RESEARCH

Pharmacy Students' Preference for Using Mobile Devices in a Clinical Setting for Practice-Related Tasks

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Objective. To examine pharmacy students' ownership of, use of, and preference for using a mobile device in a practice setting.

Methods. Eighty-one pharmacy students were recruited and completed a pretest that collected information about their demographics and mobile devices and also had them rank the iPhone, iPad mini, and iPad for preferred use in a pharmacy practice setting. Students used the 3 devices to perform pharmacy practice-related tasks and then completed a posttest to again rank the devices for preferred use in a pharmacy practice setting.

Results. The iPhone was the most commonly owned mobile device (59.3% of students), and the iPad mini was the least commonly owned (18.5%). About 70% of the students used their mobile devices at least once a week in a pharmacy practice setting. The iPhone was the most commonly used device in a practice setting (46.9% of students), and the iPod Touch was the least commonly used device (1.2%). The iPad mini was the most preferred device for use in a pharmacy practice setting prior to performing pharmacy practice-related tasks (49.4% of students), and was preferred by significantly more students after performing the tasks (70.4%).

Conclusion. Pharmacy students commonly use their mobile devices in pharmacy practice settings and most selected the iPad mini as the preferred device for use in a practice setting even though it was the device owned by the fewest students.

Keywords: iPhone, iPad, iPad mini, pharmacy, mobile device

INTRODUCTION

The incorporation of mobile devices and associated technologies into health sciences are resulting in improvements in delivery of health care to patients.[1] Smartphones and tablets help health professionals have more resources at their fingertips, access resources faster, and be more connected with each other and their patients.[2,3] In particular, the increasing incorporation of mobile devices into pharmacy practice and the use of mobile applications (apps) is expected to be highly beneficial for pharmacists and for patients.[4-11]

Documented use of mobile devices by pharmacists includes accessing electronic medical records, consulting drug and therapeutic databases, accessing clinical resources on the Internet, scheduling and planning, documenting standard clinical pharmacy interventions, performing calculations, performing medication reconciliation, educating patients, verifying medication orders while on hospital rounds, and counseling prior to discharge.[7-11] Faculty members in pharmacy practice who used mobile devices for patient care agreed that it increased their productivity and improved efficiency in patient care.[11] Thus, incorporating mobile device use into pharmacy practice experiences for students may benefit their pharmacy education.

As standards from the Accreditation Council for Pharmacy Education (ACPE) require, the Bernard J. Dunn School of Pharmacy at Shenandoah University provides "a continuum of required and elective pharmacy practice experiences throughout the curriculum, from introductory to advanced. . . in a variety of practice settings."[12] Students are involved in 300 hours of introductory pharmacy practice experiences (IPPEs) at clinical sites throughout the first 3 years, and an additional 1440 hours of advanced pharmacy practice experiences (APPEs) in practice settings the fourth year. The ACPE Standards also state that pharmacy practice experiences should include "working with the

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technology used in pharmacy practice."[12] Therefore, under the supervision of pharmacy preceptors, students incorporate mobile devices and technology into their pharmacy practice experiences.

Providing mobile devices to students at colleges and schools of pharmacy and integrating those devices into the entire curriculum is an increasing trend.[13,14] Shenandoah University pharmacy students may use their own mobile devices or those issued to them by the university in practice settings. In 2009, the university began providing incoming pharmacy students with an Apple mobile device. The first-year students were able to choose an iPod Touch, iPhone, or iPad. Since 2009, every first-year pharmacy student was trained on using mobile device to access resources to solve clinical case studies throughout a year-long biomedical laboratory course.[15]

In 2013, the choices for incoming students were changed to an iPad or iPad mini because most arriving students already owned an iPhone or other smartphone. About two-thirds of the incoming first-year pharmacy students in 2013 selected the iPad and about one-third selected the iPad mini. Many factors are involved in the mobile device selection by pharmacy students or by any health professional student or clinician, one of which is the utility of the device for use in a clinical setting. Several helpful publications written for pharmacists and other health professionals discuss the different mobile device options, their specifications, and some advantages and disadvantages of each.[16-18] However, no research publications directly compare mobile devices for their value in a clinical setting.

We initiated a study in which pharmacy students ranked their preference for an iPhone, iPad mini, or iPad in practice settings before and after completing several practice-based tasks with the 3 mobile devices.

METHODS

This crossover study included recruitment of pharmacy students, administration of a pretest survey to each student, use of 3 Apple mobile devices by each student to perform tasks likely to occur in a pharmacy practice setting, and the completion of a posttest survey by each student. The pretest and posttest surveys were revised after pilot testing on 5 pharmacy students. The surveys were administered on paper and contained multiple-choice, multiple-selection, and ranking questions. Full approval through the Institutional Review Board of Shenandoah University was obtained prior to recruiting students and collecting data.

Tasks, based on input from 5 pharmacists and 5 pharmacy students about their use of Apple mobile devices in a pharmacy practice setting, involved accessing drug information and performing calculations. The first task involved the "Epocrates" app (Epocrates, Inc., San Mateo, CA) and drug-drug interaction information, the second task involved the "Calculator‰" app (Tim O's Studios, Austin, TX) and creatinine clearance calculations, and the third task involved the "Micromedex Drug Reference" app (Truven Health Analytics Inc., Greenwood Village, CO) and adverse drug event information. Kostka-Rokosz and McCloskey reported that accessing drug information and performing calculations were 2 of the 3 most common tasks performed with a mobile device by pharmacy preceptors at their practice sites.[9] They also reported that the Epocrates app and Micromedex Drug Reference app are 2 of the 3 most frequently used drug information resources on mobile devices by pharmacy preceptors. These tasks can occur in a variety of pharmacy practice settings, and the apps are available for Apple and Android mobile device operating systems (allowing for applicability and reproducibility across different mobile operating systems).

Apple mobile devices (Apple Corporation, Cupertino, CA) were used in this study because of their popularity and their limited selection of sizes compared to the greater diversity of mobile device sizes running the Android operating system. The specifications of the 3 Apple mobile devices used in this study are shown in Table 1. The iPod Touch was excluded from the study due to its similar specifications to the iPhone. Participants prepared mobile devices prior to their use by removing protective cases, turning off password access and/or finger sensor ID, turning on airplane mode to prevent accidental notifications during the study procedure (the tasks did not require Internet connection), using identical background wallpaper on each device, removing all apps from the home screen except the 3 being used in the study, and placing the 3 apps in the same order on each home screen.

Recruitment e-mails were sent to all Shenandoah University pharmacy students. Testing occurred in a school classroom or conference room, in which the 3 mobile devices were placed face up on a table in front of each participant. Prior to handling devices or completing the tasks, participants took the pretest survey and ranked each mobile device for criteria such as screen size and ease of use (Table 2). Participants ranked their most preferred device for each criterion as 1 (top rank vote), second most preferred as 2, and least preferred as 3. The pretest survey also collected demographic and personal device information (first column of Table 3).

Each participant was given an instruction sheet for the tasks (Figure 1) and instructed to physically stand for the completion of all tasks to simulate the likely physical state of someone working in a pharmacy practice setting.

Table 1. Comparison of the 3 Apple Mobile Devices Used in the Study

	iPhone	iPad mini	iPad
Model	5S	2nd generation (Wi-Fi)	3rd generation (Wi-Fi)
Weight	0.25 lb (112 g)	0.73 lb (331 g)	1.43 lb (650 g)
Dimensions	4.87 in x 2.31 in x 0.3 in (123.8 mm x 58.6 mm x 7.6 mm)	7.9 in x 5.3 in x 0.29 in (200 mm x 134.7 mm x 7.5 mm)	9.5 in x 7.3 in x 0.37 in (241 mm x 186 mm x 9.4 mm)
Display size[a]	4.0 in (102 mm)	7.9 in (200 mm)	9.7 in (246 mm)
Pixel density[b]	326 pixels per inch	326 pixels per inch	264 pixels per inch
Operating system[c]	iOS 7.1	iOS 7.1	iOS 7.1

[a] Measurement is recorded diagonally, which is the distance from the opposite corners of the display area
[b] All 3 devices have "retina display" which is a branded term used by Apple for their displays that contain a high enough pixel density that human eyes can't discern individual pixels at a normal viewing distance.
[c] Operating system installed on the device at the time of study

Participants were informed that they would use the Epocrates app on each device to perform the first task. Each participant was offered instruction on how to turn on each device, open the Epocrates app, use the app, and close the app. For the first task, the 3 devices were arranged in the following left-to-right order on the table: iPhone (device 1), iPad mini (device 2), iPad (device 3). Participants used the Epocrates app to answer the drug interaction question on the instruction sheet for device 1, then did the same for devices 2 and 3. Once participants completed the first task, the order of the 3 devices was changed to the following left-to-right order: iPad mini (device 1), iPad (device 2), iPhone (device 3). For the second task, participants were offered instruction on how to open, use, and close the Calculator‰ app and instructed to use device 1 to complete the first equation, use device 2 to complete the second equation, and use device 3 to complete the third equation. Once participants completed the second task, the order of the 3 devices was changed to the following left-to-right order: iPad (device 1), iPhone (device 2), iPad mini (device 3). For the third task, participants were shown how to open, use, and close the Micromedex app and instructed to use device 1 to answer the first adverse event question, use device 2 to answer the second adverse event question, and use device 3 to answer the third adverse event question.

Participants wrote their answers on the instruction sheet during each task. They were given a maximum of

Table 2. Top Rank Votes for Each Mobile Device, Before and After Using the Devices for Performing Pharmacy Practice-Related Tasks

Survey Instructions	**No. of Top Rank Votes**		
Please rank the devices for use in a pharmacy practice setting based on your preference:	**Before tasks n=81 n (%)**	**After tasks n=81 n (%)**	***p* value[a]**
For device size			
iPhone	37 (45.7)	29 (35.8)	0.20
iPad mini	33 (40.7)	46 (56.8)*	0.03
iPad	11 (13.6)	6 (7.4)	0.27
For screen size			
iPhone	10 (12.3)	4 (4.9)	0.15
iPad mini	43 (53.1)	58 (71.6)*	0.005
iPad	28 (34.6)	19 (23.5)	0.05
For ease of use of touch screen			
iPhone	19 (23.5)	14 (17.3)	0.40
iPad mini	30 (37.0)	51 (63.0)*	0.001
iPad	32 (39.5)	16 (19.8)*	0.003
OVERALL			
iPhone	28 (34.6)	14 (17.3)*	0.008
iPad mini	40 (49.4)	57 (70.4)*	0.004
iPad	13 (16.0)	10 (12.3)	0.55

[a] Comparisons between Before tasks and After tasks were made using McNemar test.
* Value is significantly different from adjacent value in Before tasks column, $p<0.05$

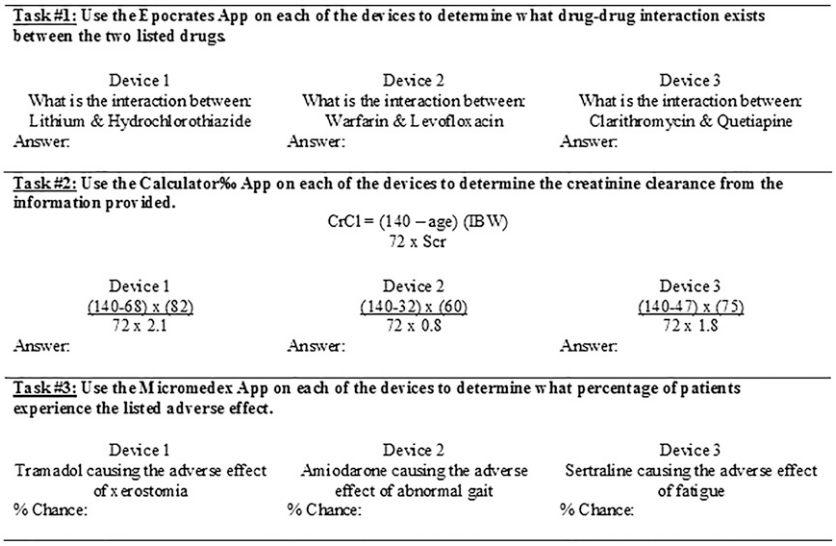
Table 3. Characteristics of Students, Stratified by Overall Preferred Device After Performing Pharmacy Practice-Related Tasks

Survey Questions	All Students n=81 n (%)	No. of top rank votes for overall preferred device after performing pharmacy practice-related tasks		
		iPhone n=14 n (%)	iPad mini n=57 n (%)	iPad n=10 n (%)
Gender?				
Male	32 (39.5)	6 (18.8)	22 (68.8)	4 (12.5)
Female	49 (60.5)	8 (16.3)	35 (71.4)	6 (12.2)
Year in Pharmacy School?				
1st year	15 (18.5)	2 (13.3)	10 (66.7)	3 (20.0)
2nd year	30 (37.0)	4 (13.3)	22 (73.3)	4 (13.3)
3rd year	23 (28.4)	7 (30.4)	13 (56.5)	3 (13.0)
4th year	13 (16.0)	1 (7.7)	12 (92.3)	0 (0.0)
Which smartphone and/or tablet do you own? Circle all that apply.[a]				
iPhone	48 (59.3)	10 (20.8)	35 (72.9)	3 (6.3)
iPad mini	15 (18.5)	1 (6.7)	14 (93.3)	0 (0.0)
iPad	39 (48.1)	7 (17.9)	25 (64.1)	7 (17.9)
iPod Touch	25 (30.9)	4 (16.0)	19 (76.0)	2 (8.0)
NonApple device	30 (37.0)	4 (13.3)	21 (70.0)	5 (16.7)
None	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Which smartphone and/or tablet do you currently use in a pharmacy practice setting? Circle all that apply.[b]				
iPhone	38 (46.9)	10 (26.3)	26 (68.4)	2 (5.3)
iPad mini	7 (8.6)	0 (0.0)	7 (100.0)	0 (0.0)
iPad	12 (14.8)	1 (8.3)	8 (66.7)	3 (25.0)
iPod Touch	1 (1.2)	0 (0.0)	1 (100.0)	0 (0.0)
NonApple device	26 (32.1)	4 (15.4)	18 (69.2)	4 (15.4)
None	8 (9.9)	0 (0.0)	7 (87.5)	1 (12.5)
How often do you use the above device(s) in a pharmacy practice setting?				
Daily	28 (34.6)	8 (28.6)	18 (64.3)	2 (7.1)
Few times a week	17 (21.0)	1 (5.9)	12 (70.6)	4 (23.5)
Once a week	11 (13.6)	2 (18.2)	7 (63.6)	2 (18.2)
<4 x month	11 (13.6)	2 (18.2)	8 (72.7)	1 (9.1)
Rarely	7 (8.6)	1 (14.3)	6 (85.7)	0 (0.0)
Never	7 (8.6)	0 (0.0)	6 (85.7)	1 (14.3)

[a] Totals exceed 100% because some students owned more than one device
[b] Totals exceed 100% because some students used more than one device

5 minutes to complete each of the tasks and all participants completed each task within that time limit. The total time commitment in the study for each participant was about 20 minutes. The devices were rotated for each task to minimize the possibility of increasing app familiarity and comfort as participants progressed through each task. After completing the 3 tasks, participants completed the posttest survey, which had them rank the mobile devices once again for the same criteria that were listed in the pretest survey, which are shown in Table 2. All the participants were tested within a 4-week period.

Data from the pretest and posttest surveys were entered into Excel and analyzed. Descriptive statistics were performed for all data. Data are presented as frequency and percent of responses. The McNemar test was used to compare the paired data from the pretest and posttest rankings of mobile devices (Table 2). Several of the stratified data responses in Table 3 were infrequently selected or not selected at all within most of the categories for student characteristics or device characteristics. Therefore, multivariate variables were created for the stratified data as follows to allow for Pearson's chi-square analysis: first-year and second-year student data were combined and compared to the group of third-year and fourth-year student data; all Apple devices data were combined and compared to non-Apple devices data; and "few times



Task #1: Use the Epocrates App on each of the devices to determine what drug-drug interaction exists between the two listed drugs.

Device 1	Device 2	Device 3
What is the interaction between: Lithium & Hydrochlorothiazide	What is the interaction between: Warfarin & Levofloxacin	What is the interaction between: Clarithromycin & Quetiapine
Answer:	Answer:	Answer:

Task #2: Use the Calculator% App on each of the devices to determine the creatinine clearance from the information provided.

$$CrCl = \frac{(140 - age)\,(IBW)}{72 \times Scr}$$

Device 1	Device 2	Device 3
$\frac{(140-68) \times (82)}{72 \times 2.1}$	$\frac{(140-32) \times (60)}{72 \times 0.8}$	$\frac{(140-47) \times (75)}{72 \times 1.8}$
Answer:	Answer:	Answer:

Task #3: Use the Micromedex App on each of the devices to determine what percentage of patients experience the listed adverse effect.

Device 1	Device 2	Device 3
Tramadol causing the adverse effect of xerostomia	Amiodarone causing the adverse effect of abnormal gait	Sertraline causing the adverse effect of fatigue
% Chance:	% Chance:	% Chance:

Figure 1. Instruction Sheet Provided to each Participant for the Pharmacy Practice-related Tasks to be Performed with the Apple Mobile Devices

a week" and "daily" use of devices data were combined and compared to the grouping of all the other frequency of uses data. Chi-square test of independence was used to analyze all the rows and columns of Table 4, as well as to analyze the groupings of first-year and second-year students compared to third-year and fourth-year students. Significance was set at $p<0.05$.

RESULTS

Eighty-one pharmacy students participated in this study. The first data column of Table 3 shows the characteristics of the participants, the mobile device(s) they owned, and the mobile device(s) they had used in a pharmacy practice setting. Participants represented pharmacy students from all 4 years of the curriculum and the majority of participants were female. The majority (59.3%) of participants owned an iPhone, which was the most commonly owned Apple device. The iPad was the second most commonly owned Apple device (48.1%), and the iPad mini was the Apple device owned by the fewest participants (18.5%). Of the 30 nonApple devices owned by participants, 27 (90.0%) were smartphones and 3 (10.0%) were tablets (data not shown in a table). Of the 27 nonApple smartphones owned by participants, 25 (92.6%) used the Android operating system and 2 (7.4%) used the Windows operating system. The most common Android based smartphone was the Samsung Galaxy S series, which was owned by 20 participants (24.7% of all participants).

The iPhone was the most commonly used device in a pharmacy practice setting followed by nonApple devices (all were smartphones except one), resulting in about 78% of the participants using smartphones in a pharmacy practice setting. Less than 10% of the participants were using an iPad mini or iPod Touch in a pharmacy practice setting. Daily use of mobile devices in a

Table 4. Frequency of device use in a pharmacy practice setting, categorized by year of pharmacy students.

Survey Question	All students n=81 n (%)	1st year students n=15 n (%)	2nd year students n=30 n (%)	3rd year students n=23 n (%)	4th year students n=13 n (%)
How often do you use the above device(s) in a pharmacy practice setting?					
Daily	28 (34.6)	3 (20.0)	8 (26.7)	10 (43.5)	7 (53.8)
Few times a week	17 (21.0)	3 (20.0)	7 (23.3)	3 (13.0)	4 (30.8)
Once a week	11 (13.6)	2 (13.3)	6 (20.0)	3 (13.0)	0 (0.0)
<4 x month	11 (13.6)	3 (20.0)	3 (10.0)	4 (17.4)	1 (7.7)
Rarely	7 (8.6)	2 (13.3)	5 (16.7)	0 (0.0)	0 (0.0)
Never	7 (8.6)	2 (13.3)	1 (3.3)	3 (13.0)	1 (7.7)

pharmacy practice setting was the most common frequency of use reported, and "rarely" or "never" were the least reported frequencies of use (Table 3). Table 4 demonstrates the frequency of mobile device use in a pharmacy practice setting by students' academic year. Daily use of mobile devices in a pharmacy practice setting increased among students in more advanced years of pharmacy school. However, there were no significant differences in the table overall ($p=0.358$), or when first-year and second-year students were combined and compared to the combination of third-year and fourth-year students ($p=0.063$).

Table 2 demonstrates the number of top rank votes each device received for different criteria before and after the participants completed the tasks with the Apple mobile devices. Prior to completing the tasks, the iPhone received the most top rank votes for device size, the iPad mini received the most top rank votes for screen size, and the iPad received the most top rank votes for ease of use of the touch screen. Interestingly, the iPad mini received the most top rank votes for device size, screen size, and ease of use of the touch screen after the participants used all the devices to perform the tasks. The number of top rank votes the iPad mini received for each criterion after the tasks was significantly more than the votes the iPad mini received for each criterion prior to the tasks. In contrast, the iPad received significantly fewer top rank votes for ease of use of the touch screen after completion of the tasks compared to the number of top ranks votes it received prior to the tasks. For overall preferred device, the iPad mini received the most top rank votes before the tasks and received significantly more top rank votes after the tasks were completed. The iPhone received the second most top rank votes for overall mobile device before and after the tasks, although it received significantly fewer top rank votes after the tasks. The iPad was the participants' least preferred device before and after the tasks.

Table 3 displays the demographic characteristics of the study participants in the first data column, and the 3 other columns display how the participants within each characteristic voted for the overall preferred device after performing pharmacy practice-related tasks. Gender was not associated with any significant differences in the number of top rank votes cast for any of the mobile devices. The iPad mini received the most top rank votes for overall preferred device by all pharmacy students, regardless of their academic year. Grouping first-year students with second-year students and comparing their top rank votes to the grouping of third-year and fourth-year students did not reveal any significant differences.

Table 3 also demonstrates that the iPad mini received the most top rank votes, regardless of the mobile device owned by the participants. The highest percentage of top rank votes cast for the iPhone (20.8%) were from iPhone owners, the highest percentage of top rank votes cast for the iPad mini (93.3%) were from iPad mini owners, and the highest percentage of top rank votes cast for the iPad (17.9%) were from iPad owners. These data also highlight that the owners of iPad minis were by far the most loyal as 93.3% of the iPad mini owners cast top rank votes for the iPad mini. In contrast, only 20.8% and 17.9% of the owners of iPhones and iPads, respectively, cast top rank votes for the device they owned. Also of interest was that although the iPad mini received the most top rank votes for preferred overall device for use in a pharmacy practice setting (57 top rank votes), it was the device that was owned the least by participants (15 participants owned one). Grouping together all owners of Apple devices and comparing their top rank votes to owners of nonApple devices did not yield any significant differences.

Regardless of the mobile device used by the participants in a pharmacy practice setting, the iPad mini still received the most top rank votes as the preferred device for use in a practice setting from each of the different mobile device users. There was a similar trend with the devices used in a practice setting as described above for device ownership, because the highest percentage of top rank votes cast for the iPhone (26.3%) were from iPhone users, the highest percentage of top rank votes cast for the iPad mini (100.0%) were from iPad mini users, and the highest percentage of top rank votes cast for the iPad (25.0%) were from iPad users. Similar to the device owner data, the users of iPad minis in a practice setting were by far the most loyal as 100% of the iPad mini users cast top rank votes for the iPad mini. In contrast, only 26.3% and 25.0% of the users of iPhones and iPads in practice settings, respectively, cast top rank votes for the device they used. Also of interest is that although the iPad mini received the most top rank votes for preferred overall device for use in a pharmacy practice setting (57 top rank votes), it was the device that was used the least by the participants in a pharmacy practice setting (only used by 7 participants). Grouping all of the users of Apple devices and comparing their top rank votes to the users of non-Apple devices did not show any significant differences.

Table 3 further demonstrates that the iPad mini received the most top rank votes for the preferred device for use in a practice setting, regardless of the how often the participants used their mobile devices in a practice setting. The highest percentage of top rank votes for the iPad mini (85.7%) came from participants who rarely or never used a device in a practice setting, the highest percentage of top rank votes for the iPhone (28.6%) came from

participants who used their mobile devices daily in a practice setting, and the highest percentage of top rank votes for the iPad (23.5%) came from participants who used their mobile devices a few times a week in a practice setting. Grouping the "daily" respondents with the "few times a week" respondents and comparing their top rank votes to the grouping of the "once a week," "less than 4 times per month," "rarely," and "never" respondents did not demonstrate any significant differences.

DISCUSSION

Similar to pharmacists, pharmacy students use mobile devices as part of their clinical experiences for drug information, decision support, patient education, patient information, literature searches, and discharge counseling.[19,20] Additional publications report that mobile device use in a practice setting enables pharmacy students to find correct answers faster and provide better patient care.[19,21] The value of mobile devices in pharmacy and clinical settings is well documented. Most prior studies with pharmacy students, pharmacists, and other clinicians demonstrate that use of a mobile device in a clinical setting is beneficial.[1-11,19,21] This study took the topic further by investigating which mobile device may be the most beneficial in a clinical setting.

The results of this study demonstrated that the majority of pharmacy students rated the iPad mini as their preferred Apple mobile device for use in a pharmacy practice setting. This may be surprising because the iPad mini is not the smallest Apple mobile device, which would make it the easiest to carry, nor does it have the largest screen, which would make it the easiest to view. On the other hand, the iPad mini may be an appropriate compromise of device size and screen size for use in a clinical setting.

Another interesting aspect of this study is that the iPad mini received the most top rank votes as the overall preferred Apple mobile device before the completion of the tasks, even though it was the device owned and used by the fewest students. This may have indicated that students already had a positive perception of the iPad mini prior to taking the pretest, even though they may have had little to no experience with one. However, this is unlikely the sole explanation for the iPad mini receiving the most top rank votes after the students completed the tasks because that number was significantly greater than the amount of top rank votes cast before performing the tasks. This difference demonstrated that using all 3 devices influenced a significant amount of the students to perceive the iPad mini as the most preferable device for use in a practice setting.

Moreover, 93% of students who owned iPad minis and 100% of students who used iPad minis in a practice setting selected the iPad mini as their preferred device for use in a practice setting. Contrast this to the 21% of students who owned iPhones and the 26% of students who used iPhones in a clinical setting who selected the iPhone as their preferred device for use in a practice setting. Additionally, 18% of students who owned iPads and 25% of students who used iPads in a practice setting selected the iPad as their preferred device for use in a practice setting. The loyalty of the iPad mini owners and iPad mini users lent additional support to the iPad mini being the best Apple mobile device for use in a pharmacy practice setting for pharmacy students.

Similar to the findings reported here, the majority of pharmacy students at another institution who owned a mobile tablet owned an iPad.[19] Most studies support that the iPad is useful in an academic or clinical setting, but it is not clear that it is the best device for the needs of a pharmacy student. The findings from this study may be helpful to students selecting a mobile device in their first year of pharmacy school. Students may only be thinking of the device as an educational tool and/or personal media consumption device, not realizing it may also be used during their introductory pharmacy practice experiences or in pharmacy technician jobs. The results of this study may also be helpful to schools of pharmacy trying to select mobile devices for their students. Perhaps offering only the iPad mini rather than a selection of devices is a consideration. Pharmacists and other health professionals may also find this study useful as they consider their next mobile device purchase.

The results of this study may not reflect the views of pharmacy students at other institutions. Future studies should attempt to include students in a different geographic region and/or across different regions. Including more students may also allow for more comprehensive analysis of categories and subcategories. Expanding this experimental design to pharmacists, other health professionals, and other health professions students would also yield interesting and useful data. Additional studies could incorporate the Apple iPad Air, which is significantly thinner and lighter than previous iPads, and the Samsung Galaxy S series smartphones, which were owned and used by about 25% of our participants.

This study had participants standing up while using apps specifically relevant to pharmacists. This model could be improved in several ways. Mobile device preference could be influenced by other factors such as how easy the device can be transported, carried in the pocket of a lab coat, held in one hand to view the screen while doing a relevant task with the other hand, observed with another individual for the purpose of consultation or reference, and used to interact with another individual across a simulated retail counter.

Future studies could incorporate other ways that mobile devices are used in pharmacy practice settings, which could include using different apps, accessing websites, accessing electronic medical records, performing medication reconciliation, conducting discharge counseling and/or communicating with patients or other professionals via e-mail, sending text messages, audio messages, voice-over-Internet protocol, or using video conferencing. The use of mobile devices in clinical settings will likely get more integrated and complex, so research models will need to evolve appropriately. Ultimately, some of the best research methods may involve comparison of multiple devices in a variety of actual pharmacy practice settings.

CONCLUSION

The iPad mini was the mobile device owned by the fewest students and was the second least used in a pharmacy practice setting; yet, participants ranked it as the most preferred Apple mobile device for use in a pharmacy practice setting prior to performing pharmacy practice-related tasks. After performing the tasks, significantly more students selected it as the preferred Apple mobile device for use in a pharmacy practice setting. These findings may be helpful to individuals and pharmacy schools selecting a mobile device for use in a clinical setting.

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