“Webside” healthcare from medical interns’ perspective: Telemedicine implementation and need for training

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Abstract:
BACKGROUND: Telemedicine involves the use of electronic communication and technology to remotely deliver clinical services to patients. With the increase in the adoption of telemedicine in healthcare delivery, “webside healthcare” is becoming the virtual analog of bedside care. The Ministry of Health in Saudi Arabia has recently established the use of telemedicine, including social media (SM) and medical applications (Apps) to enhance the quality and accessibility of healthcare services to patients and healthcare providers. In the present study, we evaluated medical interns’ perception of the use of telemedicine, SM, and medical Apps in patient care, their awareness of related guidelines to find out if targeted training is needed.

MATERIALS AND METHODS: A qualitative study recruited and interviewed, through semi-structured key informant (KI) interviews and focus group discussions (FGD), a total of 24 male and female medical interns. The Interns were purposefully sampled from all Saudi Arabia’s 5 main geographical regions until data saturation was observed. The transcripts of five KI interviews and 6 FGDs done were thematically analyzed and are presented as themes and subthemes.

RESULTS: Medical interns discussed the advantages and disadvantages related to telemedicine, SM, and medical Apps in healthcare services. Overall, interviewees appreciated the role telemedicine, SM, and medical Apps play in the healthcare and for such particular specialties as family medicine and (tele-) psychiatry. However, the interns believed that training on the technical operational aspects of different telemedicine modalities with an emphasis on targeted education for related ethical and legal regulating guidelines was vital.

CONCLUSION: Most interviewed medical interns had a positive perception of telemedicine and were willing to use it in their daily clinical practice. However, there were some challenges to its successful implementation such as prompt training on its proper use and clear ethical and legal guidance.

Keywords: Healthcare delivery, junior physicians, medical applications, medical training, patients’ privacy and confidentiality, social media, telemedicine

Introduction

Telemedicine is “the delivery of healthcare and the exchange of healthcare information across distances,”[1] utilizing current information and communication technologies. Telemedicine may be classified as (i) health-related communication from one health professional to another health professional and between a health professional and a patient,[3] or as (ii) synchronous (live) and asynchronous (prerecorded) exchange of information, such as text, audio, video, or images.[1,2] As telemedicine becomes more popular between patients and physicians, efforts are made to observe and maintain professional standards of communication with this new virtual “webside care” similar to traditional in-person bedside care.[3]
Telemedicine involves various ways of delivering healthcare remotely, using technology including social media (SM) and medical applications (Apps), both of which have been successfully and increasingly utilized in healthcare in the last decade. In Saudi Arabia, the Ministry of Health (MOH) also utilizes SM and medical Apps to deliver healthcare. Health promotion messages are distributed by Saudi MOH-affiliated accounts on SM platforms, such as Twitter and YouTube. Several medical Apps also launched before and during the pandemic are utilized by both physicians and the public. These include Sehha and Qareboon Apps for the provision of virtual general and mental healthcare, respectively, and Tawakkalna app for documenting the user’s health status.

Several barriers and facilitators of telemedicine and e-consultations’ implementation have been described in the literature; the provision of emotional and technical support to patients, engagement and motivation, and training of patients and clinicians are described as important facilitators; barriers include poor body language and communication, and patients’ negative perceptions of online health consultation privacy and security.

Recently, the 2020 Stanford Health trends report described healthcare practitioners’ preparedness for the use of technology in healthcare as a gray area, a “transformation gap,” since both current and future physicians feel inadequately trained.

Successful implementation and maintenance of the use of telemedicine in the healthcare depend on the competency and efficiency of medical professionals who use the technology. However, little is known about telemedicine-related views, knowledge, and skills of our future healthcare providers, the medical interns. Hence, the aim of the present paper was to examine medical interns’ perception of the role of telemedicine, SM, and medical Apps in patient care, their awareness of guidelines governing telemedicine use and whether related targeted training was necessary.

**Materials and Methods**

This was a qualitative study conducted from June to September 2020, through semi-structured focus group discussions (FGD) and key informant (KI) interviews. Ethical approval for this study was obtained from the Institutional Review Board (IRB), vide letter no. IRB-UGS-2019-01-205, dated 16/04/2019. Written informed consent was obtained from all study participants before data collection. Participants were assured that all data would be kept confidential and they had the right to withdraw from the study at any time.

The inclusion criteria were male and female medical interns who had completed at least 1-year internship training, from any region in Saudi Arabia and had given informed consent to participate in our interviews. Additional criteria for choosing KIs were medical interns who had participated in student councils, student clubs, or other similar activities.

A total of 24 medical interns were recruited from the five main regions of Saudi Arabia: eastern, western, central, northern, and southern regions. A purposeful sampling method was used for recruitment to ensure that all five main regions of Saudi Arabia were represented. Recruitment was done through Twitter direct messaging (n = 15) and face-to-face contact (n = 9). The aim and method of the study were explained to the medical interns, and consent to record the interviews and discussions was sought and given. Recruitment was stopped when data saturation was observed.

Six FGDs (A to F) and 5 KI interviews (K1-K5) were completed. All interviews were conducted through the Zoom platform, version 5.2.1., at a time convenient for the participants and lasted 1 h, on average. Each focused group discussion included medical interns from the same province.

During the semi-structured interviews, interns participating in the FGDs and KI interviews discussed different aspects of their use, perception and views on telemedicine, SM and medical Apps’ utilization in healthcare, addressing in particular (in sequence): their general perception on the suitability (including advantages/disadvantages) of telemedicine, SM and medical Apps for healthcare delivery at present and in the future; awareness of related ethical and legal guidelines and confidentiality and privacy aspects, as well as the need for targeted training on associated technical and ethical requirements for safe and proper use of telemedicine, SM and medical Apps in healthcare delivery. The respective questions asked in interviews are reported in the results and tables.

All FGDs and KI interviews were audio-recorded and transcribed verbatim. Translation from Arabic to English was done by the researchers and a reverse translation into Arabic done by an external assistant. All transcripts were manually coded and organized in themes and subthemes by 2 researchers and reviewed by a third researcher.

**Results**

A total of 24 medical interns participated in the KI interviews and FGDs. The participants’ mean age was 25 years (minimum 23 years and maximum 30 years), 22
participants were Saudis, 15 were females, and 2 were married. Seven participants were medical interns from the Western province, 7 from the Eastern province, 5 from the Central province, 4 from the Southern province, and 1 from the Northern province.

Interviewed interns discussed advantages and disadvantages of the use of telemedicine, SM, and Medical Apps’ in healthcare [Table 1]. Top perceived advantages were saving patients’ time and effort and facilitating interns’ educational purposes. Interviewees also praised SMs ability to raise the health awareness of the population. They described how some doctors use their SM accounts to educate the public about the conditions they specialize in. Thus, they can quickly disseminate health information among the different groups in the communities of the population. These advantages of SM are facilitated by its relative ease of use together with the wide availability of smart devices in the population.

As a downside to the use of telemedicine, SM, and medical Apps, our interviewees noted that some population groups in Saudi Arabia, especially the elderly, might not know how to use the technology or are uncomfortable with its use. Furthermore, from a physician’s perspective, medical Apps might not be suitable for the performance of a full physical examination. Regarding SMs disadvantages, interviewees agreed on how SM platforms have become the space for rumors and health-related misinformation [Table 1].

Moreover, using telemedicine tools for healthcare delivery might be viewed by the public as a form of dereliction of duty of care, suboptimal care, by the medical staff. In addition, interviewees were worried that telemedicine utilization might prove time consuming, overwhelming physicians already struggling with work-life balance [Table 1].

Interns also analyzed the possible context of the use of telemedicine, SM, and Medical Apps, including important aspects facilitating interns’ use of telemedicine in healthcare service and delivery [Table 2]. No notable gender or regional differences were observed among our interviewees regarding the reported themes and subthemes. Participants had a positive opinion on the role

Table 1: Views of medical interns regarding the advantages and disadvantages of telemedicine

| Themes                                      | Supporting quotes                                                                 |
|---------------------------------------------|----------------------------------------------------------------------------------|
| Perceived advantages of medical applications and social media use in healthcare |                                                                                  |
| Saving patient’s time and effort           | “The patients do not have to come to the hospital for everything, they can consult their physicians through the Apps from home” A1 |
| For educational purposes                   | “…because our field is huge, we can’t cover everything about everything, with this app it was easy to find the information in seconds” K5 |
| Raise the population’s health awareness    | “The advantage is that there are now known doctors in SM and people take information from” C2 |
| Reach the masses quickly and easily        | “advantage is that we can reach a large group of people with a click” E1         |
| Reach the different groups (ethnic, age, gender, etc…) within the community | “You can reach different groups of community and different age groups” K4         |
| Ease of use and wide availability          | “…it made things much easier for the younger generations…” A3                  |
|                                                                                  | “…it is in everyone’s hand and it is easy to spread the knowledge to all different groups of the population” C3 |
| Perceived disadvantages of medical applications and social media use in healthcare |                                                                                  |
| Lack of knowledge on how-to-use or discomfort in using                             | “…older generations will prefer to come to clinics…those older than 50 have no knowledge of how to use technology, and even if all of them had WhatsApp not all of them can write and read” C1 |
| Might not be suitable for physical examination                                     | “Telemedicine is not suitable for all specialties, especially the surgical, you need to examine the patient. It may be enough for (taking) history but not for physical examination…when we ask the patients for a picture of the lesion it can be unclear” E3 |
| May facilitate the spread of rumors and (health) misinformation                    | “We need to educate the public of how to tell (identify) what is true and what is not, and who to listen to” D3 |
| May be viewed as suboptimal care by some members of the population                 | “There were people who spread fear as well as wrong information” K3             |
| Might require extra time and effort of physicians and affect their work-life balance adversely | “…people still didn’t accept everything to be through technology and it still needs time” K5 |
|                                                                                  | “…it could be overwhelming for the doctor if patients contact (reach out to) their doctors too often, if I described it nicely” K2 |
|                                                                                  | “For the information to reach the people, the account must have a lot of followers. A person (physician) needs to be popular and put in much effort for 2-3 years to reach the required number of followers. This makes a lot of people avoid this activity (health promotion)” B2 |

Apps=Applications
technology could play in healthcare with the majority supporting the use of telemedicine, SM, and medical Apps, in healthcare. “The... new era of medicine depends on technology greatly... It (technology) is difficult because still we are not used to it, but it has potential” D2. In addition, interviewees discussed the medical specialties that would benefit the most from telemedicine, SM, and medical Apps [Table 2].

Table 3 summarizes medical interns’ opinions on the regulating ethical and legal guidelines for telemedicine and related knowledge and training aspects.

When asked if they were aware of any guidelines on ethical and legal considerations of using SM and medical Apps in healthcare, almost all participants did not know of any such telemedicine regulating guidelines. Nonetheless, all interviewees agreed on the importance of guidelines to regulate the use of technology in the healthcare context and showed willingness to learn more.

During the discussions on ethical, privacy, and confidentiality aspects of SM and medical Apps’ use in healthcare, some participants opined that providing care through SM and medical Apps could help protect the privacy of some patients. Interns mentioned as an example individuals who need mental healthcare but would rather not attend a psychiatry clinic because of the stigma attached. What’s more, interviewees pointed out that caution must be exercised when using SM and medical Apps to postcases online for healthcare-related purposes to ensure patients’ privacy and confidentiality are not breached [Table 3].

Above all, interns agreed that having the technical know-how and knowledge of the associated ethical and legal aspects of the use of telemedicine, SM, and medical

Table 2: Views of medical interns on the context of telemedicine use and the medical specialties that would benefit from telemedicine modalities

| Themes                                      | Supporting quotes                                                                                                                                                                                                 |
|---------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| In your opinion, how can telemedicine modalities be utilized in healthcare, i.e., context of telemedicine use? |                                                                                                                                                                                                                   |
| Health promotion                           | “In health promotion, when the patient presents to the hospital because he has learnt of (e.g., from social media (SM)) the symptoms of such (his) condition” D1                                                      |
| History taking                             | “We can use SM for history taking, for example by making a form with the questions of history for the patient to complete” A2                                                                                         |
| Clinical investigations/tests (laboratory, radiological, etc.) | “For example, one of my colleagues in a governmental hospital told me that if a hospital in rural area needs a radiologist to read the imaging, they can send it to another (specialized) hospital” E1 |
| Management                                  | “Medical Apps help us especially in management since we cannot memorize all the doses” A1                                                                                                                          |
| Follow-up                                   | “Regarding the DM, there is an app to monitor the reading of (blood glucose) and share it with the physician” B3                                                                                                     |
| Family medicine                             | “…since they (family physicians) are the first line of healthcare and they only need simple information that can be communicated through virtual clinic, and because it (family doctor visit) includes all other specialties in general” A2 |
| Psychiatry                                  | “Psychiatry since some patients hesitate to visit the clinic because of the stigma of psychiatric patients (conditions)” C3                                                                                       |
| Pediatrics                                  | “To help in educating the mothers about the vaccinations and the children’s development” A1                                                                                                                     |
| Ophthalmology                               | “In tele-retinal screening program for diabetic retinopathy and retinopathy of prematurity, where the patient comes for his internal medicine or family medicine appointment and a photo of his retina is sent to the ophthalmologist for further evaluation. So, the patient won’t have to go for an ophthalmologist unless needed” K4 |
| Dermatology                                 | “Dermatology if the app is well developed and you can send a picture or video” F2                                                                                                                               |
| Radiology                                   | “Radiology also can benefit from it if the imaging is already done and only interpretation is left” F3                                                                                                           |

SM=Social media, DM=Diabetes mellitus, Apps=Applications
Table 3: Medical interns’ views on telemedicine regulating ethical and legal guidelines and related knowledge and training aspects

| Themes                                                                 | Supporting quotes                                                                 |
|----------------------------------------------------------------------|----------------------------------------------------------------------------------|
| Are you aware of any guidelines addressing ethical and legal considerations of using SM and medical Apps? | “Not aware” C1                                                                   |
|                                                                      | “No (not aware of specific guidelines), just the ethics we studied (in medical school)” C2 |
|                                                                      | “Not aware of specific guidelines. I depend more on common practice (generally accepted medical practice and technology use)” K4 |
| Importance of guidelines to regulate technology use in the healthcare context | “No (I am not aware of any guidelines). Yes, such guidelines are important (for practice)” K3 |
|                                                                      | “I tried to search (for guidelines) before. But I could not find something clear” B1 |
|                                                                      | “No, I don’t know (about such guidelines). Yes, I think it (technology use regulating guidelines) is important since we are moving to that area (increasing role of technology in healthcare purposes)” K1 |
| Protection of patient’s privacy and confidentiality                  | “SM and (medical) Apps can help actually with confidentiality and privacy for those psychiatric patients who are afraid of the (mental illness) stigma” C1 |
|                                                                      | “If it will help others, I might post it (a patient’s case) in general terms (nonidentifying description) after taking the patient permission and ensuring privacy, but not just because the case is interesting” E2 |
|                                                                      | “They (physicians) should post it (patient information) with no (identifying) patient data as they do now. If it is purely medical, I prefer it to be shared in the specific Apps for medical profession (for physicians/medical trainees)” K2 |
| Improving medical trainees’ and physicians’ telemedicine related knowledge and skills | “For sure the answer is yes to both, training on use of SM and medical Apps and related ethical and legal aspects. I feel that there should be regular training sessions, updated every 6 months to 1 year, to address the latest programs (Apps) that emerge into the medical arena. The training should be under the auspices of the healthcare institution where physicians work and train. This allows for providing patients with improved and up-to-date healthcare services. The current situation on the ground is dependent on each physician’s personal initiative to train and remain updated on the latest programs (medical Apps)” E3 |
|                                                                      | “Yes, I think SM and medical Apps, all of these electronics (telemedicine), are beneficial in the practice and should have a big part in our teaching process in all subjects. Nowadays, we have the SM, Apps, and websites, all of them…. facilitate a lot in respect to the charts, diagnosis, treatment, everything even the patient education. So yes, I agree on training (as interns and undergraduate medical students)…. for us to learn these Apps and websites. Same for the ethical and legal part (aspects)” D3 |
|                                                                      | “Yes, I think we need to train in both undergraduate and postgraduate. For postgraduate I would recommend to incorporate courses with CME Hours to encourage them to attend. For medical students (undergraduate) I would recommend that it be included in their curriculum in the final years. And the reason for need of undergraduate and postgraduate training is that they need to be taught the proper use of the SM (platforms); SM is full of misinformation and for that reason, I believe it is crucial to master the use” E1 |

SM=Social media, Apps=Applications

Apps’ in healthcare are essential for both medical trainees and physicians [Table 4].

Most participants agreed on the need for specific and targeted training on how to properly use SM and medical Apps in healthcare. However, some participants would rather have this training made optional and directed at those who lacked the confidence to use SM and medical Apps with their patients [Table 4].

On the issue of whether there was the need for specific training on the ethical and legal aspects of SM and medical Apps’ use in healthcare, almost all interviewees believed that this training was a requisite for the protection of both patients and physicians [Table 4].

Discussion

Our study revealed that medical interns appreciated the benefits of telemedicine and its potential of facilitating healthcare delivery. Nevertheless, they believed that they needed training on its proper use and instruction on related ethical and legal regulating guidelines.

Telemedicine was adopted in Saudi Arabia primarily to enhance access and improve the quality of healthcare services, particularly in rural and remote communities. In the present study, interviewed medical interns appreciated as top advantages of medical Apps and SM, respectively, its ability to save patients’ time and effort, enhance interns’ own medical educational goals, raise awareness of the general public to health issues by their relative ease of accessibility and use, especially SM platforms. Published studies, among physicians, also report that top perceived advantages of telemedicine use include the saving of time and money, reach to remote areas and the potential as a tool for timely delivery of health promotion messages to a diverse large number of people. Nevertheless, our interviewees noted that not everyone in the public
Table 4: Medical interns' views on the need for targeted training on technical, ethical, and legal aspects of telemedicine

| Themes                                                                 | Supporting quotes                                                                                                                                                                                                 |
|------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Do you think medical interns and/or undergraduate medical students need training addressing the (technical) use of telemedicine, SM, and medical apps for healthcare and related ethical and legal aspects? Should the training be optional or mandatory? | “Yes, when people consult you on WhatsApp for example, you need to know the specific question that you need to ask to arrive at the diagnosis. Even in the physical examination, I remember one time someone asked me on WhatsApp, she was afraid of DVT. I asked her about the temperature of the leg, and to measure and compare both legs. I don’t know if the patient gave me a reliable info or not. So yes, we need to learn how to take and make sure of the info The ethical and legal (training need) yes. For the same example, if it was really DVT and I couldn’t ask her the suitable question!? Yes, I think it is important (to train on the ethical and legal aspects) because this will unify the ground for us, it will protect you from the legal claims, and will make you a clean ethical doctor. It has to be mandatory because doctors need to know what to say and when to say it, like what is happening now is not acceptable: you see a dermatologist physician talking (posting on social media) the management of COVID19 patients in ICU. There are two options (for training medical students): In 6th year before internship or in 4th year, because a lot of students when they reach clinical years they start posting in SM; I am against adding it in 2 years because it increases the burden on the students and may cause them to neglect it No, I believe our generation can adapt and learn how to use new Apps very quickly. (Regarding training on the ethical and legal aspects) A printed copy of them (the guidelines) will suffice” |
| Support training on the technical aspects and/or the ethical and legal aspects | “Yes, we need training on the technical and ethical aspects” |
| Does not support training (or support only brief training) on the technical aspects and/or the ethical and legal aspects | “Yes, but not necessarily, especially during these days… depends on the hospital and facility that you are in. Based on this once you have a personal account, take an orientation (training course) with it. Regarding the ethical part, yes definitely. How to use it could be later but the ethical part everyone should be trained not only as interns but even as (medical) students” |

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Another concern our interns raised about telemedicine use was that some patients might view care delivered through telemedicine as a form of dereliction of the duty of care by the medical staff. Comparable results were found nationally and internationally, where 53\% of Saudi doctors\[24\] and 60.8\% of Australian physicians\[25\] previously reported their discomfort in using online means to communicate with their patients.

Furthermore, our participants worried about the possibility of physicians being overwhelmed by the additional work, time, and effort perceived in the incorporation of telemedicine into healthcare delivery.

(consider the elderly) is comfortable with the use of telemedicine, SM, and medical Apps for healthcare, a concern noted in the literature.\[14,22\]

Discussing potential disadvantages of medical Apps and SM in healthcare, our participants believed that they did not provide the physician with a full picture of the patient’s condition because of the inability to carry out a complete “regular” physical examination. SM may also facilitate the easy and problematic spread of misinformation and rumors about health issues. Similar concerns have been cited by a few other studies exploring the opinion of Saudi physicians.\[21-23\]
Related concerns indicate that using telemedicine and SM to deliver care would affect time for family, friends, and other commitments and have been addressed in other studies as barriers to physicians’ utilization of telemedicine tools such as SM.[21,22,26]

Nevertheless, almost all our interns supported the use of telemedicine, SM, and medical Apps, in healthcare delivery, particularly for simple noncritical cases and in following up stable patients and those with chronic diseases or patients living a considerable distance away from hospital. This is consistent with the recent increase in the rates of adoption of telemedicine seen in Saudi Arabia,[23,27] ranging from 33% to 72%, in the use of telemedicine modalities reported by physicians in the different institutions.[14,24] On our reported themes and subthemes in this study, no notable gender or regional variation in telemedicine use was observed. This may be because medical interns’ interaction with patients is closely supervised and regulated to follow uniform standards across the different medical training institutions.

Our interviewees acknowledged that telemedicine had facilitated clinical laboratory and radiological investigations test results through online ordering and follow-up of results and the soliciting of the opinion of an expert or second opinion when interpreting test results. This is in accord with related literature in which physicians agreed that investigations could be communicated through online and thus facilitate the provision of care at a lower cost to the patient and reduce the bed occupancy in health facilities.[28-30]

Our interns indicated that family medicine was suited for telemedicine, SM, and Medical Apps’ in facilitating patients’ first contact with the healthcare system and for long periods of follow-up as needed. Some interviewees believed that all healthcare disciplines including psychiatry, pediatrics, ophthalmology, and dermatology could benefit from telemedicine. Interestingly, this opinion is in line with the preferences of the Saudi public as a recent study concluded that the preferred specialties for the use of telemedicine for virtual consultations by the Saudi public included internal medicine, dermatology, and pediatrics.[31] Radiology was also mentioned by our interns as amenable to benefit from telemedicine use in interpreting radiographic images. This is consistent with the published literature indicating specialties with essentially visual patient data, such as radiology and dermatology, which might be better suited than others to utilize telemedicine technology.[32]

Almost none of our interviewed medical interns were aware of telemedicine regulating guidelines. Nonetheless, all participants recognized the vital role of such guidelines governing telemedicine use for healthcare delivery and showed a desire to learn more about them. These findings confirm the results of recent Saudi studies reporting physicians’ concern about the legal aspects of the use of telemedicine[14,24,27] and that only about a third of studied Saudi physicians were aware of telemedicine-related guidelines.[14] It is worth noting that telemedicine regulations in Saudi Arabia were only recently discussed by the National Health Information Centre in 2018.[33] Physicians avoid using telemedicine, as some studies concluded, because of their inadequate knowledge of the guidelines; a telemedicine implementation barrier.[17,22]

Our interns appreciated the possible role of telemedicine, SM, and medical Apps in protecting the privacy and confidentiality of those patients who value discretion, such as those seeking mental healthcare services. The anonymity offered by telepsychiatry services, such as Qareebon medical app from the Saudi National Committee for Mental Health Promotion, could help increase awareness of mental health disorders and related services in the community, and increase service utilization by reducing recipients’ feelings of shame and the stigma of mental illness.[7,34] Moreover, our interviewees agreed on the importance of protecting patients’ privacy, obtaining patients’ informed consent, and removing any patient identifying information when considering posting cases on SM and medical Apps. Breaching patient privacy and its negative consequences was addressed in the literature as a risk in the use of SM for healthcare.[35,36] In fact, in a 2020 study that aimed to measure the amount of identifiable information healthcare professionals would share about their patients on Twitter, physicians were found to be more likely than other medical professionals to disclose patient identifiable information,[37] which constitutes violation of patients’ privacy and confidentiality and will no doubt lead to complaints with adverse legal effects on a physician’s career.[38]

Our interviewed interns regarded as vital the knowledge and training on the technical and related ethical and legal issues for the use of telemedicine, SM, and medical Apps’ for the purposes of healthcare. Telemedicine virtual “webside” visits, just like their contemporary traditional in-person bedside visits, require skills in effective engagement of patients, verbal and nonverbal communication, explaining risks and benefits to patients, learning to read a patient’s body language or tone of voice, knowledge of telemedicine regulations and the consequences of breaching them and maintenance of the standards of professionalism.[3,39-43] Multiple recent studies conclude that both current and future physicians welcome technological advances in medicine but feel...
inadequately trained to cope with them and are actively seeking additional training.[44-46]

The literature on this topic of training discusses a variety of optional and mandatory telemedicine training programs[47-49] in the preclinical and clinical undergraduate years.[46,50] Furthermore, the American Medical Association and the American Telemedicine Association have developed codes and guidelines for the use of telemedicine, which can be useful resources for physicians as well as training and regulatory bodies.[51,52] Some of our interns claimed that being technology “natives” without accompanying formal training was adequate; they possess the necessary technical skills and ability to deliver good patient care through teleconsultations. However, this has been recognized in the literature as a “fallacy” and may result in low quality of care with high variability and documented inconsistencies delivered to the patients.[13,17] Training on and learning more about telemedicine and its clinical application would reduce physicians’ uncertainty about it as well as promote improved care delivery.[13,17,22,53]

A key strength of this study is that our interns had all completed at least one full year of internship training, which would make their perspective more representative of a typical medical intern. Moreover, care was taken to represent interns training in Saudi Arabia’s five main regions, thereby reflecting an inclusive range of experiences and opinions. In addition, our interviews were conducted during a period of wide intensive deployment of telemedicine in Saudi Arabia, following the onset of COVID-19 pandemic, which ensured that our interviewees were familiar with the themes analyzed in this paper. Despite this, our findings have to be considered in light of some limitation, namely that medical interns might generally have limited online interaction with patients. Furthermore, reported interns’ views might have been influenced by the exceptionally heightened telemedicine use during the pandemic period. The study may be repeated at a later, postpandemic time, with perhaps more ubiquitous telemedicine use. Nonetheless, we reckon our results highlighted essential aspects of the utilization of telemedicine, SM, and medical Apps in healthcare that may inform decisions on internship training.

**Conclusion**

Medical interns appreciated the benefits of telemedicine, SM, and medical Apps, and the majority agreed on their role in facilitating healthcare delivery. However, interns face key challenges to safely and successfully utilize these technologies in clinical practice considering their lack of technical operational skills and knowledge of related ethical and legal regulating guidelines. There is, thus, the pressing need for specific accredited, uniform coaching of medical trainees on both of these aspects of technical and regulatory telemedicine.

The presented results are expected to have important current and future implications for clinical practice as well as the continuous professional development of both junior and senior physicians. Future examination of varying healthcare contexts and other healthcare workers and provider categories is warranted.

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**Conflicts of interest**

There are no conflicts of interest.

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