of each professional role and the way by which various healthcare providers can communicate and collaborate effectively in the daily clinical practice (Sunguya *et al*., 2014). A joint venture of inter-professional education (IPE) programmes can be launched with a shared vision and mission across all healthcare provider programmes for building mutually communicative healthcare team professionals, responsible for the augmentation of students' competencies and eventually better patient care (Kahaleh *et al*., 2015)

The impact of IIUM pharmacy curriculum on the students' attitudes, perceptions and perceived barriers towards PC, can be noticed from the significant difference between respondents belonging to different study years. It was obvious that final year students who were exposed to more advanced PC experience had higher scores in the current research. This may be related to the fact that as the level of professional year increases, the level of education they received also intensifies and therefore paves the way for more exposure towards PC components. This is in line with the findings from previous research where student pharmacists expressed readiness and preparedness to perform PC activities compared to when they started their educational degree experiences (Ried *et al*., 2002; Scott *et al*., 2010).

The current research is restricted to one pharmacy setting because of the paucity of time and financial constraints, and therefore, the generalisability of the findings is limited. In the future, it will be preferred to consider extrapolation of study to involve students from other public and private Malaysian universities at a larger scale to provide more extensive results and be able to identify similarities and distinctions between different public universities and also between public and private universities. Such future large-scale studies can outline the major changes that should be implemented regarding both PC education and practice.

Conclusion

Overall, pharmacy students have a positive attitude and perception towards PC. Students feel favourable in practicing clinical PC activities rather than administrative ones. Lack of physicians' trust or confidence in the pharmacists' abilities was identified as a major barrier to the implementation of PC which can be rectified by making better use of inter-professional education. This study could serve as a baseline to promote more innovative components of PC education that will focus on developing better students' communication skills with the other healthcare professionals and patients.

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