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# Telemedicine practice among Egyptian urologists: knowledge, attitude, and medicolegal concerns

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## Abstract

**Background** The usage and implementation of telemedicine by urologists to diagnose, treat, mentor, and prevent diseases have grown worldwide. Numerous clinical, legal, and ethical issues are addressed by this practice. This is a cross-sectional study based on an anonymous online questionnaire, aimed to assess the current urologists' knowledge and attitude towards telemedicine use in Egypt. A total of 108 Egyptian urologists filled out the questionnaire which included sociodemographic data, urologist knowledge, attitude regarding telemedicine, and common concerns and barriers.

**Results** Out of the total sample, 75.9% of participants did not use telemedicine modalities until COVID-19 pandemic. Nearly 66.7% of participants did not receive formal medicolegal training on using telemedicine. About 62% of participants used personal accounts on social media, and 73.1% of teleconsultations were to assess radiological and laboratory data. Several concerns were highlighted such as possible malpractice risks (79.6%), defamation (72.2%), and keeping patient records (71.3%). Urologists raised many considerable barriers regarding telemedicine, such as lack of patient technology skills (84.3%), absence of regulations or laws (76.9%), insurance reimbursement (57.4%), and lack of administrative support (53.7%). Most of the participants have a positive impression of the advantages of tele-urology. There was a statistically significant difference between the number of cases seen per week and positive total attitude score.

**Conclusions** Although most participants practiced telemedicine, many obstacles were highlighted through the study. Ignoring legal, ethical, personal, and patient issues may also jeopardize the future of telemedicine. Well-established health policies, formal education, and the implementation of regulated laws of telemedicine are fundamental.

**Keywords** Telemedicine, Urology practice, Social media, Tele-urology, Healthcare

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## Background

The adoption of telemedicine “medicine from a distance” across various fields with different applications had grown worldwide to improve healthcare delivery (Aceto et al. 2018). Telemedicine is defined as “uses information and communication technologies to promote health, provide medical care, exchange medical information, and educate healthcare providers and patients over long distances” (World Health Organization 2010). Teleurology is the incorporation of telemedicine to urologists’ daily practice of medical care, including education, tele-mentoring, telesurgery, and tele-robotics (Ayoub et al. 2022). Total lockdowns associated with pandemics, conflicts, and natural catastrophes can be overcome by proper application of telemedicine (Haleem et al. 2021). Telemedicine was not widely implemented or integrated into health systems in Egypt before the pandemic (Ghitani et al. 2019). The majority of urologists practice telemedicine on regular base particularly during and after the pandemic (Almannie et al. 2021). Urologist’s interest in telemedicine grew during the pandemic from 43.7 to 80.8% with 81% interested to continue using telemedicine in their practice (Dubin et al. 2020). Urologists started using tele-urology to overcome infection, facilitate patient’s remote consultation, and ensure the continuity of urological care and monitoring (Boehm et al. 2020). However, numerous challenges restricted them to practice. Numerous healthcare challenges exist, such as cost-effectiveness, ethical considerations, legal, medical liability, licensure difficulties, security, bandwidth, and latency (Ayoub et al. 2022). The crucial barrier is the absence of regulatory frameworks. Consequently, each physician would behave according to his own judgment. Moreover, the use of social media groups to manage patients resulted in violations of patients’ privacy, confidentiality, and informed consent (Ghitani et al. 2019; Elareed et al. 2023). Moreover, lack of physicians’ awareness of legal and ethical implications of remote consultations puts them into several malpractice issues (Kahan et al. 2022).

## Methods

This was a cross-sectional study recruiting a sample of urologists in Egypt, conducted from June 2022 to August 2022. The study aimed to assess urologists’ knowledge and attitude towards telemedicine and to explore any barriers preventing such practice in Egypt.

### Sample size

Sample size was calculated according to the following equation (an equivalent to Naing (2003)):

where:

$$\text{Sample size} = \frac{z^2 \times p(1-p)}{e^2} \div \left( 1 + \frac{z^2 \times p(1-p)}{e^2 N} \right)$$

$N$ = population size

$Z$ =1.96 (number of standard deviations a given proportion is away from the mean)

$p$ =an estimated prevalence of assurance practice among urologists=60%

$e$ =the margin of error (=width of confidence interval)=0.1

Sample size will be 92 physicians, and by adding 10%, the sample size was 101 urologists. A convenience sample has been gathered, and it was 108 participants.

## Study tools

The questionnaire consisted of four sections: *section 1*—sociodemographic data included age, gender, years of experience, current job position, medical training, workplaces, and previous encounters with a tele-urology tool; *section 2*—urologists’ knowledge and practice of tele-urology, purpose of using remote consultation, and urologists’ concerns regarding tele-urology; *section 3*—this section assessed the attitude towards tele-urology utilization; for this section, we adopted valid questionnaires from Biruk et al. (Biruk and Abetu 2018) who investigated urologists’ attitude towards telemedicine advantages (7 items), compatibility of telemedicine (four items), complexity of implementing telemedicine (5 items), and preference to try telemedicine systems (3 items); *section 4*—this was adopted from Dubin et al., investigating barriers and concerns to tele-urology use among urological patients (Dubin et al. 2020).

## Data collection

Data has been collected through an online self-administered questionnaire. The questionnaire had been validated for the study outcomes (Biruk and Abetu 2018). Egyptian urologists were targeted to participate via sharing google form through e-mails and direct messages. Research information was added to form header, and an informed consent was obtained by clicking the agree button to participate. After agreeing to take part in the survey, demographic information was initially presented, followed by the remaining questions.

This questionnaire was subjected to expert review and pilot testing ( $n=15$ ) to assess its content, structure, and language. Furthermore, the questionnaire was tested for reliability by the Cronbach’s alpha, and it had an acceptable internal consistency (Cronbach’s alpha = 76.7).

**Statistical analysis**

The Statistical Package for Social Sciences (SPSS) software version 23 (released by IBM Corp in 2015) was utilized in data coding and analysis (SPSS I 2015). Results were displayed as frequencies (*n*) and percentages (%) for categorical variables. A chi-square test was performed to assess the relationship between the variables, and correlation tests were conducted to examine the direction and magnitude of the relationship. The results were considered statistically significant if the *p*-value was less than 0.05.

**Results**

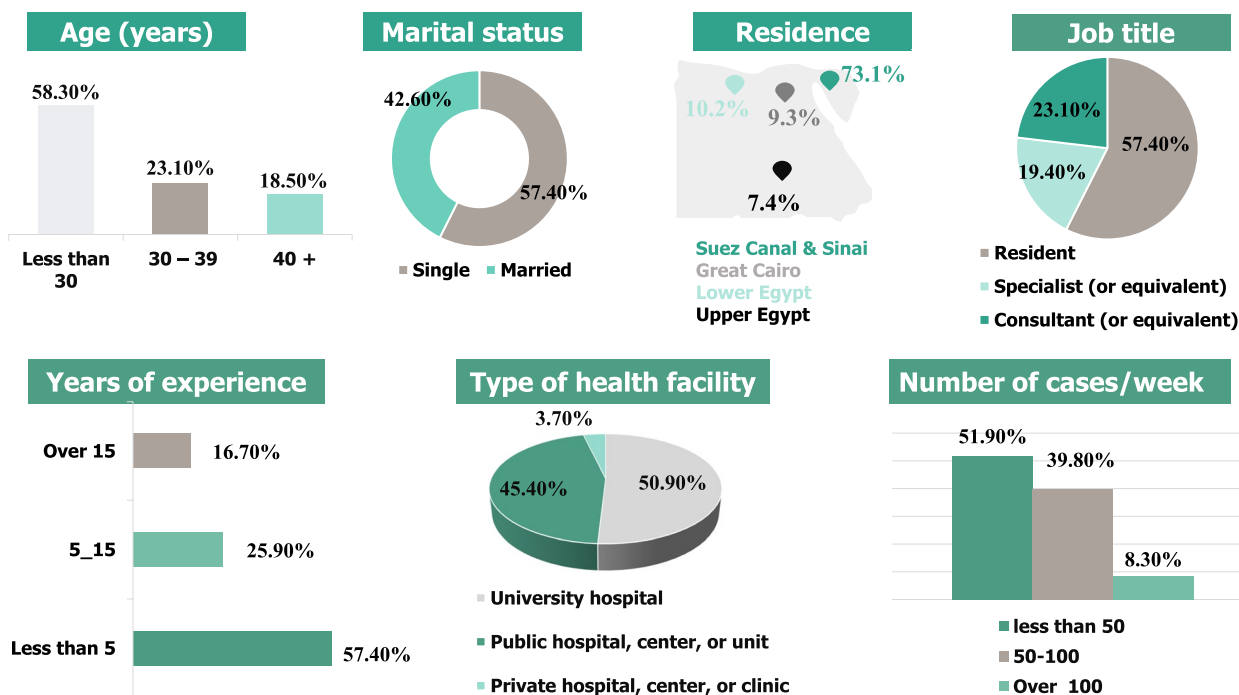
One hundred and eight Egyptian male urologists responded to our survey. A summary of the sociodemographic and occupational data is shown in Fig. 1.

All participants showed familiarity with the terms telemedicine and teleconsultation, and all have practiced at least one teleconsultation during their practice. Regarding sources of telemedicine knowledge, 67.6% of participants knew about it from scientific readings and 36.1% from attending scientific events. About 75.9% of participants used telemedicine modalities during COVID-19 pandemic. However, 66.7% of the participants did not receive formal training on the medicolegal aspects of using telemedicine techniques (Table 1). Nearly 61.9% of participants used personal accounts on social media for remote consultations, while only 4.7% stated that their

institutions provided a telemedicine-specific system. Audio modes were the most used single mode of communication (21.3%), and 53.7% utilized a combination mode. The majority of consultations were not emergency (62%). Regarding purposes of using remote consultation, 73.1% of teleconsultations were to assess radiological or laboratory data, and the least purpose was for drug prescription (18.5%) (Table 1).

Table 2 shows the attitude of urologists to the fundamental concepts of tele-urology. In general, urologists have a positive impression about the advantages of tele-urology. However, 39.8% of participants did not believe that tele-urology can reduce medical errors or improve clinical decision. Only 34.3% of urologists thought that tele-urology could be compatible with urology practice. Half of the participants, 50.9%, thought that using tele-urology fit well into their daily work. However, 58.3% of them believed that using tele-urology required a lot of mental effort, and 46.3% thought it would increase staff workload and thus add complexity to their daily work. More than 50% of participants have already observed the utility of a tele-urology system in their practices, while a comparable proportion favored an initial trial of it before formal institutionalization. Other participants' attitudes regarding the use of tele-urology are summarized in Table 2.

In Table 3, the majority of urologists (those who had more than 100 physical consultations per week) showed a



**Fig. 1** Sociodemographic and occupational characteristics of study participants (*n*=108)

**Table 1** Urologists' knowledge and practice of tele-urology ( $n = 108$ )

	Frequency (%)
<b>Evaluation point</b>	
Participants who were familiar with the terms: telemedicine, teleconsultation, and teleconference	108 (100.0%)
Practice of remote consultation (at least once)	108 (100.0%)
<b>Sources of information (multiple responses)</b>	
Social media	37 (34.3%)
Scientific events (conferences, workshops, courses)	39 (36.1%)
Experiences of other colleagues	39 (36.1%)
Scientific readings	73 (67.6%)
<b>Receipt of formal medicolegal training</b>	
Yes	36 (33.3%)
No	72 (66.7%)
<b>Mode of communications of telemedicine identified by participants (multiple responses)</b>	
Video	12 (11.1%)
Text-based	15 (13.9%)
Audio	23 (21.3%)
Combinations	58 (53.7%)
<b>Computer skills</b>	
Beginner	6 (5.6%)
Intermediate	83 (76.9%)
Advanced	19 (17.6%)
<b>First experience of telemedicine practice</b>	
Before COVID-19 pandemic	26 (24.1%)
During COVID-19 pandemic	82 (75.9%)
<b>Methods used for telemedicine practice (multiple responses)</b>	
Institutional telemedicine-specific system	3 (4.7%)
Commercial tools	2 (3.1%)
Personal account on social media	39 (61.9%)
Combinations	20 (31.3%)
<b>Type of telemedicine consultations</b>	
Emergency	41 (38.0%)
Non-emergency	67 (62.0%)
<b>Purposes of using remote consultation (multiple responses)</b>	
Drug prescription	19 (18.5%)
Clinical assessment	43 (40.7%)
Referral	50 (46.3%)
Arrange appointment	53 (49.1%)
Follow-up	60 (55.6%)
Peer consultation	61 (56.5%)
Assessment of radiological/laboratory reports	79 (73.1%)

Video = telemedicine facility, apps, video on chat platforms, Skype/FaceTime, etc

Audio = phone, VOIP, apps

Text-based = telemedicine chat-based applications or general messaging or chat platforms, e.g., WhatsApp, Google Hangouts, Facebook Messenger, etc

more positive attitude towards tele-urology applications. Hence, patients' factors were considered the major barrier to widespread use of tele-urology, i.e., lack of access or sufficient skills for tele-urology techniques. There was a statistically significant difference between the number of cases seen per week and positive total attitude score.

During teleconsultation, Table 4 showed 62% of urologists practicing tele-urology obtained verbal consent from the patient before the session, while 65.7% of them could reuse patients' data for other purposes (e.g., educational). Only one fifth of participating urologists thought that tele-consultations did not disturb physician's life.

**Table 2** Urologists' attitude regarding the use of tele-urology (n = 108)

Urologists' attitude towards tele-urology	No. (%) (endorsed)
<b>Relative advantage</b>	
Reduce medical errors	43 (39.8%)
Improve clinical decisions	43 (39.8%)
Facilitate diagnosis and treatment	56 (51.8%)
Provide more comprehensive health care services	62 (57.4%)
Enables me to accomplish my task more quickly	82 (75.9%)
Increase communication among health care providers	90 (83.3%)
Tele-urology can reduce the number of visits to health care centers	93 (86.1%)
Mean score $\pm$ SD (max. score)	25.2 $\pm$ 4.1 (35)
<b>Compatibility</b>	
In my opinion, tele-urology is compatible with all aspects of my work	37 (34.3%)
Tele-urology is completely compatible with my current situation	47 (43.5%)
I think tele-urology fits well with the way I like to work	54 (50.0%)
Using tele-urology fits well into my work style	55 (50.9%)
Mean score $\pm$ SD (max. score)	13.1 $\pm$ 3.2 (20)
<b>Complexity</b>	
Learning to operate tele-urology is hard for me	39 (36.1%)
I think tele-urology increases staff workload	50 (46.3%)
In my opinion, tele-urology threatens confidentiality and patient privacy	60 (55.5%)
I believe using tele-urology requires a lot of mental effort	63 (58.3%)
I think tele-urology creates new responsibilities for staff	76 (70.3%)
Mean score $\pm$ SD (max. score)	13.0 $\pm$ 3.4 (25)
<b>Trial ability</b>	
I do not have to take very much effort to try out tele-urology	44 (40.7%)
I believe, using tele-urology on a trial basis is enough to see what it could do	64 (59.3%)
I believe to try tele-urology applications is a great opportunity	74 (68.5%)
I would like to try out tele-urology applications before using it	74 (68.5%)
Mean score $\pm$ SD (max. score)	14.5 $\pm$ 2.5 (20)
<b>Observability</b>	
Tele-urology technology is very visible in the hospital where I work	50 (46.3%)
In the hospital, I see tele-urology technology being used for many tasks	57 (52.8%)
I have seen what other hospital staffs do with tele-urology technologies	60 (55.6%)
Mean score $\pm$ SD (max. score)	10.2 $\pm$ 2.3 (15)
<b>Mean total score <math>\pm</math> SD (max. score)</b>	<b>75.9 <math>\pm</math> 9.0 (115)</b>

Endorsed = responded with "agree" or "strongly agree"

About 80% of urologists concern of a possible malpractice in absence of physical consultation. Eighty five percent confirm concerns about confidentiality for patient's data. Furthermore, more than 70% have considerable concerns regarding keeping records of the tele-consultation session, lack of legal coverings of such practices, and risk of being blackmailed by the patients (Table 4).

## Discussion

Telemedicine and tele-urology are used to support patients and physicians by providing remote diagnosis, distant monitoring services, remote follow-up,

counseling, and health education (Almannie et al. 2021). Although the COVID-19 crisis has contributed to the globalization of telemedicine, Egypt and other underdeveloped countries are still relatively new to this field of digital health (Magdy et al. 2022). In the present study, 75% of participants practiced telemedicine during COVID-19 pandemic. Basically, participants practiced in unofficial ways, as 61.9% used personal accounts, while only 3.1% of them used commercial tools for remote consultation. This result is in line with a study that found that prior to COVID-19, 53.9% of the participants had never practiced telemedicine,

**Table 3** Relations between urologists' attitude toward tele-urology and their demographic and work-related characteristics ( $n = 108$ )

Features	Total attitude score (mean $\pm$ SD)	p-value
<b>Age (years)</b>		
Less than 30	76.4 $\pm$ 9.4	0.532
30–39	74.2 $\pm$ 9.2	
More than 40	76.6 $\pm$ 7.5	
<b>Lifestyle</b>		
Single	76.5 $\pm$ 9.4	0.438
Married	75.2 $\pm$ 8.5	
<b>Residence</b>		
Suez Canal and Sinai	75.5 $\pm$ 9.5	0.349
Great Cairo	79.2 $\pm$ 5.1	
Lower Egypt	78.4 $\pm$ 8.7	
Upper Egypt	72.8 $\pm$ 6.7	
<b>Job title</b>		
Resident	76.0 $\pm$ 9.2	0.889
Specialist (or equivalent)	76.6 $\pm$ 8.7	
Consultant (or equivalent)	75.3 $\pm$ 9.0	
<b>Years of experience</b>		
Less than 5	76.2 $\pm$ 9.4	0.155
5–15	73.5 $\pm$ 7.2	
More than 15	78.7 $\pm$ 9.7	
<b>Type of health facility</b>		
University hospital	77.2 $\pm$ 8.7	0.234
Public hospital, center, or unit	75.0 $\pm$ 9.4	
Private hospital, center, or clinic	70.8 $\pm$ 5.6	
<b>Computer skills</b>		
Beginner	74.5 $\pm$ 10.8	0.319
Intermediate	75.4 $\pm$ 8.4	
Advanced	78.7 $\pm$ 10.8	
<b>Number of cases seen per week</b>		
Less than 50	77.0 $\pm$ 8.9	<b>0.004*</b>
50–100	73.1 $\pm$ 7.9	
Over 100	83.1 $\pm$ 10.1	

\* Statistically significant two-sided  $p$ -value ( $< 0.05$ )

compared with 72.4% of them practicing after the pandemic (Almannie et al. 2021), indicating that the adoption of telemedicine by urologists has significantly increased after COVID-19 pandemic (Paesano et al. 2022). This is consistent with numerous research found that most used platforms for telemedicine were through phone calls and social media (Kahan et al. 2022; Magdy et al. 2022; Goel and Gupta 2020; Alboraie et al. 2022). In Egypt, 72.7% of them stated that they used online/phone consultations, and only 4.5% stated receiving formal consultation from official online medical service (Magdy et al. 2022). However, this unofficial and

**Table 4** Concerns and barriers of tele-urology practice ( $n = 108$ )

	No. (%)
<b>Concerns</b>	
Obtaining verbal patient's consent before consultation	67 (62.0%)
Reuse of patient data for educational purposes	71 (65.7%)
Legal issues regarding keeping records of consultation media (audio, video, or text)	77 (71.3%)
Risk of defamation or blackmailing	78 (72.2%)
Maintaining doctor-patient relationship during consultation	83 (76.9%)
Seeking consultation beyond work hours which may interfere with doctor's privacy and life	85 (78.7%)
Risk of malpractice	86 (79.6%)
Privacy and confidentiality of patient's information	92 (85.2%)
<b>Barriers</b>	
Lack of administrative support	57 (53.7%)
Secure transaction of consultation fees	57 (52.8%)
Insurance reimbursement concerns	61 (57.4%)
Legal concerns	66 (62%)
Patients lack access to technology	72 (66.7%)
Lack of clear regulations or laws	83 (76.9%)
Patient lack of technological skills	91 (84.3%)

non-organized communication is not well developed and carries the risk of medical malpractice.

Telemedicine comprehensive training is important for clinicians to enhance their digital health competencies in providing remote medical services (Khurana et al. 2022). However, the incorporation of telemedicine programs in the Egyptian medical undergraduate and postgraduate curriculum has been limited and not clear (Wahba et al. 2019). In the current study, 66.7% stated they had not received any formal training in tele-urology. This result is consistent with several studies that stated physicians participated in remote consultations without prior training (Elareed et al. 2023; Alboraie et al. 2022). Many studies recommended formal physicians' training and the development of optimum standardization for remote consultations in healthcare institutions (Magdy et al. 2022). Clearly, sufficient knowledge and training in tele-urology ethics and medico-legal issues can help fortify physicians' digital health competencies (World Health Organization. Telemedicine 2010; Alboraie et al. 2022). A recent study revealed that more than one third of physicians has not received any training in telemedicine even if they are having a telemedicine unit working at the Beni-Suef University Hospital (Elareed et al. 2023). Despite the potential benefits of telemedicine in Egypt, the current situation shows that the experience in telemedicine services is far from the standard, and there is a need for collaborative efforts from all stakeholders to improve the

implementation of appropriate training programs (Elareed et al. 2023).

Only one fifth of participating urologists think that tele-consultations did not disturb physician's life. It is proved that online consultation can lead to physician burnout (Demirel Ögüt et al. 2022). Despite the fact that social media and smartphones are feasible and fast ways to practice tele-urology, it carries many legal, ethical, and occupational burnout concerns that could endanger physician proficiency and patient rights (Demirel Ögüt et al. 2022).

In the present study, while the majority of urologists have a positive impression about the advantages of tele-urology, 34.3% of participants thought that tele-urology could be compatible with urology practice. Remote consultation should be compatible with the urologist clinical workflow and not add any additional task to the already burdensome clinical duties (Kissi et al. 2020). It is possible to improve the satisfaction, acceptance, and willingness to use telemedicine among urologists by enhancing the quality of services, adopting incentive measures, and protecting them from malpractice claims (Kissi et al. 2020). Continuous education, supportive programs, training, and regular conferences should be established to increase telemedicine service adoption and encourage physicians' satisfaction (Althumairi et al. 2022).

Seventy three percent of participants used teleconsultations to communicate radiological and laboratory data, and this finding was similar to the Square et al. study, which revealed 88% of participants used telemedicine to review the patients' reports and laboratory results without examination (Magdy et al. 2022). A study discovered that nearly all participants concurred that urological physical exams are challenging when utilizing telemedicine (Almannie et al. 2021). Absence of physical examination during teleconsultation was one of the most obvious remote consultation limitations (Miller et al. 2018). Clearly, the most appropriate indication for telemedicine consultations is when a physical examination is not critical and the primary goal of the consult is to review laboratory findings or evaluate response to therapy (Miller et al. 2018). Hence, the limitations of tele-urology in physical examination should be respected to prevent jeopardizing patients' safety.

Although tele-urology seems appealing and carries a lot of benefits, it is still confronted with many challenges and obstacles, especially in developing countries (Alboraie et al. 2022). Legal issues were identified as one of the most common barriers to remote consultation by 62% of participants in the current study. Many participants (76.9%) thought that a lack of clear telemedicine legal regulations was considered a crucial barrier hindering the successful tele-urology

implementation. A recent Egyptian study found that 77.3% of cardiologist thought there should be formal guidelines to guide the online consultation procedure (Magdy et al. 2022). In Egypt, healthcare professionals addressed the urgent need to practice remote consultation within a legal framework to ensure compliance with legal and medical licensing laws (Ghitani et al. 2019; El-Mazahy et al. 2023). The absence of a medical liability law in Egypt that regulates telemedicine raised demands to provide optimum guidelines for healthcare professionals. Online consultations are considered a violation of Article no. 8 and Article no. 15, according to list of professional ethics of the Egyptian Medical Syndicate (General Syndicate of Egyptian Doctors n.d.). Moreover, the development of regulatory frameworks and official licensure requirements is required and should be legalized and implemented to regulate the remote consultation process effectively (Ghitani et al. 2019; El-Mazahy et al. 2023).

Breach of data confidentiality, gathering patient consent, risk of malpractice, diagnostic errors, endangering patient's privacy, and absence of clear legal regulations were the most serious problems encountered in telemedicine implementation (Mahmoud et al. 2022). In the present study, privacy and confidentiality of patients' information were concerns for 85% of urologists, while 77% found that remote consultation maintains the doctor-patient relationship. Violation of patient privacy was concerned in several studies; Ashfaq et al. (2020) stated that 42.9% of participants believed that such mode of healthcare delivery disrupts the doctor-patient relationship and causes a violation of patient privacy (Ashfaq et al. 2020). A recent study found that 40.5% of healthcare workers believed tele-medicine threatens information confidentiality and patient privacy (Naqvi et al. 2022). Similarly, Anwar et al. reported that telemedicine threatens patients' confidentiality (35%), patients' privacy (37%), and 58% agreed that telemedicine increases the risk of medicolegal liability (Anwar et al. 2023). Ensuring patient privacy and confidentiality is a cornerstone to the successful implementation of tele-urology practice (Sharma et al. 2022). It is suggested that during an online consultation, the patient could use headphones or chat functions to safeguard his privacy. Additionally, private secure areas are preferred, such as isolated outdoor areas or restrooms, to enhance patient's privacy (Mishkin et al. 2023; Uscher-Pines et al. 2020). Additionally, providing private rooms in local telemedicine clinics should be also available (Mishkin et al. 2023). Furthermore, implementation of well-established regulatory policies from healthcare organizations is required to create a safe working climate for physicians and patients (Alboraie et al. 2022). Data protection, record integrity, and authorized access

to patients' electronic medical records are fundamental to secure patients' confidentiality (Sharma et al. 2022).

Telemedicine is considered complementary to traditional methods of diagnosis and treatment. Advancements made in the utilization of telemedicine were still insufficient, and certain individual, financial, technological, organizational, legal, and regulatory challenges were found to hinder the full utilization of telemedicine services (Al-Samarraie et al. 2020). Numerous effective strategies for telemedicine development and implementation in Egypt are necessary, such as developing proper legislative, licensure, and administrative frameworks that regulate telemedicine via approved platforms and applications in accordance with medicolegal laws (Al-Samarraie et al. 2020). Implementation of well-established regulatory policies from legal authorities is required to create a safe working climate for healthcare workers (Alboraie et al. 2022). In addition, it is fundamental to develop and implement remote consultation programs aimed at continuous healthcare professionals training (Anwar et al. 2023; Al-Samarraie et al. 2020).

### Strengths and limitations

One important strength point in the study is that we have focused on a single specialty, and that would reduce the influence of variable patterns of practice related to different specialties. We have covered physicians with different levels of experience and from different backgrounds, and that supports diversity and enforces the reliability of our insights. On the other hand, the influence of formal or institutional telemedicine systems were poorly represented because of the rarity of such systems in Egyptian hospitals. The use of self-reported questionnaire may be biased by recall bias. Additionally, the dependence on a convenience sample might affect the generalizability of the results.

### Conclusions

Advancement of digital health highlighted tele-urology significance in protecting patients and healthcare providers by reducing unnecessary clinical visits and viral transmission. Ignoring legal, ethical, personal, and patient issues may also jeopardize the future of tele-urology. Well-established health policies and implementation of regulated regional laws of telemedicine are fundamental. Proper integration of telemedicine education is essential to improving healthcare digital competency. Further research articles can help uncover just how beneficial and affordable telemedicine can be.

### Abbreviations

COVID-19	Coronavirus disease of 2019
SPSS	Statistical Package for Social Sciences
VOIP	Voice Over Internet Protocol

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### Authors' contributions

Conceptualization the study, EAI, SAS, MDG, AMB; methodology, EAI, SAS, AMB; resources, SAS; data collection, EAI, MDG, AMB; formal analysis, AMF; visualization, SAS; writing—original draft preparation, EAI, SAS, AMB; writing—review and editing, EAI, SAS, AMF, MDG, AMB; all authors read and approved the final manuscript.

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### Availability of data and materials

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

### Declarations

#### Ethics approval and consent to participate

The study was approved by the Ethics Committee of the Faculty of Medicine, Suez Canal University, Egypt (reference number is #4886:22/5/2022), in accordance with the Helsinki Declaration. Clicking an agreement button on the information page, besides the completion of the questionnaire, indicated the participants agreed and consented to participate in the study. An anonymous questionnaire was used throughout data processing to ensure data confidentiality.

#### Consent for publication

Not applicable.

#### Competing interests

The authors declare that they have no competing interests.

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