

Patient Attitudes Toward Mobile Device Use by Health Care Providers during working hours

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Abstract

Health care provider (HPC) usage of mobile devices is increasing globally; however, there is slight understanding of patient perceptions on this behavior in a health care setting. The aim of this study was to assess patients' attitudes toward mobile device usage by health care providers during working hours to identify predictors of these attitudes. Methods: The study was carried out at the King Salman Bin Abdul Aziz Hospital Riyadh. A cross-sectional survey design was adopted by administering a questionnaire to medically stable adult patients who presented in the Hospital between August 2022 and September 2022. The questionnaire collected relevant patient demographic information and included questions related to their mobile device usage along with those evaluating attitudes for the use of mobile devices by health care providers with respect to six major domains: role in health care, distraction potential, impact on communication, empathy, privacy, and professionalism. Results: Among the 438 eligible patients, 338 patients responded to the questionnaire for a response rate of 70.0%. Overall, 313/338 (92.6%) respondents agreed that mobile devices improve health care delivery, whereas 132/338 (39.1%) respondents were opposed to their usage by health care providers in the hospital during working hours (95% CI: 34.0-44.4). The majority (240/338, 71.0%) of patients agreed that mobile devices are a source of distraction to health care providers in the workplace. Females (odds ratio [OR]=1.67, 95% CI: 1.00-2.78) as well as all patients (OR=2.54, 95% CI 1.36-4.76) who believed that mobile devices were a source of distraction, reflecting a lack of professionalism (OR=2.77, 95% CI 1.59-4.82) and impacting the provider's ability to relate to the patient (OR=2.93, 95% CI 1.72-4.99), were more likely to agree that mobile devices should not be used in the hospital working hours. Conclusions: Patients' negative attitude toward mobile device use in the hospital working hours is largely driven by patient gender (females),

patient perception of the distraction potential of the devices, and their negative impact on the health care provider's empathy and professionalism. The findings of this study shed light on the importance of encouraging stakeholders to impose a digital professionalism code of conduct for providers working in acute health care settings.

Introduction

The dissemination and usage of mobile devices is increasing globally, with rising penetration into the health care system ⁽¹⁾. There are benefits and drawbacks of providers utilizing their mobile devices in the healthcare setting for personal and professional purposes ⁽²⁾. With computing power and Internet connectivity, personal devices give healthcare providers access to textbooks, journal articles, practice guidelines, clinical calculators, and medical applications ^(3,4). mobile devices are improving the efficiency and accuracy of communication. Healthcare providers are using short messaging services (SMS) to communicate patient information ⁽⁵⁻⁷⁾.

Mobile devices are also improving communication between healthcare providers and patients. The use of videos on personal devices has been reported to be an efficient and effective way to educate patients on their disease that resulted in increased medication compliance ^(8,9). Drawbacks of such constant connectivity include a risk for distraction from patient care. Healthcare providers may be interrupted for less acute clinical issues in addition to personal calls, texts, emails, social media, and applications. Personal devices also create a physical barrier between the user and the rest of the world. This barrier translates into cognitive and psychological barriers, and patients are often unaware of the clinical benefits of mobile devices ⁽¹⁰⁻¹²⁾.

There is an increasing body of literature on the safety implications of the usage of mobile devices and the so-called "inattention blindness" associated with their use ⁽¹³⁾. However, few studies have directly investigated patient perceptions of their providers' usage of mobile devices in health care settings or the impact of such use on the healthcare providers-patient relationship ⁽¹⁴⁾. Studies that have examined the effect of mobile device usage on interpersonal relations showed that the presence of mobile devices in a social setting negatively affects the quality of conversations, extent of satisfaction with a social encounter, as well as the level of empathy and connection ⁽¹⁵⁾.

Several studies have explored patient attitudes toward health technology and their impact on the patient-provider relationship. However, these studies have been limited to the use of computers in the consultation room ⁽¹⁶⁻¹⁸⁾, tablets in the examination room and tele rounding ^(19, 20), mobile phone images in wound care ⁽²¹⁻²³⁾, personal digital assistants in hospital ⁽²⁴⁾, and personalized smart bedside stations in an inpatient setting ⁽²⁵⁾. In general, most patients did not express a negative attitude toward their physicians' use of such technology ^(19, 24, 26) and did not feel that their interaction with their care provider was less personal due to the use of the technology ^(17, 19).

However, these findings cannot be extrapolated to the usage of mobile devices for several reasons, including the mobility of such devices, their strong distracting potential, association with the users' wider social network even when not actively being used, and accumulating evidence on their negative impact on empathy and quality of interactions. Focused assessments of patient attitudes

toward their health care providers' use of mobile devices in health care settings is of importance⁽¹³⁻¹⁵⁾,

Therefore, understanding patient perspectives in this setting can guide policy and practice recommendations that will help address patient concerns and preserve the patient-provider relationship as mobile device adoption in health care continues to rise. Accordingly, the aim of this study was to assess patients' attitudes toward the usage of mobile devices by health care providers. Moreover, we statistically explored the predictors of these attitudes, including demographic characteristics as well as perceptions of the role in health care, distraction potential, impact on communication, empathy, privacy, and professionalism.

Methods

Study Design and Setting

The study was conducted at the King Salman Bin Abdul Aziz Hospital Riyadh. A cross-sectional survey design was adopted by administering a questionnaire to medically stable adult patients who presented in the Hospital between August 2022 and September 2022. The questionnaire collected relevant patient demographic information and included questions related to their mobile device usage along with those evaluating attitudes for the use of mobile devices by health care providers with respect to six major domains: role in health care, distraction potential, impact on communication, empathy, privacy, and professionalism.

The eligibility criteria were patients aged 18 years and older presenting to the hospital that they were medically stable. Among the 483 eligible subjects invited to participate in this study, 145 refused to participate, resulting in a total of 338 subjects available for analyses (response rate of 70.0%). The main reasons for refusal to participate included not feeling well enough to participate, lack of interest in the research study, or not having time to participate. A survey instrument in English was developed to evaluate patients' awareness and attitudes to the utilization of mobile devices. A review of the published peer-reviewed literature and other surveys examining the use mobile devices was carried out to develop the survey questionnaire used in this study⁽²⁷⁾.

Upon this review, a preliminary version of the survey was constructed, which was further customized to the institutional setting and reviewed by a group of experts. The English version of the questionnaire was translated into Arabic and then back-translated to English, and the two drafts were compared for consistency. The preliminary drafts were then pilot-tested among 45 patients (who were excluded from the final analyses) for redundancy, validity, and clarity of the questions and statements. The survey was subsequently revised and modified based on patient feedback. Patients were given the option to choose which version they would like to complete based on their preferences. Before administering the survey, the participants were asked to read and sign an informed consent form.

The survey included relevant patient demographic information (age, gender, level of education, patient arrival time, employment status, and monthly income) and their usage of mobile devices. The questionnaire also included a list of statements graded on a 4-point Likert scale ("disagree," "strongly disagree," "strongly agree," or "agree") that evaluated patients' attitude toward the use of mobile devices by health care providers with respect to six major domains: role in health

care, distraction potential, impact on communication, empathy, privacy, and professionalism. The attitude toward the usage of mobile device in the hospital was the main outcome variable considered in this study. More specifically, the statement was “I believe mobile devices should not be used by health care providers in hospital.” Responses were divided into two groups: agree (those who answered “agree” or “strongly agree” to that question) and disagree (those who answered “disagree” or “strongly disagree” to that question).

Sample Size Calculation

Sample size calculation was carried out considering the primary outcome and based on a previous study carried out in a pediatric teaching hospital in Australia, which reported that 33% of patients were against the use of mobile devices at bedside [33]. A sample of 338 patients was estimated with a 95% CI and 5% margin of error to detect a similar distribution. Statistical Analysis Statistical Package for Social Sciences version 24.0 (SPSS Inc, Chicago, IL, USA) was used for data cleaning, management, and analyses. Descriptive statistics are summarized by the number and percentage for categorical variables.

The association between “mobile devices should not be used in the hospital” and other categorical variables was assessed using the Chi square test. Multivariate regression analysis was performed to adjust for potentially confounding variables. Stepwise logistic regression analysis was used to assess the association between the response to “mobile devices should not be used in the hospital” as a binary variable (agree versus disagree) with all demographic variables and the statistically significant attitude variables. $P < .05$ was set as the entry threshold of potential predictors into the model, whereas $P < .10$ was set as the threshold for removal from the model. The results are presented as the odds ratio (OR) and 95% CI; $P < .05$ was considered statistically significant.

Results

Among the 338 respondents, 132 (39.1%) were opposed to the usage of mobile devices by health care providers in the hospital. (Table 1) presents the demographic characteristics of all patients and the self-reported mobile device usage, as well as the association with the main outcome (health care providers should not use mobile devices in the hospital). Overall, the study sample was relatively young with 174/338 (51.5%) respondents aged 35 years or less, with a slightly higher number of women. The majority of the patients had completed at least a university degree.

The large majority of respondents reported owning a mobile device, most commonly a smartphone, with the top uses including messaging apps, phone calls, and social media. Analysis of the association between the main outcome and different variables (demographic and self-reported mobile device usage) revealed gender as the only significant factor, with females more likely to agree that mobile devices should not be used in the hospital.

Table 1. Demographic characteristics, self-reported usage of a mobile device, and their association with main outcome

Demographic Characteristics	Health care providers should not use a mobile device in the hospital, n (%)			
	All (N=338)	Disagree (n=206)	Agree (n=132)	P value
Gender	0.02			
Male	158 (46.7)	107 (51.9)	51 (38.6)	
Female	180 (53.3)	99 (48.1)	81 (61.4)	
Age (years)	0.53			
<25	81(24)	48 (23.3)	33 (25)	
25-35	39 (27.5)	57 (27.7)	36 (27.3)	
36-50	73 (21.6)	45 (21.8)	28 (21.2)	
51-65	52 (15.4)	28 (13.6)	24 (18.2)	
66+	39 (11.5)	28 (13.6)	11 (8.3)	
Educational level	0.78			
Less than high school	32 (9.6)	20 (10)	12 (9.2)	
High school graduate	47 (14.2)	26 (12.9)	21 (16)	
University graduate	194 (58.4)	121 (60.2)	73 (55.7)	
Postgraduate	59 (17.8)	34 (16.9)	25 (19.1)	
Utilization				
Own a mobile device	327 (96.7)	200 (97.1)	127 (96.2)	0.76
Type of mobile device owned				
Smartphone	319 (97.6)	195 (97.5)	124 (97.6)	>0.99
Tablet	109 (33.3)	70 (35)	39 (30.7)	0.42
Smartwatch / band	27 (8.3)	21 (10.5)	6 (4.7)	0.06
Regular phone	1 (0.3)	1 (0.5)	0 (0.0)	>0.99
Other	95 (29.1)	57 (28.5)	48 (29.9)	0.81
Reasons for using a mobile device				
Phone calls	284 (86.9)	176 (88)	108 (85)	0.30
Messaging apps	284 (86.9)	175 (87.5)	109 (85.8)	0.66
Social media	205 (62.7)	124 (62)	81 (63.8)	0.75
Games	112 (34.3)	76 (38)	36 (28.3)	0.07
Browsing the internet	202 (61.8)	120 (60)	52 (64.6)	0.41

Table 2. presents the descriptive analyses of patients' attitudes toward the usage of a mobile device by health care providers in the hospital, as well as the association with the main outcome. The majority of respondents believed that mobile devices play a role in patient care and improve health care delivery, but that they should only be used for medical care purposes. According to the respondents, the top reasons for appropriate use of mobile devices in a health care setting are

accessing medical information, sending/receiving medical documents/images, looking up patient information, and communicating via messaging apps. In addition, two thirds of respondents reported that the use of mobile devices does not demonstrate a lack of professionalism, and more than half believe that the use of mobile devices does not cause a breach of confidential patient information.

By contrast, more than two thirds of respondents agreed that mobile devices are a distraction to health care providers in the workplace, half agreed that the use of mobile devices by health care providers leads to poor patient-provider communication, and close to half agreed that the use of mobile devices impacts the ability of health care providers to relate to patients. Moreover, the large majority of patients who agreed that mobile devices are a distraction to health care providers in the workplace were more likely to agree that mobile devices should not be used.

Consistently, most patients who agreed that mobile devices lead to poor patient-provider communication were also more likely to agree that mobile devices should not be used in the hospital. Moreover, patients who agreed that use of mobile devices impacts providers' ability to relate to patients, demonstrates lack of professionalism, and causes a breach of confidential information were more likely to agree that mobile devices should not be used in the hospital. Finally, those who do not like providers using their mobile devices when treating them were more likely to agree that mobile devices should not be used in the hospital during working hours.

Table 2. Descriptive analysis of patients' attitudes toward the usage of a mobile device by health care professionals and association with main outcome.

Attitude	Health care providers should not use mobile devices in the hospital, n (%)			
	All (N=338)	Disagree (n=206)	Agree (n=132)	P value
Role in health care				
Agree that mobile devices play a role in patient care	279 (85.3)	176 (88)	103 (81.1)	0.09
Mobile device functions in hospital setting				
Access medical information (general)	249 (76.1)	155 (77.5)	94 (74)	0.47
Send/receive medical documents/images	245 (74.9)	155 (77.5)	90 (70.9)	0.18
Look up patient information	213 (65.1)	131 (65.5)	82 (64.6)	0.86
Personal calls	150 (45.9)	95 (47.5)	55 (43.3)	0.46
Messaging apps	153 (46.8)	94 (47)	59 (46.5)	0.92
Facebook or other social media	105 (32.1)	58 (29)	47 (36.2)	0.13
Mobile devices play a role in improving health care delivery	313 (92.6)	196 (95.1)	117 (88.6)	0.03
Mobile devices should only be used for medical care	296 (87.8)	183 (89.3)	113 (85.6)	0.32
Distraction potential				

Attitude	Health care providers should not use mobile devices in the hospital, n (%)			
	All (N=338)	Disagree (n=206)	Agree (n=132)	P value
Mobile devices are a distraction to health care providers	240 (71)	126 (61.2)	114 (86.4)	<0.001
Health care providers spend more time on their mobile devices than with me	13 (3.8)	6 (2.9)	7 (5.3)	0.27
Communication and empathy				
Mobile device usage by health care providers leads to poor patient- provider communication	170 (50.3)	81 (39.3)	89 (67.4)	<.001
Health care providers' mobile devices usage impacts their ability to relate to me	151 (44.8)	61 (29.6)	90 (68.7)	<0.001
Professionalism and privacy				
I don't like health care providers using their mobile devices when treating me	205 (60.7)	93 (45.1)	112 (84.8)	<0.001
Mobile device usage demonstrates a lack of professionalism	109 (32.3)	39 (18.9)	70 (53.4)	<0.001
Mobile device usage causes a breach of confidential information	138 (40.9)	68 (33)	70 (53.4)	<0.001

Table 3. summarizes the independent factors associated with patients' believing that mobile devices should not be used in the hospital during working hours. Women were more likely to agree that mobile devices should not be used in the hospital during working hours. In addition, patients who agreed that mobile devices were a source of distraction and those who believed they reflected lack of professionalism were more likely to agree that mobile devices should not be used in the hospital during working hours. Moreover, those who felt that the usage of mobile devices impacted the provider's ability to relate to them were more likely to agree that mobile devices should not be used in the hospital during working hours.

Table 3. Multivariate regression analysis for predictors of the main outcome*.

Predictor variable	Health care providers should not use mobile devices in the hospital (reference: Disagree)	
	Odds ratio (95% CI)	P value
Gender	1.67 (1.00 – 2.78)	0.5
Distraction to health care provider	2.54 (1.36 -4.76)	0.03
Demonstrates lack of professionalism	2.77 (1.59 4.82)	<0.001

Impacts health care provider's ability to relate to me	2.93 (1.72 – 4.99)	<0.001
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* The following variables were included in the full model: gender (reference: male); age (reference: <25 years); education (reference: <high school); distraction; improves health care delivery; mobile device should be used only for medical care; poor communication; impacts health care providers' ability to relate to me; lack of professionalism; causes a breach of confidential information.

Discussion

This study represents a rare attempt to examine patient perspectives on the use of mobile devices in the health care setting. With the growing body of literature on the distraction potential of mobile devices and their negative impact on interpersonal relationships, understanding patients' perceptions toward the use of mobile devices by health care providers is important for limitation any unintended consequences of their permeation into health care. The present findings reveal that although the majority of patients agree that mobile devices can improve health care and should be used for medical purposes, many felt that mobile devices should not be used in the hospital during working hours (41%).

The results of this study concur with those of existing literature showing that patients acknowledge the importance of technology usage in health care delivery ⁽¹⁶⁻²⁶⁾. The surveyed patients had clear views on the use of mobile devices, with the majority stating that mobile devices improve health care delivery (92.5%) and that they should be used for medical care (87.5%). Furthermore, close to three quarters of the respondents believed that healthcare providers use their mobile devices in health care settings to access medical information and send or receive medical documents. The overall positive attitude expressed by patients is counterbalanced by several concerns.

Many patients felt that mobile device usage impacted the providers' ability to relate to them. This study matching with research conducted by Stergiannis et al., (2017) ⁽²⁸⁾ showed that all health care categories use their mobile phones at work, but physicians use private mobile phones for professional related tasks more often than nurses. Also, this study line with Kameda-Smith., et al. (2018) ⁽²⁹⁾ revealed that it is common for physicians to store clinical images in private mobile phones and that images are sent via SMS to colleagues. This may jeopardize the patient safety as the identity of the patient might be revealed.

However, other studies conducted by El Hadidy et al., (2018) ⁽³⁰⁾ and Nerminathan et al., (2017) ⁽³¹⁾ exhibited that physicians use of mobile phones might be of a professional relation, but it can be questioned how ethical it is to use private cell phones to take pictures of patients for clinical purposes. This is in contrast to studies that considered the patient perspective on other forms of technology, including computers, tablets, and personal digital assistants, who denied any change or depersonalization in their interaction with healthcare providers using such devices ^(16-21,25,26).

Most previous studies reported that the use of technology in health care is considered to enhance communication and quality of care ^(20,22,26). However, our findings are in line with the psychology literature suggesting that mobile devices may negatively affect relationships by dividing

an individual's attention between an immediate face-to-face interaction and a distant wider social network, even when not being actively used. Studies also show that the mere presence of a mobile device during a paired interaction inhibits the ability to develop closeness and trust, in addition to reducing perceived empathy by the partner ⁽¹⁴⁾.

Within the health care context, specific features of mobile devices, compared to other technologies, may highlight the abovementioned negative feelings for patients. The mobility and accessibility of mobile devices, along with their high distraction and addiction potential ^(32,33), as well as the reduced visibility of the mobile device screen may all heighten feelings of isolation and suspicions that the mobile device is distracting providers from patient care and the face-to-face interaction ⁽³²⁾. Distraction also emerged as one of the main concerns in our study, with more than two thirds of the respondents reporting that mobile devices may be a source of distraction to health care providers in the workplace (71.1%).

This finding is in contrast to studies considering the patient perception of provider usage of computers where distraction did not emerge as a significant patient concern. Our findings instead concur with studies that showed high rates of health care professional self-reporting of distraction by a mobile device ^(27, 16, 34). The link between the use of mobile devices and distractibility has been extensively established, showing an association with reduced reaction time, the worst performance on tasks that require cognitive focus, as well as "inattention blindness", which is the reduced ability to notice unique and novel stimuli ^(35, 39).

This perceived distraction may also add to patient concerns about providers relating to them or displaying empathy during the episode of care. The abovementioned concerns can explain the fact that 2 out of every 5 patients (41%) felt that mobile devices should not be used in the hospital during working hours. Although age and education were not associated with this patient opinion, gender did emerge as a significant predictor variable, with women being significantly more likely to disagree with the usage of mobile devices in the hospital setting. This finding is in line with studies showing that men, as compared to women, are more likely to find talking on their mobile phones in various personal situations more acceptable ⁽⁴⁰⁾.

Moreover, patient perception of how mobile device usage may influence factors related to the care process was highly associated with the potential impact on the provider-patient relationship. Specifically, those who believed that the use of mobile devices reflected lack of professionalism, distracted from care, and negatively impacted the provider's ability to relate to them also agreed that mobile devices should not be used in the hospital during working hours. Such findings suggest that providers were visible to patients while using their mobile devices or that such use may have taken place during the clinical encounter with the patient.

The use of mobile devices by health care providers during clinical encounters would be perceived by many patients to reflect a lack of professionalism, whether it took place inside the hospital. The ability to relate to patients, a reflection of empathy, was the strongest driver for disagreeing with usage in the hospital, corroborating the psychology literature on the impact of using mobile devices on empathy and relationship building ⁽¹³⁻¹⁵⁾. This study sheds light on serious patient concerns that warrant consideration as mobile device permeability in health care continues to grow.

Multiple sectors have already addressed the distracting potential of mobile devices on safety through regulatory initiatives such as the Distracted Driver Law that prohibits usage while driving and the “Sterile cockpit law” that prohibits pilots and crew members from engaging in any activity during critical phases of takeoff and landing ⁽⁴¹⁾.

Although the use of mobile devices has become too intertwined with clinical care for a complete ban to be possible, there is a clear need to place some guidelines surrounding their use in health care and introduce some codes of conduct. From a policy perspective, managers need to ensure the right balance between security and liberty ⁽⁴²⁾.

From a liberty perspective, care providers should have the freedom to use their devices as they deem appropriate. From a security perspective, such use should be regulated to mitigate the negative impact on providers’ productivity, patient safety, and the patient-provider relationship. The tradeoff between security and liberty is inevitable and would call for wider discussions between care providers, administrators, regulatory bodies, and the ministry of health to build support for regulatory policies and procedures that could be endorsed at the national level with the support of concerned stakeholders.

Gill et al., (2012) ⁽⁴³⁾ proposed several guidelines that aimed at securing institutional networks and regulating the use of mobile devices for nonwork-related purposes. This can be realized through ensuring high-security wifi connections and extending firewalls to identify and control the use of an application on the network. Limiting access to social network websites such as YouTube and Facebook and establishing an intracompany communication network are also possible solutions ⁽⁴³⁾.

Nevertheless, successful interventions cannot solely rely on technological solutions to limit personal use. Developing and nurturing a digital professionalism code of conduct will be essential. Setting expectations for clinical care usage in clinical areas and designating separate hotspots for personal use should be part of this implementation. Raising awareness on the impact of the use of mobile devices on face-to-face interactions, empathy, and communication is also essential, with specific attention to female patients.

Similarly, it is important to develop best practices for the use of mobile devices around patients, including maintaining eye contact, and explaining to patients why they are using the device to counter the limited screen visibility and associated suspicions that arise. Although the external validity of the findings and recommendations of this study are particularly applicable to the hospital setting, they are also applicable, with some contextualization, to other care areas within a health care institution. Future studies should validate the present findings in other care areas and across other contexts.

Conclusion Patients in the hospital recognize the important role of mobile devices in health care delivery and patient care. Nonetheless, 2 out of every 5 patients believe that mobile devices should not be used in the hospital during working hours. This seems to be driven by gender, with women more likely to disagree with usage in the hospital, along with patients’ perception of how mobile devices may negatively impact the fundamentals of care and the patient-provider relationship, namely professionalism, provider attention, and their ability to relate to patients. This is particularly important

in the hospital setting, where time constraints challenge a physician's ability to build a rapport with patients. Accordingly, this study highlights the significance of fostering and cultivating, in consultation with concerned stakeholders, a digital professionalism code of conduct in the hospital with particular attention to female patients.

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