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Experience and attitude of Malaysian undergraduate pharmacy students towards clinical pharmacy education

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Abstract---Clinical pharmacy education (CPE) is an important element in the undergraduate pharmacy programmes as the pharmacy profession had changed from product-oriented to patient-oriented services. This study was designed to assess the experience and attitude of Malaysian undergraduate pharmacy students on clinical pharmacy education, to compare attitude score according to different demographic characteristics and experiences, and to identify preferred teaching and learning methods for CPE. This was a cross-sectional study conducted using an adopted and adapted questionnaire which was distributed via email. A total of 305 final year Bachelor of Pharmacy students from all universities offering pharmacy programme were recruited through convenient sampling and the mean (SD) age of the respondents was 23.03 (1.589) years. This study revealed that almost 50% of respondents started CPE in

Year 3 of their study. The highest proportion of respondents spent 31-50 contact hours per semester for clinical pharmacy courses and the biggest percentage of contact hours were spent in traditional lectures. However, this study found that majority of the respondents have positive attitude towards CPE and those who had hands-on experience in therapeutic drug monitoring (TDM), those who had experience interacting with site preceptors during clinical clerkship and those who received active guidance from their site preceptors had significantly better attitude towards CPE than their counterparts ($P < 0.005$). This study also found that majority of the respondents agreed that clinical clerkship are fairly and very important as a teaching method in CPE. Therefore, clinical pharmacy curriculum must be reviewed and updated regularly to ensure students are receiving sufficient experiential learning and appropriate teaching and learning methods are used to optimise students' learning experience.

Keywords---*clinical pharmacy education, experience, attitude, Malaysia.*

Introduction

Over the last four decades, the pharmacy profession has seen a major revision from medication oriented to patient-focused practice. This has brought up the challenges of how clinical skills can be acquired by the pharmacist-in-training in areas such as clinical pharmacy and pharmaceutical care. According to the American College of Clinical Pharmacy, clinical pharmacy is concerned with the practice of rational medication use and it helps in optimising medication therapy, promoting health, wellness and disease prevention [1]. Meanwhile, pharmacy education can be defined as an educational system that have the capacity to develop stakeholders for various pharmacy settings which including community, hospital, academic, research and development across varying levels of services [2]. The growth of pharmacy as a clinical profession relies on updated pharmaceutical education, thus would require significant review of pharmacy curriculum and competency assessment methods [3]. The duration and syllabus of pharmacy education may be different in various countries, but clinical pharmacy still remain as a core element in pharmacy education.

In Malaysia, the first Bachelor of Pharmacy (BPharm. (Hons.)) programme was offered by *Universiti Sains Malaysia* (USM) in 1972 [4]. Clinical pharmacy education (CPE) has been long incorporated in the Malaysian pharmacy curriculum where a minimum contact hour of 210 hours has been set for clinical pharmacy courses within the 4-year bachelor's degree programme [5]. A cross-sectional study conducted among 138 of third- and fourth-year pharmacy students at International Islamic University Malaysia showed that more than 70% of the students believed that CPE enhanced their ability to understand clinical problems as well as teamwork and communication skills through clinical practice in hospital [6]. However, the effectiveness of the whole CPE curricular offered in Malaysian universities is still largely unknown. Thus, assessing the experience and attitude of Malaysian undergraduate pharmacy students towards CPE may

provide vital clues. In addition, this study was also conducted to compare the attitude towards CPE according to different demographic characteristics CPE exposures and to identify preferred teaching and learning methods for CPE.

1. Materials and Methods

This was a cross-sectional study conducted among final year Bachelor of Pharmacy students involving all institutions that offer pharmacy program in Malaysia. This study employed convenient sampling method and was conducted over a study period of 3 months, utilising self-administered questionnaire adopted and adapted from several authors [7-9]. The questionnaire was distributed online through the Malaysian Pharmacy Students' Association (MyPSA) email group. Minimum sample size of 278 respondents was calculated based on the number of registered pharmacy students in Malaysian universities reported to MyPSA. Ethical approval by University of Cyberjaya Research Ethics Review Committee (CRERC) was obtained prior to the start of the study (Approval number: CUCMS/CRERC/ER/051). Consent from respondents was obtained upon agreement to participate in this research. Only those in final year (Year 4) of Bachelor of Pharmacy during the study period and agreed to participate were included in this study. Meanwhile, respondents with incomplete questionnaire were excluded.

The questionnaire was divided into four sections which were demographic characteristics of respondents (Section A), experience towards CPE (Section B), attitude towards clinical pharmacy education (Section C) and preferred teaching and learning methods (Section D). Items in Section C was administered using 5-point Likert scale. A total score of 30 to 50 indicates that study subjects had a positive attitude towards CPE while a total score 29 or less indicates that respondents had a negative attitude. Meanwhile, there were 5 items in Section D and data for this questionnaire was administered using a 3-point Likert scale system in which 3 represent as "Very Important", 2 represent as "Fairly Important" and 1 represent as "Not Important". A pilot study was carried out on 15 respondents to determine face validity of the study tool and appropriate amendments were carried out prior to final data collection. Reliability was determined by calculating the Cronbach α coefficients in which the values for Section C and Section D were 0.978 and 0.943 respectively. Data was arranged, classified and analysed using Statistical Package for Social Sciences (SPSS) software version 24.0. Descriptive and inferential statistics were utilised as necessary to analyse the data.

Results

A total of 305 respondents out of 952 of total students were included in the study, giving a response rate of 32.0%. The overall mean (SD) age of was 23.03 (1.589) years and majority of the respondents were female (n=205, 67.2%) (Table 1). Besides, 53.4% (n=163) of the respondents were from private universities while 46.6% (n=142) were from public universities.

Table 1. Demographic characteristics of respondents

Characteristics	Frequency (%) N=305	Mean (SD)
Age (years)		23.03 (1.589) (Range: 21-33)
Gender		
Male	100 (32.8)	
Female	205 (67.2)	
Institution of study		
Public university	142 (46.56)	
Private university	163 (53.44)	

This study found that almost 50% of respondents reported that they started CPE in Year 3 of study although 34.4% (n=105) reported that they started the courses in Year 2 (Table 2). The highest proportion of respondents spent 31- 50 contact hours per semester learning clinical pharmacy courses (n=90, 29.6%) although 21.4% (n=65) reported that they spent > 90 hours learning the subjects. Another 20.8% (n=63) reported that they spent 51-70 contact hours for CPE. The biggest percentage of contact hours were spent in lectures followed by clinical clerkship (20%). Only 14 % and 3.1% of the contact hours were reported to be spent for role plays and poster presentation respectively. Majority of respondents (92.8%, n=283) also reported to receive explanation on learning objectives for their clinical pharmacy courses during their study. For clinical clerkship, 84.3% (n=257) reported that site preceptors were available during the clerkship although a lower percentage (63.9%, n=195) reported that site preceptors were actively involved during their clinical clerkship.

Table 2. Clinical pharmacy education (CPE) experienced by Malaysian undergraduate pharmacy students

Characteristics	Number respondents (%) N=305	of % of contact hours
Academic year when CPE started		
Year 1	20 (6.6)	
Year 2	105 (34.4)	
Year 3	150 (49.2)	
Year 4	30 (9.8)	

Table 2. Clinical pharmacy education (CPE) experienced by Malaysian undergraduate pharmacy students (continued)

Characteristics	Number of respondents (%)	% of contact hours
Contact hours spent for CPE per semester		
< 30 hours	42 (13.4)	
31 – 50 hours	90 (29.6)	
51 – 70 hours	63 (20.8)	
71 – 90 hours	45 (14.8)	
> 90 hours	65 (21.4)	
Learning methods used in CPE		
Lecture		46.3
Case study		14.0
Role play		6.2
Group discussion		10.4
Clinical clerkship		20.0
Poster presentation		3.1
Learning objectives of clinical pharmacy courses were clearly explained		
Yes	283 (92.8)	
No	22 (7.2)	
Clinical clerkship Availability of site preceptors		
Yes		
No	257 (84.3)	
Active guidance received from site preceptors during clinical clerkship		
Yes	205 (67.2)	
No	64 (21.0)	

As demonstrated in Table 3, the mean (SD) of the total attitude score towards CPE was 40.68 (8.779) out of 50. Most respondents (90.5%, n=276) had positive attitude towards learning clinical pharmacy courses.

Table 3 Attitude of Malaysian undergraduate pharmacy students towards CPE

Attitude	Frequency (%)	Mean total attitude score (SD)
Positive attitude (30-50)	276 (90.5)	40.68 (8.779)
Negative attitude (29 or less)	29 (9.5)	

There was no significant correlation between attitude score and age of the respondents ($P = 0.100$) (Table 4). Similarly, this study found no significant difference in attitude towards CPE between genders and whether the respondents were studying in the public or private universities ($P > 0.05$).

Table 4 Analysis of attitude toward CPE according to demographic characteristics of the respondents

Characteristics	N	Mean total attitude score (SD)	Correlation coefficient (r)	P-value
Age (years)			-0.094 ^a	0.100
Gender				
Male	100	40.04 (8.478)		0.373 ^b
Female	205	41.00 (8.926)		
Types of university				
Public	142	40.95 (8.283)		0.619 ^b
Private	163	40.45 (9.209)		

^aPearson correlation test

^bIndependent t-test

Table 5 shows that the academic year when CPE was started in the curriculum has no effect on respondents' attitude towards the courses. However, respondents who were aware of the learning objectives of clinical pharmacy courses were found to have significantly higher mean total attitude score compared to those who did not (41.10 (8.472) vs 35.32 (10.93); $P = 0.003$). This study also found that those who were exposed to hands-on therapeutic drug monitoring (TDM) services in their curriculum also have statistically better attitude towards CPE compared to those who did not ($P = 0.028$). In addition, this study also established that respondents who had site preceptors made available to them and those who received active guidance from the site preceptors to achieve their learning objectives during the clerkship also had significantly better attitude towards CPE compared to those who did not ($P < 0.05$).

Table 5. Comparison of attitude score toward CPE according to experience on clinical pharmacy education

Characteristics	N	Mean total attitude score (SD)	Median total attitude score (IQR)	P-value*
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Academic year when CPE started			
Year 1	20	44.0 (12.0)	0.421 ^c
Year 2	105	41.0 (8.0)	
Year 3	150	43.0 (6.0)	
Year 4	30	43.0 (6.0)	
Learning objectives of clinical pharmacy courses were clearly explained			
Yes	283	41.10 (8.472)	0.003^b
No	22	35.32 (10.93)	
Formal contact hours spent in clinical pharmacy courses			
< 70 contact hours	195	40.10 (9.279)	0.122 ^a
≥ 70 contact hours	110	41.72 (7.746)	
Hands-on sessions experienced in clinical pharmacy courses			
Patient interview			
Yes	248	40.77 (8.673)	0.703 ^a
No	57	40.28 (9.294)	
Therapeutic counselling			
Yes	241	41.00 (8.570)	0.220 ^a
No	64	39.48 (9.500)	
Total parenteral nutrition			
Yes	173	41.35 (7.966)	0.127 ^a
No	132	39.80 (9.704)	
Therapeutic drug monitoring			
Yes	186	41.56 (7.863)	0.028^a
No	119	39.30 (9.924)	
Drug information services			
Yes	219	41.04 (8.885)	0.255 ^a
No	86	39.77 (8.485)	
Clinical clerkship			
Availability of site preceptors			
Yes	257	41.14 (8.391)	0.035^b
No	12	35.83 (10.365)	
Active guidance received from site preceptors during clinical clerkship			
Yes	205	42.23 (7.829)	0.001^b
No	64	37.08 (9.363)	

^bIndependent t-test

^cKruskal-Walis test

*P-value < 0.05 shows statistical significance

Descriptive data analysis of the preferred teaching and learning methods for clinical pharmacy education found that majority of the respondents (n=233, 76.4%) ranked clinical clerkship as very important followed by case studies (n=230, 75.4%) and lectures (n=161, 52.8%) (Table 7).

Table 7 Preferred teaching and learning methods for clinical pharmacy education

Methods	Frequency (%) N=305		
	Not important	Fairly important	Very important
Clinical clerkship	9 (3.0)	63 (20.7)	233 (76.4)
Case studies	9 (3.0)	66 (21.6)	230 (75.4)
Lectures	4 (1.3)	86 (28.2)	215 (70.5)
Dialogic classroom	37 (12.1)	107 (35.1)	161 (52.8)
Role play	34 (11.1)	127 (41.6)	114 (47.2)

Discussion

The overall mean (SD) age of the respondents was 23.03 (1.589) years and ranged between 21 to 33 years. The minimum entry requirements for Bachelor of Pharmacy in Malaysia is either qualification in pre-university matriculation, foundation in science, Cambridge Higher School Certificate, Diploma in Pharmacy certification or equivalent [5]. Hence this explains the variation in age of respondents since the pre-degree study may take various number of years to complete. The big number of female respondents tallies with a report which stated that Malaysian tertiary education has uneven distribution of male and female students where their prevalence were 37% and 64% respectively [10].

This study revealed that there is a variation in when clinical pharmacy education is introduced in the pharmacy curriculum in Malaysia although 50% of the respondents stated that they started clinical pharmacy education during year 3. Currently, there is no specific recommendation in when clinical pharmacy education should be started in [5]. In some countries, clinical pharmacy courses are introduced since second year of academic calendar. This is to ensure that the students have greater understanding on clinical pharmacy and how pharmaceutical care can be applied in real practice [11]. Besides that, this study also showed that vast majority of respondents reported that they received

explanation on learning objectives of clinical pharmacy courses which is parallel with suggestion in the Malaysian guidelines on approval and recognition of pharmacy programme that stated students should be exposed to learning objectives of the courses as it would create awareness on the desired outcomes of the courses [5].

The current study found that majority of the study subjects spent less than 70 contact hours for CPE per semester. Although the current national guidelines recommended that minimum contact hours for CPE is 210 hours for the whole of Bachelor of Pharmacy programme, no specific recommendation of total contact hours per semester was stated. In Nigeria, Pharmacists Council of Nigeria (NUC) recommended that clinical pharmacy courses should have at least 70 contact hours per semester during the clinical years which were the fourth year and fifth year in their academic calendars [12]. Students who spent sufficient contact hours for CPE have an opportunity to be exposed to various components in clinical pharmacy education that help students to understand better about clinical pharmacy concepts [11].

In order to ensure that pharmacy graduates are practice-ready and able to competently provide pharmaceutical care services to patients, clinical pharmacy curriculum should deliver broad clinical knowledge as well as sufficient exposure on practical skills such as performing patient interview, therapeutic drug monitoring, patient counselling, total parenteral nutrition and drug information services. The current study showed that respondents who had hands-on sessions on therapeutic drug monitoring as part of their curriculum had statistically better attitude towards CPE. By emphasising the principles and practices of TDM in the curriculum, students would be able to appreciate the importance of individualised drug treatment based on patient's needs on top of the applications of knowledge on pharmacokinetic and pharmacodynamic properties of learned drugs.

This study also found that site preceptors play vital roles during students' clinical clerkships at the hospitals and respondents who had active guidance from the preceptors showed better attitude towards CPE. Site preceptors are real practice role models for the students and by providing active guidance such as case discussion and feedback, they can stimulate students to recall previously learned materials and review students work [13]. Preceptors are also encouraged to create appropriate environment for providing practical experiences and develop strategies for engaging the students with real pharmacy practices [14]. As CPE involves various scientific, critical thinking and communication skills, it is not surprising that majority of the respondents rated clinical clerkship as a very important teaching and learning method in the CPE curriculum. Similarly, by having case studies as another very important teaching and learning method, simulated cases can be used to engage students in discussing and recommending the best evidence-based treatment options for the given simulated cases. This provides the opportunities for the students to develop their problem-solving skills prior to exposure to real-practice settings. Despite this, lectures remain as one of the important teaching methods in CPE since a large amount of information can be relayed to the students in a short time to stimulate good interest among the students towards the subjects [15]. However, a few challenges such as one-way communication, passive audience and difficulty in assessing student learning may act as limitations during classroom-based teaching. Thus, a combination of

modern teaching methods including problem based learning (PBL), case based learning (CBL) and blended-learning may be utilised on top of the traditional classroom lecture.

Conclusion

As a conclusion, although CPE in Malaysia is generally well-established as evident by the reported experience and positive attitude among the respondents, having more detailed national standards is probably necessary to ensure that all schools of pharmacy in Malaysia are providing optimised and updated CPE in their pharmacy curriculum. Ensuring all students receiving sufficient clinical clerkship exposures with active guidance from the site preceptors will also improve experience and attitude of pharmacy students towards clinical pharmacy education.

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References

1. American College of Clinical Pharmacy. The definition of clinical pharmacy. *Pharmacotherapy*. 2008 Jun;28(6):816-817.
2. Anderson C, Bates I, Bruno A, Futter B, & Rouse MJ. Pharmacy education (Part 4). FIP Global Pharmacy Workforce Report. 2009; 16-24.
3. Awaisu A & Mohamed M. Advances in Pharmaceutical Education: An Experience with the Development and Implementation of an Objective Structured Clinical Examination (OSCE) in an Undergraduate Pharmacy Program. *Pharmacy Education*. 2010; 10 (1): 32-38.
4. Abu Bakar AR, Simbak NB and Haque M. Knowledge, attitude and practice on medication use and safety among Nigerian postgraduate-students of UniSZA, Malaysia. *International Journal of Pharmaceutical Research*. 2014; 6(4): 104–110.
5. Pharmacy Board Malaysia. Guidelines on approval and recognition of pharmacy program. 2017. Available from <https://www.pharmacy.gov.my/v2/en/content/pharmacy-board.html>.
6. Zakaria SF, & Awaisu A. Shared-Learning Experience During a Clinical Pharmacy Practice Experience. *American Journal of Pharmaceutical Education*, 2011; 75 (4).
7. Hasan S, Wong PS, Ahmed SI, Weng D, Kairuz T. Perceived impact of clinical placements on students' preparedness to provide patient-centred care in Malaysia. *Currents in Pharmacy Teaching and Learning*. 2013; 5(4): 303-310.
8. Katoue MG, Awad AI, Schwinghammer TL, Kombian SB. Pharmaceutical care education in Kuwait: pharmacy students' perspectives. *Pharmacy Practice*. 2014; 12(3): 411-419.
9. Mesquita AR, Souza WM, Boaventura TC, Barros IMC, Antonioli AR, Silva WB, Lyra DP. The effect of active learning methodologies on the teaching of

- pharmaceutical care in a Brazilian pharmacy faculty. *PLoS ONE*. 2015; 10(5): 1–16.
10. Ministry of Higher Education, Malaysia. *Statistik Pendidikan Tinggi 2020: Kementerian Pengajian Tinggi*. Kementerian Pengajian Tinggi Malaysia, 2020; 9–36.
 11. Rudall N, Kalemeera F, Rennie T. (2015) Implementing clinical pharmacy within undergraduate teaching in Namibia. *International Journal of Clinical Pharmacy*. 2015; 37(3): 3-5.
 12. Ikhile IJ. Pharmacy Education In Nigeria The Progression. *World Journal of Pharmaceutical Research*. 2016; 5(7): 258-272.
 13. Kassam R. Students' and preceptors experiences and perceptions of a newly developed pharmaceutical care clerkship. *Pharmacy Education*. 2006; 6(3): 179-188.
 14. Mirel S, Daraban A, Mihaiu L, Palage M. Practice Experiences and Preceptor Behaviours in Pharmacy Education. *Procedia Social and Behavioral Sciences*, 2013; 92: 561-566.
 15. Kaur G. Study and Analysis of Lecture Model of Teaching. *International Journal of Educational Planning & Administration*. 2011; 1(1): 9-13.