

An assessment of pharmacy students' knowledge, attitude, and practice toward oral health: An exploratory study

Kingston Rajiah, Chow Jun Ving¹

Department of Pharmacy Practice, School of Pharmacy, ¹Department of Dentistry, School of Dentistry, International Medical University, Kuala Lumpur, Malaysia

Corresponding author (email: <kingrajiah@gmail.com>)

Mr. Kingston Rajiah, Department of Pharmacy Practice, International Medical University, No 126, Jalan Jalil Perkasa 19, Bukit Jalil, Kuala Lumpur - 570 00, Malaysia.

Abstract

Background: Community pharmacies are now frequently being visited by customers/patients to seek oral advice. Malaysian community pharmacists are also found to be experiencing an increased demand of oral health advices by their visiting customers. **Aims/Objectives:** The aim of the study was to explore the knowledge, attitude, and practice of the final year Bachelor of Pharmacy students in a private university toward oral health, as these students will be the future pharmacists. **Materials and Methods:** This cross-sectional study was carried out among final year undergraduate pharmacy students by using self-administered questionnaire. It was conducted as a classroom survey. Raosoft software was used to determine the minimum required sample size. **Results:** The demographic distribution of the respondents was separated into gender, ethnicity, and state of origin. Over 83.8% of the participants were females, with Chinese ethnicity dominating (78.4%) compared to others, and the distribution showed 11 different states of origin. **Conclusions:** This research finding shows that pharmacy students have positive attitude toward oral health despite having poor knowledge and mediocre practice principles regarding oral health.

Key words: *Cross-sectional study, knowledge, oral health, oral hygiene, pharmacist, pharmacy students*

INTRODUCTION

The role of pharmacists has expanded and evolved with time and is not restricted to only dispensing medication to customers or patients.^[1] Pharmacists are now an important member of the primary healthcare team and hold a great potential to expand their role in oral health promotion.^[2-7] Consistent with many other studies, the Malaysian community pharmacists are also found to be

experiencing an increased demand of oral health advices by their visiting customers.^[8]

Community pharmacies are now frequently being visited by customers/patients to seek oral advice.^[9] At least one question per week regarding oral health is being asked to the pharmacists according to a survey done by Iwanowickz^[10] in Edinburg, Scotland, and over 11 questions per week are asked according to a survey in North England.^[5] They are often the first “port of call” or “point of contact” for the public, whether to seek general health advices or oral health advices.^[3,11] This is also due to the long opening hours of the pharmacies.^[12] In fact, with a large number of customers visiting, the pharmacists actually come into contact with more people with dental problems than an average dentist does.^[9,13] We have to understand that community pharmacies are a setting for the general

Access this article online	
Quick Response Code:	Website: www.jispcd.org
	DOI: 10.4103/2231-0762.144601

public who cannot attend dental care to consult for dental advices.^[1,11] Costs and accessibility are among the reasons that prevent general public from having proper dental care.^[14]

Based on these reports, it is obvious that pharmacists play an important role in oral health promotion. Therefore, we aimed to carry out this study to explore the knowledge, attitude, and practice of the final year Bachelor of Pharmacy (B. Pharm) students in a private university in Malaysia toward oral health, as these students will be the future pharmacists.

MATERIALS AND METHODS

Study setting

This cross-sectional study was carried out among final-year undergraduate pharmacy students by using self-administered questionnaire. It was conducted as a classroom survey. Prior approval was obtained from the concerned university. During the data collection phase, researchers approached the cohort of final year pharmacy students to provide information about the study and obtained written informed consent before distributing the questionnaires to the students. Raosoft software was used to determine the minimum required sample size. Based on the calculation with 5% margin of error, 95% confidence level, and 50% response distribution, at least 68 students were needed out of a total of 130 students involved. By the end of data collection phase, 74 completed questionnaires were collected from the participants.

Sampling

Convenience non-probability sampling technique was used in this study. This method was used to select subjects because of their convenient accessibility and proximity to the researchers. Students who had given their written informed consent were included in this study. Students who were unable to give their consent, who had barrier in communication, and who were not interested to participate were excluded from this study.

Ethical approval

This study was approved by the International Medical University Joint-Committee of the Research and Ethics Committee.

Designing the questionnaire

A questionnaire was designed after a detailed review of relevant literature. It was written in

English, as the medium of instruction in Malaysian universities is English. Demographic data such as age, gender, state, and ethnicity were collected. The questionnaire consisted of three sections with 16 questions. Six questions evaluated the knowledge, five questions evaluated the attitude, and another five questions evaluated the practice toward oral health.

Validation of questionnaire

A pilot study was done on twenty final year pharmacy students to validate the questionnaire. Cronbach's alpha test was used to assess the reliability. The questionnaire was found to have a reliability coefficient of 0.74.

Data analysis

Descriptive and inferential data analyses were carried out using SPSS version 20. The variables for testing knowledge questions were dichotomized. The right option was assigned 1, whereas the wrong option was given 2. Frequency and percentage of pharmacy students with right and wrong responses were then obtained. Correlation bivariate test was performed to find the relationship between pharmacy students' knowledge, attitude, and practice toward oral health.

The variables for testing attitude and practice of pharmacy students were graded on a four-point scale [Figures 1 and 2]. For the attitude section, the response was assigned 1, 2, 3, or 4, where 1 was the best response and 4 the worst response. During the analysis, 1 and 2 were combined as the right/positive response and 3 and 4 as the wrong/negative response. The frequency and percentage of pharmacy students with positive and negative attitudes toward oral health were obtained during the analysis.

The practice section was similar to the attitude section, where the response was assigned 1, 2, 3, or 4. In this, 1 was the best response and 4 the worst response. During the analysis, 1 and 2 were combined as encouraging practice toward oral health and 3 and 4 as non-encouraging practice. The frequency and percentage of pharmacy students with encouraging and non-encouraging practice toward oral health were obtained during the analysis.

RESULTS

The demographic distribution of the respondents, which was separated into gender, ethnicity, and state of origin, is shown in Table 1. Over 83.8% of the participants were females, with Chinese ethnicity

Knowledge, attitude and practice among pharmacy students towards oral health in International Medical University

(A) Demographics

- Gender
Male Female
- Age in years: _____
- State of origin: _____
- Ethnicity
Malay Chinese Indian Others

(B) Knowledge towards Oral health

- Do you know the different techniques for brushing teeth?
Yes No
- Do you know that there are different types of dental floss available?
Yes No
- Do you know what is halitosis?
Yes No
- Do you know teeth grinding can expose the dentin?
Yes No
- Do you know what is oral thrush?
Yes No
- Do you know what is stomatitis?
Yes No

Figure 1: The questionnaire used for collecting data on demographics and knowledge among pharmacists toward oral health

(C) Attitude towards Oral health

- Do you agree it is necessary to brush in the morning and at night to keep the teeth healthy?
Strongly Agree Agree Disagree Strongly disagree
- Do you agree it is necessary to rinse the mouth with water after every meal to remove the food debris?
Strongly Agree Agree Disagree Strongly disagree
- Do you agree sweets, sugary foods and drinks can cause tooth decay?
Strongly Agree Agree Disagree Strongly disagree
- Do you agree using fluoride tooth paste strengthens the teeth?
Strongly Agree Agree Disagree Strongly disagree
- Do you agree, it is necessary to have a dental checkup at least once in a year?
Strongly Agree Agree Disagree Strongly disagree

(D) Practice towards Oral health

- How often do you brush your teeth in a day?
3 times 2 times 1 time not at all
- How often do you rinse your teeth in a day?
3 times 2 times 1 time not at all
- How often do you floss your teeth in a week?
Everyday 4 to 6 days 2 to 3 days less than 2 days
- How often you use fluoride tooth paste to brush your teeth in a week?
Every day 4 to 6 days 2 to 3 days less than 2 days
- How often do you go for dental checkups?
2 times a year once a year only when necessary (toothache etc) Not at all

Figure 2: The questionnaire used for collecting data on attitude and practice of pharmacists toward oral health

Table 1: Demographic data of pharmacists on gender, ethnicity, and states of origin

Demography	Frequency (n)	Percentage
Gender		
Male	12	16.2
Female	62	83.8
Ethnicity		
Malay	6	8.1
Chinese	58	78.4
Indian	5	6.8
Others	5	6.8
State		
Kuala Lumpur	8	10.8
Selangor	14	18.9
Negeri Sembilan	2	2.7
Malacca	3	4.1
Johor	11	14.9
Pahang	3	4.1
Perak	8	10.8
Penang	11	14.9
Kedah	4	5.4
Sabah	4	5.4
Sarawak	6	8.1

dominating (78.4%) compared to others, and the distribution showed 11 different states of origin.

Data analysis revealed that in the knowledge section of the questionnaire, there was almost an equal

distribution of right and wrong answers by the students. Among the six questions for knowledge, question 7 (Do you know what is halitosis?) was the least correctly answered question with only 18.9% of students answering it correctly [Table 2]. Also, answers for other knowledge-related questions did not show significant results.

Data analysis showed that in the attitude section of the questionnaire, majority of the students had shown positive attitude toward oral health [Table 3]. 5.4% of students displayed slight negative attitude toward oral health, as these students disagreed that rinsing is necessary to remove food debris after every meal. 1.4% of students displayed slight negative attitude toward oral health, as these students disagreed that sweet sugary food and beverages can cause tooth decay. 5.4% of students displayed slight negative attitude toward oral health, as they disagreed that using fluoride toothpaste strengthens teeth. 4.1% of students displayed slight negative attitude toward oral health as they disagreed that it is necessary to have at least one dental checkup in a year.

Data analysis revealed that in the practice section of the questionnaire, students had mixed practice principles toward oral health [Table 4]. Among those with encouraging oral health practices, 94.6% brush at least twice a day, 75.7% rinse at least twice a day, and 83.8%

Table 2: Knowledge toward oral health based on gender, ethnicity, and states of origin

Questions	Response	Gender n (%)		Ethnicity n (%)										States n (%)									
		Male	Female	Malay	Chinese	Indian	Others	KL	SR	NS	MA	JR	PG	PK	PN	KH	SS						
5	Right	4 (5.4)	30 (40.5)	4 (5.4)	24 (32.4)	3 (4.1)	3 (4.1)	5 (6.8)	4 (5.4)	0 (0)	2 (2.7)	5 (6.8)	3 (4.1)	2 (2.7)	8 (10.8)	1 (1.4)	4 (3.4)						
	Wrong	8 (10.8)	32 (43.2)	2 (2.7)	34 (45.9)	2 (2.7)	2 (2.7)	3 (4.1)	10 (13.5)	2 (2.7)	1 (1.4)	6 (8.1)	0 (0)	6 (8.1)	3 (4.1)	3 (4.1)	6 (8.1)						
6	Right	7 (9.5)	38 (51.4)	3 (4.1)	36 (48.6)	4 (5.4)	2 (2.7)	5 (6.8)	10 (13.5)	1 (1.4)	1 (1.4)	8 (10.8)	1 (1.4)	4 (5.4)	6 (8.1)	1 (1.4)	8 (10.9)						
	Wrong	5 (6.8)	24 (32.4)	3 (4.1)	22 (29.7)	1 (1.4)	3 (4.1)	3 (4.1)	4 (5.4)	1 (1.4)	2 (2.7)	3 (4.1)	2 (2.7)	4 (5.4)	5 (6.8)	3 (4.1)	2 (2.8)						
7	Right	2 (2.7)	12 (16.2)	1 (1.4)	10 (13.5)	3 (4.1)	0 (0)	3 (4.1)	4 (5.4)	0 (0)	1 (1.4)	0 (0)	3 (4.1)	0 (0)	2 (2.7)	0 (0)	1 (1.4)						
	Wrong	10 (13.5)	50 (67.6)	5 (6.8)	48 (64.9)	2 (2.7)	5 (6.8)	5 (6.8)	10 (13.5)	2 (2.7)	2 (2.7)	11 (14.9)	0 (0)	8 (10.8)	9 (12.2)	4 (5.4)	9 (12.2)						
8	Right	3 (4.1)	33 (44.6)	2 (2.7)	29 (39.2)	3 (4.1)	2 (2.7)	3 (4.1)	6 (8.1)	1 (1.4)	2 (2.7)	8 (10.8)	1 (1.4)	2 (2.7)	8 (10.8)	2 (2.7)	3 (4.1)						
	Wrong	9 (12.2)	29 (39.2)	4 (5.4)	29 (39.2)	2 (2.7)	3 (4.1)	5 (6.8)	8 (10.8)	1 (1.4)	1 (1.4)	3 (4.1)	2 (2.7)	6 (8.1)	3 (4.1)	2 (2.7)	10 (13.5)						
9	Right	7 (9.5)	50 (67.6)	4 (5.4)	44 (59.5)	4 (5.4)	5 (6.8)	5 (6.8)	10 (13.5)	2 (2.7)	2 (2.7)	9 (12.2)	3 (4.1)	3 (4.1)	11 (14.9)	2 (2.7)	4 (5.4)						
	Wrong	5 (6.8)	12 (16.2)	2 (2.7)	14 (18.9)	1 (1.4)	0 (0)	3 (4.1)	4 (5.4)	0 (0)	1 (1.4)	2 (2.7)	0 (0)	5 (6.8)	0 (0)	2 (2.7)	0 (0)						
10	Right	11 (14.9)	43 (58.1)	5 (6.8)	41 (55.4)	3 (4.1)	5 (6.8)	5 (6.8)	9 (12.2)	2 (2.7)	3 (4.1)	10 (13.5)	3 (4.1)	5 (6.8)	7 (9.5)	4 (5.4)	6 (8.1)						
	Wrong	1 (1.4)	19 (25.7)	1 (1.4)	17 (23.0)	2 (2.7)	0 (0)	3 (4.1)	5 (6.8)	0 (0)	0 (0)	1 (1.4)	0 (0)	3 (4.1)	4 (5.4)	0 (0)	4 (3.4)						

KL=Kuala Lumpur, SR=Selangor, NS=Negeri Sembilan, MA=Malacca, JR=Johor, PG=Perang, PK=Penak, PN=Penang, KH=Kedah, SS=Sebah and Sarawak

of the students use fluoride toothpaste at least 4 times a week. Among those with non-encouraging practices, only 21.7% floss at least 4 times a week, whereas 78.3% floss less than 2 times a week, and only 41.3% of the students used to go for dental checkup at least once a year.

Based on the results obtained, correlation among pharmacy students' knowledge, attitude, and practice toward oral health was studied [Table 5].

DISCUSSION

Data analysis on the knowledge section of the questionnaire revealed that there was almost an equal distribution of right and wrong answers by the students. This indicates the lack of oral health knowledge among the pharmacy students, as they were expected to know the answers to all knowledge-related questions. This expectation was absolute as these questions are taught in their curriculum and also represent the common terminology and topics asked by customers to the pharmacists in pharmacies. This result was consistent with that of several studies^[11,13,15] which highlighted the lack of topics on oral health education in their curriculum. The minimal interaction between pharmacy students and dental students is also a factor which may be due to the nature of pharmacists, who operate in isolation from the dentists.^[1,9]

The positive attitude displayed by the students is consistent with the study by Buxcey *et al.*,^[2] where almost all the pharmacists felt that it was one of their responsibilities to give oral advices to the general public. This result was also consistent with another study by Baseer *et al.*,^[16] where healthcare professionals including pharmacists, doctors, nurses, technicians, and also medical students showed positive attitude toward dental care.

Data analysis of the practice section of the questionnaire revealed that students have mixed practice principles toward oral health. The results obtained were similar to the study by Baseer *et al.*,^[16] where less than 50% of health professionals were found to actually floss their teeth.

There was a significant correlation between students' knowledge and practice, whereas there was no correction between students' attitude and practice or between students' attitude and knowledge. From this it can be interpreted that lack of knowledge does not influence the attitude of the students toward oral health. However, students' practice toward oral health will make an impact to a certain extent, as knowledge determines one's self-awareness, self-protection, and personal hygiene practices.^[17]

Table 3: Attitude toward oral health based on gender, ethnicity, and states of origin

Questions	Response	Gender n (%)		Ethnicity n (%)						States n (%)							
		Male	Female	Malay	Chinese	Indian	Others	KL	SR	NS	MA	JR	PG	PK	PN	KH	SS
11	Positive																
	++	11 (14.9)	45 (60.8)	5 (6.8)	44 (59.5)	4 (5.4)	3 (4.1)	7 (9.5)	11 (14.9)	2 (2.7)	3 (4.1)	7 (9.5)	2 (2.7)	6 (8.1)	8 (10.8)	3 (4.1)	7 (9.5)
	+	1 (1.4)	17 (23.0)	1 (1.4)	14 (18.9)	1 (1.4)	2 (2.7)	1 (1.4)	3 (4.1)	0	0	4 (5.4)	1 (1.4)	2 (2.7)	3 (4.1)	1 (1.4)	3 (4.1)
	Negative																
	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	Positive																
	++	6 (8.1)	19 (25.7)	3 (4.1)	18 (24.3)	3 (4.1)	1 (1.4)	5 (6.8)	8 (10.8)	1 (1.4)	1 (1.4)	2 (2.7)	0	2 (2.7)	2 (2.7)	1 (1.4)	3 (4.1)
	+	4 (5.4)	41 (55.4)	3 (4.1)	36 (48.6)	2 (2.7)	4 (5.4)	3 (4.1)	4 (5.4)	0	2 (2.7)	9 (12.2)	3 (4.1)	6 (8.1)	9 (12.2)	2 (2.7)	7 (9.5)
	Negative																
	-	2 (2.7)	2 (2.7)	0	4 (5.4)	0	0	0	2 (2.7)	1 (1.4)	0	0	0	0	0	1 (1.4)	0
13	Positive																
	++	9 (12.2)	39 (52.7)	5 (6.8)	36 (48.6)	3 (4.1)	4 (5.4)	5 (6.8)	9 (12.2)	1 (1.4)	3 (4.1)	7 (9.5)	0	3 (4.1)	8 (10.8)	4 (5.4)	8 (10.8)
	+	3 (4.1)	22 (29.7)	1 (1.4)	21 (28.4)	2 (2.7)	1 (1.4)	3 (4.1)	5 (6.8)	1 (1.4)	0	3 (4.1)	3 (4.1)	5 (6.8)	3 (4.1)	0	2 (2.7)
	Negative																
	-	0	1 (1.4)	0	1 (1.4)	0	0	0	0	0	0	1 (1.4)	0	0	0	0	0
14	Positive																
	++	4 (5.4)	5 (6.8)	3 (4.1)	4 (5.4)	2 (2.7)	0 (0)	1 (1.4)	3 (4.1)	0	2 (2.7)	0	0	2 (2.7)	0	0	0
	+	8 (10.8)	53 (71.6)	3 (4.1)	50 (67.6)	3 (4.1)	5 (6.8)	7 (9.5)	9 (12.2)	2 (2.7)	1 (1.4)	10 (13.5)	3 (4.1)	5 (6.8)	11 (14.9)	4 (5.4)	9 (12.2)
	Negative																
	-	0	4 (5.4)	0	4 (5.4)	0	0	0	2 (2.7)	0	0	1 (1.4)	0	1 (1.4)	0	0	0
15	Positive																
	++	6 (8.1)	17 (23.0)	2 (2.7)	16 (21.6)	3 (4.1)	2 (2.7)	3 (4.1)	6 (8.1)	2 (2.7)	2 (2.7)	1 (1.4)	0	1 (1.4)	3 (4.1)	1 (1.4)	4 (3.4)
	+	5 (6.8)	43 (58.1)	4 (5.4)	40 (54.1)	2 (2.7)	2 (2.7)	5 (6.8)	8 (10.8)	0	1 (1.4)	10 (13.5)	3 (4.1)	6 (8.1)	7 (9.5)	2 (2.7)	6 (8.1)
	Negative																
	-	1 (1.4)	2 (2.7)	0	2 (2.7)	0	1 (1.4)	0	0	0	0	0	0	1 (1.4)	1 (1.4)	1 (1.4)	0

KL=Kuala Lumpur, SR=Selangor, NS=Negeri Sembilan, MA=Malacca, JR=Johor, PG=Perak, PK=Perlis, PN=Penang, KH=Kedah, SS=Sabah and Sarawak, ++ strongly positive, + slightly positive, - slightly negative, -- strongly negative

Table 4: Practice toward oral health based on gender, ethnicity, and states of origin

Questions	Response	Gender n (%)		Ethnicity n (%)						States n (%)								
		Male	Female	Malay	Chinese	Indian	Others	KL	SR	NS	MA	JR	PG	PK	PN	KH	SS	
16	Encouraging	2 (2.7)	13 (17.6)	2 (2.7)	10 (13.5)	1 (1.4)	2 (2.7)	3 (4.1)	1 (1.4)	1 (1.4)	0	0	1 (1.4)	1 (1.4)	3 (4.1)	4 (5.4)	2 (2.7)	
	**																	
	*	8 (10.8)	47 (63.5)	4 (5.4)	46 (62.2)	2 (2.7)	3 (4.1)	4 (5.4)	12 (16.2)	2 (2.7)	3 (4.1)	10 (13.5)	2 (2.7)	4 (5.4)	7 (9.5)	3 (4.1)	8 (10.9)	
	Non-encouraging	2 (2.7)	2 (2.7)	0	2 (2.7)	2 (2.7)	0	1 (1.4)	1 (1.4)	0	0	0	0	1 (1.4)	0	1 (1.4)	0	
	#																	
	##	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
17	Encouraging	4 (5.4)	21 (28.4)	4 (5.4)	15 (20.3)	4 (5.4)	2 (2.7)	5 (6.8)	4 (5.4)	1 (1.4)	3 (4.1)	4 (5.4)	0	1 (1.4)	3 (4.1)	0	4 (3.4)	
	**																	
	*	5 (6.8)	26 (35.1)	1 (1.4)	26 (35.1)	1 (1.4)	3 (4.1)	1 (1.4)	4 (5.4)	0	0	5 (6.8)	2 (2.7)	4 (5.4)	5 (6.8)	4 (5.4)	6 (8.1)	
	Non-encouraging	2 (2.7)	13 (17.6)	1 (1.4)	14 (18.9)	0	0	1 (1.4)	5 (6.8)	0	0	2 (2.7)	1 (1.4)	3 (4.1)	3 (4.1)	0	0	
	#																	
	##	1 (1.4)	2 (2.7)	0	3 (4.1)	0	0	1 (1.4)	1 (1.4)	1 (1.4)	0	0	0	0	0	0	0	
18	Encouraging	1 (1.4)	4 (5.4)	0	4 (5.4)	0	1 (1.4)	1 (1.4)	2 (2.7)	0	0	0	0	1 (1.4)	0	0	1 (1.4)	
	**																	
	*	2 (2.7)	9 (12.2)	0	10 (13.5)	0	1 (1.4)	1 (1.4)	3 (4.1)	0	1 (1.4)	0	0	2 (2.7)	0	2 (2.7)	0	
	Non-encouraging	0	8 (10.8)	1 (1.4)	5 (6.8)	0	2 (2.7)	1 (1.4)	2 (2.7)	1 (1.4)	0	0	1 (1.4)	0	2 (2.7)	0	1 (1.4)	
	#																	
	##	9 (12.2)	41 (55.4)	5 (6.8)	39 (52.7)	5 (6.8)	1 (1.4)	5 (6.8)	7 (9.5)	1 (1.4)	2 (2.7)	11 (14.9)	2 (2.7)	5 (6.8)	9 (12.2)	2 (2.7)	6 (8.1)	
19	Encouraging	7 (9.5)	50 (67.6)	6 (8.1)	41 (55.4)	5 (6.8)	5 (6.8)	8 (10.8)	9 (12.2)	1 (1.4)	3 (4.1)	9 (12.2)	1 (1.4)	4 (5.4)	9 (12.2)	4 (5.4)	9 (12.2)	
	**																	
	*	2 (2.7)	3 (4.1)	0	5 (6.8)	0	0	0	2 (2.7)	0	0	0	0	2 (2.7)	1 (1.4)	0	0	
	Non-encouraging	1 (1.4)	1 (1.4)	0	2 (2.7)	0	0	0	1 (1.4)	0	0	0	0	1 (1.4)	0	0	0	
	#																	
	##	2 (2.7)	8 (10.8)	0	10 (13.5)	0	0	0	2 (2.7)	1 (1.4)	0	2 (2.7)	2 (2.7)	1 (1.4)	1 (1.4)	0	1 (1.4)	
20	Encouraging	2 (2.7)	8 (10.8)	0 (0)	7 (9.5)	1 (1.4)	2 (2.7)	1 (1.4)	3 (4.1)	0	0	0	1 (1.4)	1 (1.4)	1 (1.4)	2 (2.7)	0	1 (1.4)
	**																	
	*	3 (4.1)	25 (33.8)	2 (2.7)	25 (33.8)	1 (1.4)	0 (0)	4 (5.4)	4 (5.4)	1 (1.4)	1 (1.4)	3 (4.1)	1 (1.4)	4 (5.4)	5 (6.8)	2 (2.7)	3 (4.1)	
	Non-encouraging	6 (8.1)	28 (37.8)	3 (4.1)	26 (35.1)	2 (2.7)	3 (4.1)	2 (2.7)	7 (9.5)	1 (1.4)	1 (1.4)	7 (9.5)	1 (1.4)	3 (4.1)	4 (5.4)	2 (2.7)	6 (8.1)	
	#																	
	##	1 (1.4)	1 (1.4)	1 (1.4)	0	1 (1.4)	0	1 (1.4)	0	0	1 (1.4)	0	0	0	0	0	0	

KL=Kuala Lumpur, SR=Selangor, NS=Negeri Sembilan, MA=Malacca, JR=Johor, PG=Pahang, PK=Perak, PN=Penang, KH=Kedah, SS=Sabah and Sarawak, **=strongly encouraging, *encouraging, #=Non-encouraging, ##=Strongly non-encouraging

Table 5: Correlation between pharmacy students' knowledge, attitude, and practice toward oral health

Correlation coefficient	Oral health knowledge	Oral health attitude	Oral health practice
Oral health of students	0.568**	0.079	0.218*
	0.000	0.000	0.010

Knowledge: ** $P < 0.01$; practice: * $P < 0.05$

Limitation

The present study had some limitations. The present study results were those of pharmacy students attending a private university. So, the results of the study do not represent the entire population of pharmacy students in Malaysia.

CONCLUSION

The findings of this study show that pharmacy students have positive attitude toward oral health despite having poor knowledge and mediocre practice principles regarding oral health. There is a definite need for the students to improve their knowledge as the demand for oral health advices in community pharmacies is increasing.^[8,18] There is an edge and awareness of the importance of oral health for them to be competent in giving oral health care advices to the public as part of the primary healthcare team in the near future.

Recommendations

There are several recommendations that may help improve the overall knowledge, attitude, and practice among pharmacy students toward oral health.

- Dental health-related seminars, workshops, and inter-professional learning with dental students can be incorporated into the curriculum of pharmacy students to improve their oral health knowledge, attitude, and practice
- Further research could be conducted to examine the demand and possibilities of opportunistic oral health advices in community pharmacies, in order to increase the comprehensiveness and expectations of services that could be provided to customers by students in their future career^[5]
- More workshops and continuing professional development (CPD) recognized oral health courses could be conducted by manufacturers and professional dental organizations in the future to motivate the pharmacists to update their dental knowledge. This is because most pharmacists cannot recall details of the oral health curriculum taught in their undergraduate course.^[2]

REFERENCES

1. Priya S, Madan Kumar PD, Ramachandran S. Knowledge and attitudes of pharmacists regarding oral health care and oral hygiene products in Chennai city. *Indian J Dent Res* 2008;19:104-8.
2. Buxcey AJ, Morgaine KC, Meldrum AM, Cullinan MP. An exploratory study of the acceptability of delivering oral health information in community pharmacies. *N Z Dent J* 2012;108:19-24.
3. Dickinson C, Howlett JA, Bulman JS. The role of the community pharmacist as a dental health advisor. *Community Dent Health* 1995;12:235-7.
4. Gilbert L. The role of the community pharmacist as an oral health advisor – an exploratory study of community pharmacists in Johannesburg, South Africa. *SADJ* 1998;53:439-43.
5. Maunder PE, Landes DP. An evaluation of the role played by community pharmacies in oral healthcare situated in a primary care trust in the north of England. *Br Dent J* 2005;199:219-23, discussion 211.
6. Scott A, Bond C, Inch J, Grant A. Preferences of community pharmacists for extended roles in primary care: A survey and discrete choice experiment. *Pharmacoeconomics* 2007;25:783-92.
7. Sheridan J, Aggleton M, Carson T. Dental health and access to dental treatment: A comparison of drug users and non-drug users attending community pharmacies. *Br Dent J* 2001;191:453-7.
8. Eickhoff C, Verheyen F, Schulz M. Health Promotion in Community Pharmacy: Experiences and Perspectives in Germany. Available from: <http://www.univie.ac.at/phc/pics/docs/doc86.pdf>. [Last accessed on 2014 Jan 11].
9. Anderson C. Health promotion in community pharmacy: The UK situation. *Patient Educ Couns* 2000;39:285-91.
10. Iwanowicz SL, Marciniak MW, Zeolla MM. Obtaining and providing health information in the community pharmacy setting. *Am J Pharm Educ* 2006;70:57.
11. Chessnutt IG, Taylor MM, Mallinson EJ. The provision of dental and oral health advice by community pharmacists. *Br Dent J* 1998;184:532-4.
12. Blenkinsopp A, Tann J, Platts A, Allen J. Evaluation of feasibility and acceptability of a community pharmacy health promotion scheme – Views of users and providers. *Health Educ J* 2002;61:52-69.
13. Chestnutt IG, Taylor MM, Mallinson EJ. The provision of dental and oral health advice by community pharmacists. *Br Dent J* 1998;184:532-4.
14. Freeman R. Barriers to accessing and accepting dental care. *Brit Dent J* 1999;187:81-4.
15. Omar AB. Knowledge and Attitudes of Pharmacists Regarding Oral Healthcare and Oral Hygiene Products in Riyadh, Saudi Arabia. *J Int Oral Health* 2014;6:1-4.
16. Baseer MA, Alenazy MS, Alasqah M, Algabbani M, Mehkari A. Oral health knowledge, attitude and practices among health professionals in King Fahad Medical City, Riyadh. *Dent Res J (Isfahan)* 2012;9:386-92.
17. Badran IG. Knowledge, attitude and practice the three pillars of excellence and wisdom: A place in the medical profession. *East Mediter Health J* 1995;1:8-16.
18. Steel BJ, Wharton C. Pharmacy counter assistants and oral health promotion: An exploratory study. *Br Dent J* 2011;211:E19.

How to cite this article: Rajiah K, Ving CJ. An assessment of pharmacy students' knowledge, attitude, and practice toward oral health: An exploratory study. *J Int Soc Prevent Communit Dent* 2014;4:S56-62.

Source of Support: Nil, **Conflict of Interest:** None declared.