

# Smartphone Use among Healthcare Providers in Saudi Arabia: A Cross-sectional Study

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## Abstract

**Introduction:** Distraction due to smartphone use in healthcare settings is a threat to patient safety. There are growing concerns regarding its negative impacts on health providers' performance and image.

**Purpose:** The aim of this study was to explore smartphone usage among healthcare providers in Saudi public hospitals with a focus on potential distractions and risks to patient safety.

**Materials and Methods:** A cross-sectional study using an electronic version of a validated instrument conducted in four hospitals of Al Madinah Region, Saudi Arabia. The study sample included nurses, physicians, and other healthcare providers working in main medical departments. Descriptive and bivariate analysis using SPSS (V.20) was applied.

**Results:** The response rate was acceptable at 86% (1290). A total of 56.20% of respondents used their smartphone during working hours. Respondents who received e-mails, sent e-mails, chatted, or watched video clips 20 times or less in the previous working day were 19.40%, 14.10%, 25%, and 13.70%, respectively. A total of 43.80% of respondents agreed that smartphone use distracted them from patient care, while 42.20% believed that these distractions harmed patients. The belief that smartphone use could harm patients was significantly associated with age ( $P = 0.001$ ), nationality ( $P = 0.000$ ), length of experience ( $P = 0.000$ ), and current position ( $P = 0.032$ ).

**Conclusions:** The patterns of smartphone utilization identified in this study pose a significant challenge to patient safety. Initiatives to reduce the negative consequences of smartphone use on patients' outcomes and health professionals' image are needed. Such efforts should not underestimate the role of smartphones in facilitating access of health professionals to updated medical knowledge and international clinical guidelines.

**Key words:** Distractions, Patient safety, Smartphone

## INTRODUCTION

Distraction due to smartphone use is one of the top ten technology hazards in healthcare settings, as it may distract healthcare providers attention while performing medical procedures.<sup>[1]</sup> Regardless of the cause of healthcare providers' distraction, the consequences could bring serious harm to the patient.<sup>[2]</sup> For instance, using smartphones was found to decrease peripheral vision, which may lead to missing important medical signs.<sup>[3]</sup> Furthermore, the

improper use of smartphones by healthcare providers during duty could raise professional concerns such as poor professional image due to using the phone in patient rooms.<sup>[4]</sup>

The literature reveals a growing concern with smartphone negative effects. Previous studies reported that almost 43% of nurses were distracted by their colleagues' smartphones, while 70% believed that using mobile phones during duty had consequences for patient care.<sup>[5]</sup> Furthermore, using smartphones contributed to nurses' inability to recognize critical patient and a higher probability of medical errors, which raises significant concerns regarding patient safety.<sup>[6,7]</sup> Additional concerns include breaching patients' confidentiality and microbial contamination.<sup>[8,9]</sup>

In general, healthcare providers use smartphones during duty hours to send text messages, read news, check social

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networking sites, shop online, and play games; in addition, physicians also text orders to nurses.<sup>[4,5,7,10,11]</sup> A literature review revealed few studies investigating smartphone use in Saudi Arabia. Two studies examined smartphone adoption and utilization among university students.<sup>[12,13]</sup> From a healthcare perspective, smartphone usage among medical residents was investigated in one study on work-related smartphone usage.<sup>[14]</sup> To the best of the researcher knowledge, no studies have examined possible distractions and patient safety issues in relation to smartphone usage in the Saudi public healthcare system. Therefore, this study examined smartphone usage among healthcare providers in four hospitals of Al Madinah Region, Saudi Arabia.

## MATERIALS AND METHODS

### Study Design

This was a cross-sectional study.

### Setting and Sample

The study was conducted in four hospitals in Al Madinah Region, Saudi Arabia. Health professionals, predominantly nurses, and physicians working in main departments (ER, critical areas, medical, and surgical) were included in the study sample. Interns and temporary staff were excluded from the study. The estimated target population in all study locations was about 3,422 healthcare providers.

### Ethical Considerations

Ethical approval was granted by the health directorate of Al Madinah Province.

### Measurement/Instruments

The study instrument was adapted from the tool developed by McBride, LeVasseur, and Dongmei.<sup>[10]</sup> The instrument included two parts: First, demographic data, and second, six questions investigating participant's smartphone utilization and potential risks to patient safety.

### Data Collection/Procedures

Following ethical approval, the researcher conducted data collection in the four locations sequentially. Invitation posters explaining the study aim and providing a brief explanation of the previous literature and the link to the electronic questionnaire were posted in nurses' stations. Since there was no personal information collected on the electronic form and no traceable data, responding to the questionnaire was considered as participants' consent to participate in the study.

### Data Analysis

Data were analyzed using SPSS (version 20). Descriptive statistics including frequencies and percentages were

calculated, and bivariate analyses were performed to identify associations between the study variables.

## RESULTS

A total of 1,290 healthcare providers were responded to the study questionnaire, resulting in a response rate of 86%. Table 1 presents the distribution of the respondents' characteristics. It was observed that most of the respondents were working at study location A, with 31.20%, followed by location B, with 26.20%, and only 16.90% at location C. The majority of the respondents were female (74.30%). In addition, most of the respondents were aged between 26 and 30 years (43%). Nurses, physicians, and other healthcare providers represented 79.50%, 10.50, and 10%, respectively.

A total of 56.20% of respondents used their smartphone during working hours [Table 2]. Regarding frequency of use, participants were asked to identify how many times they used their mobile phone during the last working day. Those who received e-mails, sent e-mails, chatted, and watched video clips 20 times or less were 19.40%, 14.10%, 25%, and 13.70%, respectively. A total of 43.80% of the respondents agreed that smartphone use distracted from patient care, while 42.20% believed that these distractions harmed patients. Participants were asked to identify the purpose of their daily use of smartphone [Figure 1]. Talking and listening to music were the most frequent

**Table 1: Percentage distribution of the respondents' profile**

Profile variables	n (%)
Workplace	
Study location A	403 (31.20)
Study location B	331 (25.70)
Study location C	218 (16.90)
Study location D	338 (26.20)
Gender	
Male	331 (25.70)
Female	959 (74.30)
Age (years)	
≤25	321 (24.90)
26–30	555 (43.00)
≥30	414 (32.10)
Nationality	
Saudi	721 (55.90)
Non-Saudi (Arab)	179 (13.90)
Non-Saudi (non-Arab)	390 (30.20)
Length of experience	
<2	319 (24.70)
2–5	413 (32.00)
>5	558 (43.30)
Current position	
Physician	135 (10.50)
Nurse	1026 (79.50)
Others	129 (10.00)

**Table 2: Percentage distribution of the respondents' profile regarding smartphone**

Variables	Frequency (%)
Have smartphone	
Yes	1079 (83.60)
No	211 (16.40)
Use smartphone during work	
Yes	841 (65.20)
No	449 (34.80)
During the last working shift, how many times did you: Received email	
1–20	250 (19.40)
≥21	1 (0.10)
Send email	
1–20	182 (14.10)
≥21	4 (0.40)
Received calls	
1–20	686 (53.20)
≥21	12 (1.00)
Initiate calls	
1–20	638 (49.50)
≥21	28 (2.2)
Send text/chat	
1–20	322 (25.00)
≥21	14 (1.00)
Watch video clips	
1–20	177 (13.70)
≥21	10 (0.80)
Smartphone distracted patient care	
Yes	565 (43.80)
No	725 (56.20)
Using smartphone harming patient	
Yes	545 (42.20)
No	745 (57.80)

with 33% and 24%, respectively. Searching, which could be explained as the need for medical related information, was identified as a purpose for 4%.

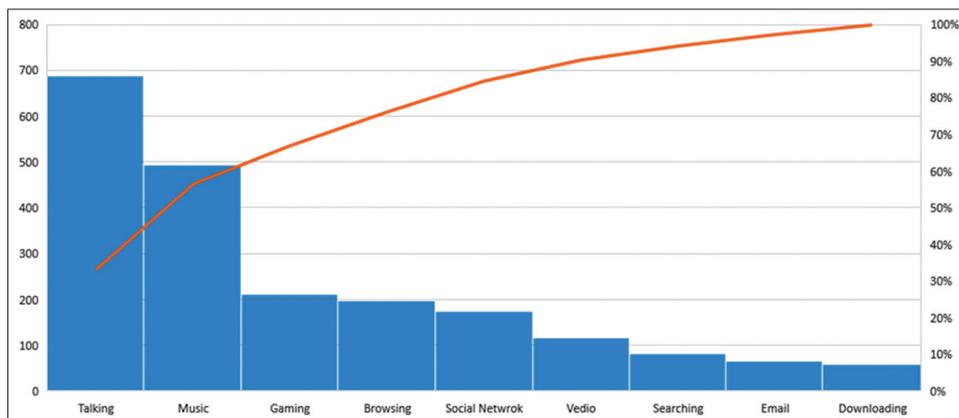
There were statistically significant associations between demographic and work characteristics and the belief that smartphone use caused distraction from patient care [Table 3]. However, workplace was not significantly associated with this belief. On the other hand, the belief that smartphone use could harm patients was significantly associated with age ( $P = 0.001$ ), nationality ( $P = 0.000$ ), length of experience ( $P = 0.000$ ), and current position ( $P = 0.032$ ).

### DISCUSSION

There is no doubt that smartphones have become life essentials; however, their negative effects on healthcare services should be minimized. In the current study, a wide proportion of participants reported using their personal smartphone during working hours. E-mail was the dominant use of a smartphone during participants' last working day (30%), which may have various explanations. On the one hand, e-mails could have been work related, and on the other hand, they could have been personal. Regarding work e-mails, several studies showed a steady increase in smartphone applications in healthcare settings for clinical purposes, such as referrals and consultations,

**Table 3: Association between the demographic profiles and smartphone distracted or harm patients' care**

Demographic profile	Smartphone distracted patients' care		Smartphone somehow harming patient	
	$\chi^2$	$P$	$\chi^2$	$P$
Workplace	2.343	0.504	2.041	0.564
Gender	5.333	0.021	0.390	0.532
Age	9.703	0.008	15.168	0.001
Nationality	14.719	0.001	19.377	0.000
Length of experience	13.046	0.001	20.058	0.000
Current position	11.373	0.003	6.856	0.032



**Figure 1: Rationales for daily use of smartphone during working hours**

telemedicine, and requesting information.<sup>[10,14,15]</sup> The study instrument did not allow the researcher to identify the reason for sending/receiving e-mails during working hours, which is a limitation to be avoided in future studies.

As indicated in Figure 1, the main reason for everyday smartphone utilization during working hours was searching, which may suggest the role of smartphones in developing health professionals' knowledge and consulting clinical guidelines.<sup>[13]</sup> Health professionals in Saudi Arabia have the privilege to access several data engines supported by the Ministry of Health and Saudi Commission for Healthcare Specialties.

On the other hand, there was improper utilization of smartphones during working hours in activities such as social networking and gaming. These activities were evident in this study, which raises concerns about patient safety and an increased risk of distractions in clinical settings.<sup>[1,4]</sup> The proportion of gaming activities in the current study was identical to a study in the United States (6.50%). Therefore, this seems to be an international trend that healthcare organizations should manage by implementing international recommendations related to smartphone use during working hours.<sup>[10]</sup>

An important finding from the current study was that 43.80% of the respondents agreed that smartphone use distracted from patient care and 42.20% believed that these distractions harmed patients. These percentages were more than triple of those reported in an earlier study in the United States.<sup>[7]</sup> Moreover, this raised the alarm regarding the urgent need for smartphone use policies in healthcare organizations. Training to increase health professionals' awareness and compliance was positively associated with lower improper smartphone utilization.<sup>[11]</sup> In addition, future health professionals should gain awareness of and complete training on the negative consequences of smartphone utilization during patient care as part of the university curriculum.<sup>[16,17]</sup>

## CONCLUSION

The patterns of smartphone utilization in Saudi public hospitals pose a significant challenge to patient safety. Policy and decision-makers and healthcare organizations should work together to reduce the negative consequences

of smartphone use on patients' outcomes and health professionals' image. Such efforts should not underestimate the role of smartphones to facilitate the access of health professionals to updated medical knowledge and international clinical guidelines. Further studies are needed to explore the best use of smartphones and evidence-based interventions to decrease their potential harm to patients' outcomes.

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