

Pharmacists' Familiarity with E-learning in Transferring Pharmaceutical Knowledge in the Arab World

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Abstract

This study is the first of its kind in the Arab world and it aimed to reveal Arab pharmacists and pharmacy students' familiarity with e-learning in transferring pharmaceutical knowledge. It aims to explore their usage of the internet and social media and the frequency of using web 2.0 tools in their daily lives. This study is a cross-sectional study that targeted Arab pharmacists and pharmacy students using social media sites in their daily lives. Six hundred and eighty respondents completed the online survey, and most of them were 18-30 years old, females, and possessing their internet connection. Most respondents (n=491, 72.2%) had intermediate computer and internet skills and used the internet for educational purposes (n=609, 89.6%). Almost all of the respondents (n=635, 93.4%) were using the internet daily and more than half of them (n=360, 53.0%) used social media and web 2.0 tools for more than two hours daily. More than half of the respondents were not familiar with e-learning (n=367, 54.0%), and most of them did not attend any online course ever (n=484, 71.2%). Almost all of the participants had either intermediate or high confidence levels in e-learning (n=669, 98.4%) and the vast majority of them were confident of using web 2.0 tools as learning aids which motivated them to learn interactively (n=548, 80.6%; n=524, 77% respectively). This study showed promising results regarding implementing e-learning and novel web 2.0 tools in pharmacy.

Keywords: Arab world, EdTech, E-learning, Social media, Pharmacy education, Web 2.0

INTRODUCTION

Educational technologies (EdTech) have been used globally in pharmacy and medical education. These technologies helped instructors share their knowledge and expertise interactively with medical and pharmacy students. Several studies showed that e-learning helps healthcare professionals stay updated with the latest healthcare trends [1-3]. Conventional educational methods, such as face-to-face didactic lecturing and knowledge-based teaching, are still used in pharmacy education in most Arabic Language Speaking Countries (ALSCs). However, problem-based learning (PBL), computer-assisted learning (CAL), and self-directed learning are used in Saudi Arabia, United Arab Emirates (UAE), Kuwait, Qatar, Jordan, and Egypt [4-6]. Videoconferencing and telemedicine have been used successfully among pharmacy students and instructors in West Bank, Palestine [7]. Unfortunately, using web 2.0 tools as novel educational technologies in most ALSCs and e-learning in pharmacy education is still in its infancy [8]. There is a lack of information about internet accessibility, frequency of usage, and familiarity of Arab pharmacy practitioners and pharmacy students about using e-learning in pharmacy education and practice [9, 10]. This study aimed to reveal their familiarity with implementing such emerging technologies in transferring pharmaceutical knowledge and

exploring their usage of internet and social media and the frequency of using web 2.0 tools in their daily lives.

MATERIALS AND METHODS

This study is cross-sectional using a self-administered web-based survey. A convenient sampling design was used to reach study participants through social media sites. The inclusion criteria included undergraduate pharmacy students, fresh pharmacy graduates, practicing pharmacists in hospital and community settings, and pharmacists working in

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pharmaceutical industries or had administrative roles. Participants resided either in Arab Countries or outside ALSs and used the internet and social media websites in their daily lives. Exclusion criteria included other healthcare professionals or medical students, those who are not working in the healthcare industry, and pharmacists or pharmacy students who were not active on social media. Invitation letter, which included the study information was posted on the first page before filling the online informed consent in SurveyMonkey®. Furthermore, the invitation letter to pharmacists and pharmacy students was shared on Facebook®, WhatsApp®, Telegram®, Instagram®, LinkedIn®, and Twitter®. The preliminary paper-based questionnaire was developed in the English language based on a literature review. The study questionnaire consisted of 18 items which covered socio-demographics (5 items), familiarity with e-learning (5 items), internet usage (6 items), and frequency of using the internet and social media websites (2 items) as shown in study questionnaire section. The questionnaire was tested for its face and content validity. Face validity was done by consulting three academic pharmacy education experts (Ph.D. level). Content validity index (CVI) was tested by eight Arab pharmacy education experts (professors). A self-administered online assessment tool using Google Forms® was designed to assess each item's relevancy and representativeness. Scale-level content validity index, averaging calculation method (S-CVI/Ave) was used [11]. Items with a CVI value less than 0.75 were eliminated. The average content validity index for all instruments was excellent (0.873). The study was approved by the Department of Pharmacy Practice at Kulliyah of Pharmacy, International Islamic University Malaysia (IIUM). IBM SPSS version 22.0 (Chicago, IL) was used for data analysis. Descriptive and inferential statistics were performed. The results were expressed as percentages and frequency to describe categorical variables. Data distribution around the mean was assessed using the Kolmogorov-Smirnov test to determine the normality of data distribution. Data extracted from a Likert scale were analysed statistically as non-parametric data [12]. Associations between groups were examined using chi-square or Fisher's exact tests. Values of $p < .05$ were considered statistically significant at a 95% confidence interval (95% CI). Post-hoc tests were done to confirm where the differences between groups.

RESULTS AND DISCUSSION

Socio-Demographics

Six hundred eighty (N=680) participants completed the online survey. Almost all of the participants were residing in 15 Arab countries (n=651, 95.73%), while, the minority of respondents (n=29, 4.3%) were living in countries outside Arab states (Table 2). In this study, Arab countries were grouped into three geographical regions. Five countries were assigned to **Region A** (Syria, Lebanon, Palestine, Iraq, and Jordan), and Six countries were assigned to **Region B** (Saudi Arabia, Kuwait, Oman, United Arab Emirates, Qatar, and

Yemen). **Region C** included Egypt, Sudan, Libya, and Algeria. Most of the respondents (N=426, 62.65%) were from **Region A**, followed by **Region B (Gulf Region) and Region C** (n=122, 17.95%, n=103, 15.15% respectively). Most participants were females, undergraduate students and possessing their internet connection (n=434, 63.8%; n=284, 41.8%; n=565, 83% respectively). About one-third of respondents (n=243, 35.7%) were 21-25 years old. Less than half of respondents (n=325, 47.8%) were pharmacy students, while (n=355, 52.2%) were practitioners, as shown in Table 1.

Table 1. Socio-demographic Characteristics (N=680)

Variables	Frequency (n)	Percentage (%)
Gender		
Male	246	36.2
Female	434	63.8
Age		
18 – 21 years	153	22.5
21 – 25 years	243	35.7
26 – 30 years	157	23.1
> 31 years	127	18.7
Job Status		
Undergraduate pharmacy students	284	41.8
Postgraduate pharmacy students	41	6.0
Community pharmacists	187	27.5
Hospital pharmacists	64	9.4
Working in academia	19	2.8
Working in pharmaceutical industries	17	2.5
Administrative pharmacists	21	3.0
Medical representatives	12	1.8
Pharmacy technicians	1	0.1
Unemployment new graduate pharmacists	23	3.4
Unemployment pharmacists	11	1.6

Most pharmacy practitioners worked in community pharmacies (n=187, 52.7%) followed by hospital pharmacists (n=64, 18%). There was a statistically significant relationship between gender and current job status ($p < .001$). More than half of community pharmacists were females (n=104, 55.6%) and about two-thirds of undergraduate students were females (n=190, 66.9%). However, more than half of the participants who worked in academia were males (n=10, 52.6%).

Table 2. Country of Residency of Study Participants (N = 680)

Country	Frequency (n)	Percentage (%)
Syria	314	46.2
Jordan	51	7.5
Egypt	47	6.9

Saudi Arabia	41	6.0
Sudan	40	5.9
Yemen	39	5.7
UAE	33	4.9
Iraq	31	4.6
Palestine	25	3.7
Libya	12	1.8
Lebanon	5	0.7
Algeria	4	0.6
Oman	4	0.6
Qatar	3	0.4
Kuwait	2	0.3
Outside ALSCs	29	4.3
Total	680	100

Internet Skills, Usage, and Accessibility

Results showed that most respondents ($n=491$, 72.2%) had intermediate computer and internet skills. In contrast, the minority of participants had either basic or advanced internet and computer skills ($n=95$, 14.0%, $n=94$, 13.8% respectively). There was a statistically significant relationship between the year of graduation and computer & internet skills ($p=.02$). More than half of pharmacy students ($n=17$, 58.6%) had intermediate computer and internet skills. In contrast, about one-fifth of respondents with advanced computer and internet skills ($n=12$, 17.9%) were pharmacy practitioners who graduated 10-15 years before the study period. Results showed that most of the respondents used their internet connection at home only ($n=490$, 72.1%). In contrast, one-fifth of respondents ($n=140$, 20.6%) used multiple access options (i.e. at home, internet café, and university campus). There was a statistically significant relationship between possessing an internet connection and place of surfing the internet ($p<.001$). Respondents who possessed an internet connection ($n=404$, 71.7%) were surfing the internet at home only followed by those who surfed the internet at home, internet café, and university campus ($n=128$, 22.7%). Most respondents possessed their private internet connection ($n=565$, 83.0%), and there was a statistically significant relationship between owning an internet connection and using the internet for educational purposes ($p=.029$). The vast majority of respondents using the internet for educational purposes ($n=514$, 90.8%) possessed their internet connection. Surprisingly, most of those who did not possess internet access were using the internet for educational purposes ($n=95$, 83.3%). Furthermore, there was a statistically significant relationship between owning an internet connection and being familiar with e-learning ($p=.01$). About half of the respondents who possessed their internet connection ($n=291$, 51.5%) were familiar with e-learning. In contrast, two-thirds of those who did not possess their internet connection ($n=76$, 66.1%) were not familiar with e-learning. Furthermore, there was a statistically significant relationship between possessing an internet connection and attending an

online course ($p=.022$). Most respondents who did not possess an internet connection ($n=90$, 81.8%) had not attended any online course. However, more than two-thirds of respondents who possessed an internet connection ($n=394$, 69.1%) did not attend any online courses, as shown in **Table 3**.

Table 3. Responses of Attending an Online Course According to Possessing an Internet Connection (N=680)

Attending an online course	Possessing an Internet Connection		Total n (%)	p-value
	Yes n (%)	No n (%)		
No	394 (69.1)	90 (81.8)	484	
Yes, one time only	104 (18.3)	12 (10.9)	116	.02*
Yes, ≥ 2 times	72 (12.6)	8 (7.3)	80	
Total	570 (100)	110 (100)	680 (100)	

*Chi-square was used to determine significance, defined as $p<.05$

Slightly less than two-thirds of participants ($n=428$, 63.0%) stated that they had good internet service with easy access. However, the minority of the respondents ($n=68$, 10.0%) claimed poor internet service, whereas more than one-third reported fair ease of internet access ($n=184$, 27.0%). There was a statistically significant relationship between the ease of internet access and country of residency ($p<.001$). The majority of respondents who lived in Jordan had either good or very good internet access ($n=42$, 82.4%) followed by those who lived in UAE, Saudi Arabia and Lebanon and Territories of Palestine ($n=27$, 81.8%, $n=33$, 80.5%, $n=4$, 80.0%, $n=18$, 72.0% respectively). In contrast, one-third of respondents who lived in Libya ($n=4$, 33.3%) had either bad or terrible internet access followed by those who lived in Algeria, Sudan, Syria and Yemen ($n=1$, 25.0%, $n=6$, 15.0%, $n=43$, 13.7%, $n=3$, 7.7% respectively). About half of respondents had a high-speed internet connection ($n=352$, 51.7%), followed by those who had a moderate internet speed connection ($n=264$, 38.9%) and low-speed connection ($n=63$, 9.4%). There was a statistically significant relationship between internet speed connection and country of residency ($p<.001$). All respondents who lived in Oman had either high or very high internet speed connection ($n=4$, 100%) followed by those who lived in the Territories of Palestine, outside ALSCs, Saudi Arabia, Algeria, UAE, Lebanon and Jordan ($n=19$, 76%, $n=22$, 75.9%, $n=31$, 75.6%, $n=3$, 75.0%, $n=23$, 69.7%, $n=3$, 60.0%, $n=30$, 58.8% respectively). However, one third of respondents who lived in Libya ($n=4$, 33.0%) had either slow or very slow internet connection followed by those who lived in Algeria, Yemen, Iraq and Syria ($n=1$, 25.0%, $n=5$, 12.12.8%, $n=3$, 9.7%, $n=30$, 9.5% respectively).

Frequency of Using Internet and Web 2.0 Tools

Almost all of respondents ($n=635$, 93.4%) were using the internet daily, followed by weekly ($n=43$, 6.3%) and monthly users ($n=2$, 0.3%). Slightly more than half of the study

participants (n=360, 53.0%) reported using social media websites such as Facebook® and web 2.0 tools for more than two hours daily. In contrast, about one-third of respondents (n = 233, 34.3%) were using these tools for less than two hours daily, as shown in **Table 4**. There was no statistically significant relationship between current job status and internet usage frequency ($p=.28$). There was no statistically significant relationship between the year of graduation or current job status and the frequency of using social media websites and other web 2.0 tools ($p=.06$, $p=.32$, respectively).

Table 4. Frequency of Using Social Media Sites and Web 2.0 Tools by Study Participants (N=680)

Frequency of use	Frequency (n)	Percentage (%)
> 2 Hours daily	360	53.0
< 2 Hours daily	233	34.3
≥ 3 times weekly	52	7.7
1 – 2 times weekly	21	3.0
No frequent use	14	2.0
Total	680	100.0

Familiarity with E-learning

Most respondents used the internet for educational purposes (n=609, 89.6%). However, more than half of the respondents were not familiar with e-learning (n=367, 54.0%), and most of them did not attend any online course ever (n=484, 71.2%), while less than one-third of respondents (n=196, 28.8%) have attended at least one online course. There was a statistically significant relationship between using the internet for educational purposes and being familiar with e-learning ($p<.001$). About half of the respondents familiar with e-learning (n=297, 48.8%) used the internet for educational purposes. In contrast, most respondents who were not familiar with e-learning (n=55, 78.6%) did not use the internet for educational purposes (**Table 5**).

Table 5. Familiarity with e-learning according to use the internet for educational purposes (N=680)

Being Familiar with E-learning	Using the Internet for Educational Purposes		Total n (%)	p-value
	Yes n (%)	No n (%)		
Yes	297 (48.8)	15 (21.4)	312	
No	313 (51.2)	55 (78.6)	368	<.001**
Total	609 (100)	70 (100)	680 (100)	

** Chi-square was used to determine significance, defined as $p<.05$

There was no statistically significant relationship between using the internet for educational purposes and current job status or graduation year ($p=.36$, $p=.62$, respectively). There was a statistically significant relationship between graduation year and being familiar with e-learning ($p=.01$). More than

one-third of respondents familiar with e-learning (n=124, 39.6%) were pharmacy practitioners who graduated 15 years before the study period followed by those who graduated five years before the study period (n=114, 36.4%). There was no statistically significant relationship between current job status and familiarity with e-learning ($p=.07$). In contrast, there was a statistically significant relationship between respondents' current job status and attending online courses ($p=.004$). Less than half of the participants who attended at least two online courses were undergraduate pharmacy students (n=33, 41.3%), followed by community pharmacists (n=13, 16.3%) and hospital pharmacists (n=7, 8.8%). There was a statistically significant relationship between the country of residency and respondents' familiarity with e-learning ($p<.001$). Three-quarters of participants who lived in Libya were not familiar with e-learning (n=9, 75%) followed by those who lived in Syria, Yemen (n=213, 67.83%, n=26, 66.7% respectively). All participants who lived in Oman were familiar with e-learning (n=4, 100%), and the majority of participants who lived in Lebanon, Palestine, Egypt, and Saudi Arabia were also familiar with e-learning (n=4, 80%, n=20, 80%, n=34, 72.4%, n=29, 70.8% respectively). There was a statistically significant relationship between the country of residency and attending an online course ($p<.001$). The majority of respondents who were resident in Syria, Yemen have never attended any online course (n=250, 79.6%, n=39, 79.5%), followed by those who were resident in Sudan, Jordan, Iraq and Libya (n=26, 65.0%, n=33, 64.7%, n=20, 64.5%, n=7, 58.3% respectively). However, all participants lived in Oman (n=4, 100%) attended at least one online course followed by those lived in Lebanon, Algeria, Egypt and Saudi Arabia (n=3, 60%, n=2, 50%, n=23, 49%, n=17, 41.5% respectively). Participants who lived in Libya, Syria, Yemen attended online courses less than other participants (n=2, 16.7%, n=67, 21.4%, n=9, 23% respectively). The results showed that almost all participants had either intermediate or high confidence levels in online learning (n=669, 98.4%) and the vast majority of respondents were confident of using web 2.0 tools as learning aids which motivated them to learn interactively (n=548, 80.6%; n=524, 77% respectively). However, a small percentage of participants were neither confident (n=28, 4.1%) nor motivated to use web 2.0 tools in learning (n=26, 3.8%). About 10% of participants claimed that such novel educational tools decreased their motivation to learn (n=63, 9.3%). Study findings indicated no statistically significant relationship between current job status and confidence in learning using web 2.0 tools ($p=.88$, $p=.11$, respectively). In contrast, there was a statistically significant relationship between using the internet for educational purposes and being confident and motivated to learn using web 2.0 tools ($p<.001$, $p<.001$, respectively). Most of the respondents (n = 446, 78.9%) who used the internet for educational purposes were confident in learning using web 2.0 tools, while almost all of them were motivated (n=489, 93.3%). There was no statistically significant relationship between current job status and being more motivated to learn using web 2.0 tools ($p=.99$). About one-fourth of respondents (n=17, 23.6%)

claimed that using web 2.0 tools decreased their motivation for learning, did not use the internet for educational purposes.

This study aimed to explore the Internet usage, accessibility, and frequency of using the internet and web 2.0 tools. Also, to explore pharmacists and pharmacy students' familiarity in the Arab world with e-learning in transferring pharmaceutical knowledge. The majority of study participants were millennials during the study period. Pharmacy programs in almost all ALSCs have a higher proportion of females than male students [6]. Our study showed that female students were more than males. This result was consistent with other studies [13-15]. Arab pharmacists who graduated 15 years before the study period had a higher tendency to attend online courses than pharmacy students. This result is consistent with Conte's (2012) study, which showed that older respondents were more engaged in continuing online education [16]. In our study, most respondents were confident and motivated in learning using web 2.0 tools and pharmacists, or pharmacy students share the same confidence and motivation. This result promises future use of these novel tools in pharmacy education or continuing pharmaceutical professional development programs. Unsurprisingly, pharmacy students agreed more than pharmacists that instructors should use emerging online tools to deliver online educational materials. This result was consistent with another study that showed that millennial pharmacy students accept to use these technologies in a didactic setting [15]. Our study showed a positive tendency to use social media sites and other web2.0 tools for educational purposes. However, this result was inconsistent with a study done by Hall *et al.*, which showed that almost all respondents used social media sites for personal purposes, rather than educational [16]. Regarding the place of internet access, our study showed that respondents preferred to access the internet at home only. This result is consistent with another study that showed the home was the most frequently reported location for viewing online lectures, while the fewest respondents viewed lectures at the campus [17]. In our study, internet speed connection and internet access were highly associated with the country of residency. Respondents who had high-speed internet connection were resident in Gulf countries. This result is reasonable as Gulf countries have matched or outperformed international ICT infrastructure standards. UAE with some Arabian Gulf countries are statistical outliers in the overall Arab internet access landscape [18]. However, respondents who were living in Libya, Yemen, Syria, Iraq, and Sudan could have slower or bad internet access due to the political and war conflicts during the study period. Similarly, there was a strong relationship between familiarity with e-learning and country of residency. Respondents in Libya, Yemen, Syria, and Sudan were less familiar with e-learning than other respondents. Those who lived in Gulf countries, Lebanon, The Territories of Palestine, Egypt and outside ALSCs were more familiar with e-learning and attended more online courses. Our results showed that respondents who were less familiar with e-learning either attended fewer online courses or never

attended such courses ever. However, some respondents who lived in The Territories of Palestine, UAE, and outside ALSCs did not attend any online courses even though they were more familiar than respondents who lived in Libya, Syria, Yemen, Iraq, and Sudan. This result could be due to their negative perception and attitudes towards using e-learning in pharmacy education or accessibility difficulties or lower computer and internet skills. In our study, most respondents had intermediate computer and internet skills. This result showed a need for enhancing ICT and online learning skills for Arab pharmacists and pharmacy students for successful implementation of e-learning. A lack of informational skills, computer anxiety, and lack of computer skills are among the main barriers to e-learning in health sciences [19].

Limitations

Respondents to the online survey were selected via the internet conveniently, so there was under-coverage bias because of internet access limitations in some Arab countries. Under-coverage bias may be considered less an issue shortly, especially with using social network sites where more people are going online day after day [20, 21]

Study Questionnaire

Item no.	Statement
Socio-demographics	
1	What is your gender?
2	What is your age?
3	What is your country of residency?
4	What is your current job status?
5	What is your graduation year?
6	Do you have an internet connection?
7	Where do you access the internet?
8	How much easy to access internet service?
9	What is your computer and internet skills level?
10	What is your internet connection speed?
11	Do you use the internet for educational purposes?
12	How frequently do you use the internet?
13	How frequently do you use social media websites and web 2.0 tools?
14	Do you have a background in e-learning?
15	Have you attended any online courses?
16	What is your confidence in online educational materials?
17	Are you confident in using web 2.0 tools as learning aids?
18	Are you motivated to learn more when using web 2.0 tools as learning aids?

CONCLUSION

This study was considered the first of its kind in ALSCs. It showed potential for accepting e-learning and emerging web 2.0 tools in transferring pharmaceutical knowledge. Several challenges and barriers prevent the successful implementation of e-learning in ALSCs. Fortunately, most

pharmacists and pharmacy students in the Arab world were familiar with e-learning. Pharmacy education policymakers in ALSCs are encouraged to implement e-learning in pharmacy education and encourage staff members at faculties of pharmacy to improve their internet and computer skills towards delivering more engaging and useful materials for millennial pharmacy students. Furthermore, Arab policymakers in ALSCs other than Gulf countries are recommended to improve the ICT infrastructure and improve the internet services towards decreasing the digital gap between ALSCs and developed nations. Researchers in ALSCs and developed countries are advised to do further studies regarding the effectiveness of emerging online education in pharmacy education and practice.

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