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Smartphones and professionalism: A cross-sectional study on interns and final-year medical students

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ABSTRACT

The smartphone is a powerful tool that can be used to improve the health care system as long as certain checks and balances are implemented. It is commonly used by health care providers and medical students. A cross-sectional study conducted at Qassim University, Saudi Arabia. Final-year medical students and interns were included. A survey was distributed and divided into three sections: personal technology, experiences of using smartphones during clinical rotations, and attitudes about the usage of smartphones for clinical work. A total of 156 interns and students participated in the study. All of them owned a smartphone. Three-quarters of the respondents used their mobile for personal purposes, while 71.2% used them to look up medical references and resources. Respondents also used personal mobiles to keep in contact with team members regarding patient- (29.5%) and non-patient-related issues (26.3%). Some 16% of participants did not have any security features on their smartphones. Over half the participants did not get proper instructions about using their smartphones from either their medical college or senior residents or consultants. There is a lot to be done in this area, as certain regulations need to be carried out to lead toward a world that is pro-technology, health centered, and safe.

Keywords: Smartphones, Medical Education, technology, professionalism, Medical Students

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INTRODUCTION

Smartphones have become the latest adopted tool for current health care providers. There is an unprecedented utilization of this technology among health care providers and medical students. The popularity of their use is owed to their myriad of uses, including effective communication between clinicians and multidisciplinary teams. Some studies have showed that 94% of interns own a smart phone and that 83% use their phones for work[1,2].Owing to their high computing capabilities and reliable applications (apps), which can be downloaded from an online marketplace, these apps can be used to perform day-to-day clinical duties, such as discussing cases online, taking image supported notes, and accessing remote health records, references, and drug information[2]. In a recent study, residents in an internal medicine ward felt subjectively more efficient when they were provided with iPads preloaded with the hospital medical records apps[3].One survey elaborated positive perceptions by patients toward tablet-using physicians in clinical settings[4]. Nowadays, there is substantial growth, both in the quantity and quality of apps that aim to enhance knowledge, improve work quality, and decrease medical errors.

While smartphones are considered a clinical and educational tool, they are also a source of distraction. For example, Robert Wu et al. found that due to the constant distractions and interruptions from mobile devices, residents'on-site availability was reduced[5].Security and privacy are also primary concerns related to utilizing this technology. Therefore, certain recommendations have been suggested to tackle these problems[6,7].This study aims to assess smartphone usage by interns and medical students during their rotations and to explore their perceptions of issues related to confidentiality and professionalism.

MATERIALS AND METHODS

This study was conducted using a cross-sectional survey in the Qassim region, Saudi Arabia. We included males and female's interns and final-year medical students who are enrolled in College of Medicine at Qassim University during the academic year 2015-2016. An online survey was distributed to the participants from September to October 2015 with a sample size of 156 participants. We adopted with permission the same survey used by Tran K and colleagues. A verbal consent was obtained before conducting the study from the participants. The survey was divided into three sections. The first section was about personal technology (phone type, usual use, and security features). The second section focused on experiences of using smartphones during clinical rotations. The third section assesses attitudes about the usage of smartphones for clinical work. Responses to each item on the questionnaire were summarized in terms of frequency (percentage). Results were obtained and analyzed by SPSS.

RESULTS

Table 1: The type, uses, and security features on medical students' personal mobile phones

Question	Answer options	n (%)
1. What type of personal mobile phone do you currently use?	iPhone	104(66.7)
	BlackBerry	3(1.9)
	Windows Phone	2(1.3)
	Android	61(39.1)
	Cellular phone (non-smartphone)	14(9.0)
	Other	0
2. How do you use your personal mobile phone during clinical rotations?	Communication with patients	5(3.2)
	Communication with other medical team members (patient-related)	46(29.5)
	Communication with other medical team members (not patient-related)	41(26.3)
	Medical references, resources, and applications	111(71.2)
	View patient information	17(10.9)
	Personal purposes (not work-related)	117(75.0)
3. What type of security features do you have on your personal mobile phone?	Password protection	120(76.9)
	Encryption	12(7.7)
	I don't know	1(0.6)
	None	25(16.0)

In total, 156 responded, of which 93 (59.6%) were male, 90 (57.7%) were in their fifth years, and 66 (42.3%) were interns. The features of the mobile phones used are described in Table 1. Twenty-nine students had more than one mobile phone, and the most popular model was the iPhone, owned by 66.7% of respondents, followed by the Android (39.1%). Three-quarters of the respondents used their mobile for personal purposes, while 71.2% also used them to look up medical references and resources. Respondents also used personal mobiles to keep in contact with team members regarding patient- (29.5%) and non-patient-related issues (26.3%). The majority (76.9%) had password protection on their mobiles, but only a few (7.7%) had encrypted their phones.

Table 2: Participants' experiences using personal mobile technology during clinical rotations.

Question	Never, n (%)	Rarely (1-3 times / month), n (%)	Occasionally (1-6 times / week), n (%)	Frequently (1-10 times / day), n (%)	Always (>10 times / day), n (%)
Q1. I have answered/made a call, texted, or emailed on my personal mobile phone while I was with a patient.	95(60.9)	39(25.0)	14(9.0)	8(5.1)	0(0)
Q2. My senior resident or attending physician has interrupted a patient meeting to answer/make a call, text, or email.	47(30.1)	60(38.5)	34(21.8)	14(9.0)	1(0.6)
Q3. I have answered/made a call, texted, or emailed on my personal mobile phone while I was in an educational session (eg, teaching rounds, bullet rounds, etc)	25(16.0)	64(41.0)	50(32.1)	16(10.3)	1(0.6)
Q4. My senior resident or attending physician has interrupted an educational session to answer/make a call, text, or email.	15(9.6)	63(40.4)	57(36.5)	19(12.2)	2(1.3)
Q5. I used my personal mobile phone for personal matters (eg, personal texts, calls, etc) during clinical rotations.	37(23.7)	57(36.5)	42(26.9)	19(12.2)	1(0.6)
Q6. I used my personal mobile phone to text or email identifiable patient data (eg, patient last name, OHIP number, medical record number, etc) to colleagues.	121(78.1)	20(12.9)	7(4.5)	6(3.9)	1(0.7)
Q7. My senior resident or attending physician has texted or emailed identifiable patient data to colleagues.	101(66.0)	34(22.2)	12(7.8)	5(3.3)	1(0.7)

The use of mobiles during clinical rotations is further described in Table 2. Most respondents stated they had never (60.9%) or rarely (25%) used a personal mobile while with a patient, but only 30% reported that they had never been with a senior resident or attending physician who had interrupted a patient meeting to take a call. Respondents were more likely to have used their phones while in an educational session or to have witnessed a senior colleague doing so (only 16% and 9.6%, respectively, stated that this never happens).More than one-third of students used their mobile for personal reasons occasionally or more frequently. Nearly one-quarter of respondents declined to answer if they had never used a personal mobile to send personal information, while 66% had never received identifiable information on their mobile.

Table 3: Participants' attitudes about using personal mobile technologies for clinical work purposes.

Question	Strongly disagree n (%)	Disagree n (%)	Neutral n (%)	Agree n (%)	Strongly agree n (%)
Q8. The medical school curriculum has educated me on appropriate and inappropriate ways to use my personal mobile phone for communicating patient information.	53(34.0)	31(19.9)	41(26.3)	24(15.4)	7(4.5)
Q9. My senior resident or attending physician has given me feedback on appropriate and inappropriate ways to use my personal mobile phone for communicating patient information.	55(35.3)	47(30.1)	29(18.6)	21(13.5)	4(2.6)
Q10. The medical school curriculum has educated me on appropriate and inappropriate ways to conduct myself professionally with mobile technology.	60(38.5)	38(24.4)	38(24.4)	16(10.3)	4(2.6)
Q11. My senior resident or attending physician has given me feedback on appropriate and inappropriate ways to conduct myself professionally with mobile technology.	60(38.5)	43(27.6)	42(26.9)	8(5.1)	3(1.9)
Q12. The use of personal mobile phones for patient-related communication with colleagues poses a risk to the privacy and confidentiality of patient health information.	10(6.5)	26(16.8)	24(15.5)	62(40.0)	33(21.3)
Q13. My personal mobile phone is distracting during clinical work.	21(13.5)	48(30.8)	30(19.2)	41(26.3)	15(9.6)
Q14. Using my personal mobile phone for clinical work makes me more efficient.	11(7.1)	15(9.7)	41(26.5)	70(45.2)	18(11.6)
Q15. The efficiency of communicating with colleagues through text and email using my personal mobile phone outweighs the risk to the privacy and confidentiality of patient health information.	10(6.4)	35(22.4)	57(36.5)	46(29.5)	8(5.1)
Q16. Using my personal mobile phone for clinical work allows me to provide better patient care.	11(7.1)	28(18.0)	56(35.9)	48(30.8)	13(8.3)

Attitudes toward mobile phone usage are described in Table 3. More than half the respondents strongly disagreed (34%) or disagreed (19.9%) that the medical school had educated them appropriately on mobile phone use for communicating patient information, and 35.3% strongly disagreed and 30.1% disagreed that their senior resident or attending physician had given appropriate guidance. Most students also felt that neither the medical school (62.9%) nor senior physician (66.1%) had given proper guidance on professional conduct related to mobile usage. The majority of students (61.3%) agreed or strongly agreed that the use of personal mobiles poses a risk to patients' privacy and confidentiality. The respondents had mixed views over whether a personal mobile was distracting in the clinical setting, but most (56.8%) felt it made clinical work more efficient, with 34.6% agreeing that this outweighed the risk to patient confidentiality. Just over a third agreed (or strongly agreed) that the use of mobile phones leads to better patient care.

DISCUSSION

Our study results describe and explore smartphone usage by interns' and medical students' during their rotations and their perceptions issues related to confidentiality and professionalism. The most popular smartphone type observed was the iPhone, followed by Androids. The majority of participants (75%) used their Smartphones for personal purposes, which could be explained by today's social media revolution, facilitated by well-designed social media apps. However, a large proportion (71%) of participants used their Smartphones for reviewing medical references, resources, and applications, and this is probably due to the rapid growth in medical apps that are available for many purposes, including ones for electronic prescribing, diagnosis and treatment, practice management, medical references, and CME or e-learning[8,9].Only 16% of participants do not have any security features on their

smartphones. Also, 78% of participants had never used their smartphones to text or email patient-identifiable data (e.g., patient last name, OHIP number, and medical record number) to colleagues. However, 34% of participants stated that senior residents or attending physicians had texted or emailed patient-identifiable data to colleagues, which carries a risk of patients' privacy, although it might facilitate consultation for patients.

In this study, all participants own smartphones, which is similar to a Korean study among university students[10]. However, smartphone ownership was higher than a similar Canadian study on medical students, residents, and faculty (92%) [11]. In the United States (USA) and United Kingdom (UK), nearly 80% of medical students own smartphones [12,13]. Another local study in Najran showed that almost all university students had smartphones [14]. This high ratio is expected, as the popularity of smartphones goes up as costs go down.

Regarding the use of smartphones in clinical rotation, the current study states that smartphones are most commonly used for personal matters (75%), which is in contrast with a Canadian study that suggested that the most common use of smartphones in clinical rotations is to communicate with other medical team members (not patientrelated) (93%). Also, contrary to the Canadian study, only 26% of participants in the current study use smartphones for this purpose[1]. However, in the same Canadian survey, 90% of participants use smartphones for personal matters [1]. The use of smartphones for personal matters among med students and young physician is increasing, since the use of online social networking forums among them has become widespread[15] Also, about two-thirds of the participants of the current study use their phones for viewing medical references, resources, and applications, a similar proportion found in a study of attitudes toward the use of mobile computing devices in medical education. In that study, 70% of medical students used smartphones to access medical sources and textbooks[16]. This was expected, as smartphone browsers nowadays are capable of easily browsing most of the online sources, which have attractive designs that are specifically made for smartphones, in addition to the medical apps and textbooks that can be downloaded to smartphones for offline use[8,9].

About 16% of study participants' smartphones lack any security features. This proportion is slightly higher in other similar studies.In general, the smartphone is still considered a risk to patients' privacy and a drawback in the health care system[1,17].Only 22% of our study participants stated that they used their smartphones to text or email patient-identifiable data (e.g., patient last name, OHIP number, and medical record number) to colleagues. However, 34% of participants stated that senior a resident or attending physician had texted or emailed patient-identifiable data to colleagues. This percentage supports the results of a study conducted on general internal medicine wards across four academic teaching hospitals in Toronto, Ontario, in which 39% of residents reported using their personal cell phones to email or text patient information that may have contained patient identifiers [18].

Medical schools play an imperative role in providing students with the knowledge of appropriate and inappropriate ways to use personal mobile phones for communicating patient information. In the current study, only 20% of participants are satisfied with college curriculum regarding this point. However, about 60% of final-year medical students at the University of Toronto agree that their curriculum provides them with knowledge of appropriate and inappropriate ways to use personal mobile phones for communicating patient information[1]. This discrepancy could probably be overcome by introducing a relevant course to the college curriculum.

What participants think of smartphone use for clinical purposes is widely studied. The current study shows that about 57% of students think that using a personal mobile phone for clinical work makes them more efficient. At the University of Birmingham, UK, medical students were positive toward the concept of smartphones as future educational aids, with 84% believing the devices would be useful or very useful[19]. Also, 57% of Toronto final-year medical students believed that the efficiency of communicating with colleagues through text and email using their personal phone outweighed the risk to the privacy and confidentiality of patient health information[1].

One limitation is the response rate, which was 60% of final-year medical students and 43% of interns. Another limitation is that the study was cross-sectional, which may lead to recall bias. This limitation could be avoided by following participants and recording participants' attitudes on smartphones on a daily basis.

We recommend implementing a course about the professional use of smartphones and modern mobile technology in clinical rotations and addressing the issue of patients' confidentiality. We also recommend that hospitals and health institutes should develop secure apps or services that facilitate student/intern-specialist/consultant communication without exposing patient-identifiable data to the risks of being viewed by external audiences.

CONCLUSION

The smartphone is a tool that can be used to enhance communication and increase efficiency in the health care system, but it can lead to dreadful consequences if patients' confidentiality is breached. There is a lot to be done in

this area, as certain regulations need to be carried out to lead toward a world that is pro-technology, health centered, and safe.

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