Original Article

# "Tele-urology": Is the COVID-19 pandemic a wake-up call?

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## Abstract

**Background:** The purpose of this research is to measure the current use of telemedicine technologies among urologists, their readiness to adopt the same, and to assess the barriers preventing such usage.

**Methods:** Two hundred and twenty eight board-certified urologists completed our self-designed survey. An analysis was done to assess the increase in the use of telemedicine and the urologists' telemedicine experience responses. Data analysis was done using SPSS software.

**Results:** There has been a tremendous increase in the use of telemedicine among urologists during the coronavirus disease (COVID-19) pandemic. Most of the respondents of this study performed general urology as part of their daily practice (59.6%). Prior to the pandemic, 53.9% of the participants had never used any means of telemedicine. However, during the pandemic, 72.4% of urologists who had never used telemedicine began using the same. Almost all of the respondents agreed that physical examination is difficult when using telemedicine, which resulted in the highest mean value among the questionnaire items. Urologists below 35-year-old agreed, to a larger extent, that telemedicine saves them more time and is simple to use than urologists from other age groups.

**Conclusion:** During the COVID-19 pandemic, most urologists adopted telemedicine technology rapidly. Adopting telemedicine in the future could have multiple advantages. However, the limitations of telemedicine should be respected in order to avoid compromising patient safety.

**Keywords:** Pandemic, Saudi Arabia, telemedicine, urology

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## INTRODUCTION

While there are many variations of the definition of telemedicine, it is generally defined as "medicine from a distance." Given the tremendous advancements in the quality of real-time, interactive, audio-visual, and digital technologies, as well as impressive gains in internet speed and capacity, the development of telemedicine is happening faster than we can grasp.[1] Telemedicine, which is not a new concept, was made famous in 1999 when physician Jerri Nielsen found a lump in her breast while on a research assignment in Antarctica. Due to her geographic location as well as the weather conditions, the diagnosis and treatment of her breast cancer were done via a satellite connection and video equipment, and the chemotherapy drugs were dropped at her location.[2]

Telemedicine is currently used across multiple fields and in different applications. Psychiatrists use it in case

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of emergencies, while pediatric surgeons use it to offer assistance to centers that do not have specialized surgeons.[3] In the field of urology, pediatric urologists spearheaded the use of telemedicine, which was utilized in postoperative care and for providing expertise to other institutions.[4-6]

Since the announcement of the coronavirus disease (COVID-19) pandemic, the main aims for urologists were: preventing their patients from getting COVID-19, protecting themselves as health-care professionals, and delivering optimal and safe urologic care.[7] Many urological patients have risk factors which would increase the likelihood of poor outcomes from COVID-19. Furthermore, the implementation of telemedicine consultations have become a necessity in order to provide contact-free continuity of care.[8] Although the use of telemedicine has widely been imposed during the present pandemic, it should be assessed as a means of improving health care even during times of ease.

We aim to test the application and experience of urologists with telemedicine during the COVID-19 pandemic, which may provide insights for future applications.

## METHODS

A self-designed questionnaire was sent to board-certified urologists in Saudi Arabia through E-mail in June 2020. The questionnaire included three main sections: demographic data (gender, age, health-care setting, subspecialty, and years of practice); an evaluation of the change in use of telemedicine before and during the pandemic; and the respondent's telemedicine experience if they utilized telemedicine during the pandemic. The third section contained 10 statements which were scored on a 5-point Likert scale, with 5 being "very important" and 1 being "unimportant."

Data analysis was done through SPSS Version 23 (IBM Corp. Released 2015. version 23.0. Armonk, NY, USA: IBM Corp.). McNemar's test was used to investigate the increased utilization of telemedicine compared to before the pandemic. The McNemar–Bowker test was used to check whether the percentages of clinic appointments done through telemedicine changed prior to and during the pandemic. An analogs analysis was performed to compare telemedicine outpatient visits prior to and during the pandemic based on the age groups of physicians and their years of practice.

An independent samples *t*-test was used to compare the answers to the 10 items regarding telemedicine usage experience of urologists who used telemedicine both prior to and during the pandemic, and urologists who started using telemedicine during the pandemic. A Mann–Whitney U test was used in item 6 of the same section due to the lack of homogeneity. Finally, a one-way analysis of variance (ANOVA) was done to compare the results of the telemedicine usage experience questionnaire based on the physician's age and years of practice. A Kruskal–Wallis test was used for items 3 and 10 of the same section when comparing based on years of experience due to the violation of ANOVA.

King Saud University's College of Medicine institutional ethics board approval was obtained, and informed consent was obtained from the urologists participating in the questionnaire.

## RESULTS

### Demographic profile

A total of 228 board-certified urologists responded to the questionnaire. Most of the respondents were male (99.1%). The most common age group was 40–50-year-old (36.8%). Majority of the respondents performed general urology as part of their daily practice (59.6%). On the other hand, neuro-urology was the least common subspecialty practiced by the respondents (0.9%). Most of the respondents worked in the Ministry of Health (43%), followed by private practice (33.3%). Half of the respondents had more than 10 years of experience in their respective fields. The demographic profile of the respondents is presented in Table 1.

### Use of telemedicine prior to and during the pandemic

Prior to the COVID-19 pandemic, 53.9% of the participants had never used any means of telemedicine. However, during the pandemic, 72.4% of urologists who had never used telemedicine started using telemedicine platforms. A statistically significant difference in the use of telemedicine prior to and during the pandemic was identified in three age groups: under 35-year-old ($P = 0.031$), 35–40-year-old ($P < 0.001$), and 40–50-year-old ($P < 0.001$). When repeating the same comparison of urologists according to years of practice, a statistically significant change was observed in the following groups: less than 5 years of practice ($P < 0.001$), 5–10 years of practice ($P = 0.001$), and more than 10 years of practice ($P = 0.011$).

### Telemedicine in the outpatient department

When comparing the total percentage of appointments done through telemedicine platforms prior to and during the pandemic, there was a statistically significant increase in

**Table 1: Demographic profile of respondents**

| Variable/group | *n* (%) |
|---|---|
| Gender | |
| Female | 2 (0.9) |
| Male | 26 (99.1) |
| Age | |
| <35 | 12 (5.3) |
| 35-40 | 44 (19.3) |
| 40-50 | 84 (36.8) |
| 50-60 | 63 (27.6) |
| >60 | 25 (11.0) |
| Subspecialty | |
| Andrology/sexual medicine | 76 (33.3) |
| Endourology | 79 (34.6) |
| Female urology | 18 (7.9) |
| General urology | 136 (59.6) |
| Kidney transplant | 12 (5.3) |
| Minimally-invasive urologic surgery | 43 (18.9) |
| Neuro-urology | 2 (0.9) |
| Pediatric urology | 48 (21.1) |
| Reconstructive urology | 27 (11.8) |
| Urologic oncology | 41 (18.0) |
| Hospital | |
| General organization | 3 (1.3) |
| Military hospital | 42 (18.4) |
| MOH | 98 (43.0) |
| Private sector hospital | 76 (33.3) |
| University hospital | 47 (20.6) |
| Other health-care settings | 4 (1.8) |
| Practice (years) | |
| <5 | 69 (30.3) |
| 5-10 | 45 (19.7) |
| >10 | 114 (50.0) |

MOH: Ministry of health

the use of telemedicine for outpatient services ($P < 0.001$). However, when age was considered, we found a statistically significant change in the use of telemedicine in only two age groups: 35–40 year-old ($P = 0.002$), and 50–60-year-old ($P = 0.006$).The same analysis was done based on years of practice, and a statistically significant change was present in all categories: less than 5 years of practice ($P < 0.001$), 5–10 years of practice ($P = 0.001$), and more than 10 years of practice ($P = 0.001$).

## Telemedicine usage experience questionnaire

Most of the respondents (41.5%) reported using phone calls as the platform for telemedicine in their practice, followed by Zoom (32.7%). Platforms used in Telemedicine are represented in Figure 1. In addition, most of the respondents answered "strongly agree" and "agree" when asked whether "physical examination is difficult using telemedicine methods," with a mean score of 4.53 out of 5. The telemedicine usage experience items, their mean scores, and standard deviation (SD) are presented in Table 2. The respondents were categorized into two groups: group 1 started using telemedicine only after the pandemic, and Group 2 used telemedicine prior to and during the pandemic. Group 2 agreed that telemedicine is "simple to use" (Median = 4.25, Mean = 4.00, SD = 0.70) to

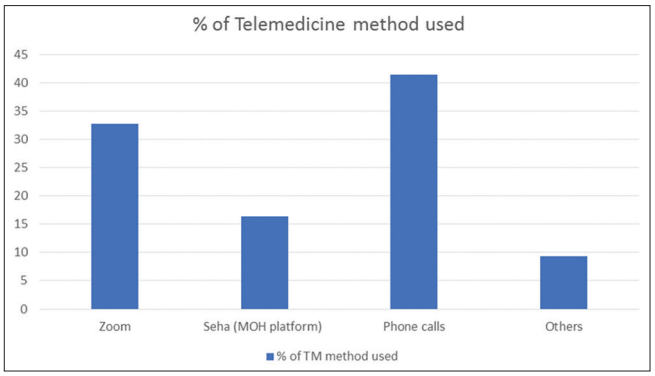


**Figure 1:** Telemedicine platforms used

a significantly higher extent than Group 1 (Median = 3.75, Mean = 4.00, SD = 0.98). Similarly, Group 2 agreed to a significantly higher extent that telemedicine is easy to learn (Median = 4.40, Mean = 4.00, SD = 0.57) compared to Group 1 (Median = 4.06, Mean = 4.00, SD = 0.78) [Table 2].

When comparing telemedicine usage experience responses based on age, only marginal results emerged for items 3 and 7 despite the significant ANOVA result. However, with regard to item 4 ("I can see more patients using telemedicine relative to clinic visits"), participants aged <35 (Median = 4.09, SD = 1.45, Mean = 5.00) scored significantly higher than those aged 35–40 (Median = 3.00, SD = 1.00, Mean = 3.00, $P = 0.036$) and those aged more than 60 (Median = 2.67, SD = 0.78, Mean = 2.50, $P = 0.018$). A similar pattern emerged for item 5 ("telemedicine will save me more time,") wherein respondents aged <35 (Median = 4.45, SD = 0.82, Mean = 5.00) agreed that telemedicine will save them more time to a higher extent than respondents aged 35–40 (Median = 3.11, SD = 1.08, Mean = 3.00, $P = 0.004$) and those aged more than 60 (Median = 3.17, SD = 1.12, Mean = 3.00, $P = 0.048$).

As for item 6 ("it is simple to use telemedicine,") the participants aged <35 (Median = 4.73, SD = 0.47, Mean = 5.00) agreed more strongly than those aged 40–50 (Median = 3.88, SD = 0.98, Mean = 4.00, $P = 0.023$) and more than 60 (Median = 3.25, SD = 0.97, Mean = 3.50, $P < 0.001$). Additionally, the respondents aged 50–60 (Median = 4.13, SD = 0.73, Mean = 4.00) agreed with the same item more strongly than those aged more than 60 (Median = 3.25, SD = 0.97, Mean = 3.50, $P = 0.015$).

Finally, the participants aged <35 (Median = 4.27, SD = 0.91, Mean = 5.00) scored significantly higher on item 8 ("I prefer interacting with patients through telemedicine") compared to those aged 35–40 (Median = 3.11, SD = 0.88,

**Table 2: Telemedicine usage questionnaire**

| Items | Mean | SD | Group 1 versus Group 2 | | Age groups | | Years of experience | |
|---|---|---|---|---|---|---|---|---|
| | | | *t*/U | *P* | *F* | *P* | *F*/U | *P* |
| 1. I am interested in continuing to use telemedicine in my clinic appointments after the COVID-19 pandemic | 3.81 | 1.002 | −1.85 | 0.067 | 1.80 | 0.133 | 1.40 | 0.250 |
| 2. Telemedicine is a cost-effective substitute for in-person consult | 3.79 | 0.977 | −1.19 | 0.235 | 1.63 | 0.168 | 0.18 | 0.840 |
| 3. Telemedicine improves patients' access to me | 3.71 | 0.962 | −1.45 | 0.149 | 3.57 | 0.008 | 9.79 | 0.007 |
| 4. I can see more patients using telemedicine relative to clinic visits | 3.26 | 1.104 | 0.31 | 0.760 | 3.35 | 0.012 | 1.97 | 0.143 |
| 5. Telemedicine will save me more time | 3.48 | 1.113 | 0.00 | 0.998 | 3.78 | 0.006 | 0.76 | 0.471 |
| 6. It is simple to use telemedicine | 3.96 | 0.88 | 2159.0 | 0.001 | 5.05 | 0.001 | 1.56 | 0.213 |
| 7. It was easy to learn to use telemedicine | 4.2 | 0.716 | −3.07 | 0.003 | 2.79 | 0.028 | 2.17 | 0.117 |
| 8. I prefer interacting with patients through telemedicine | 3.32 | 1.009 | −0.68 | 0.496 | 3.43 | 0.010 | 0.11 | 0.895 |
| 9. Using telemedicine, i can see the patient as well as if we met in person | 2.91 | 1.091 | −1.35 | 0.180 | 2.03 | 0.092 | 6.21 | 0.002 |
| 10. Physical examination is difficult using telemedicine methods | 4.53 | 0.769 | −0.22 | 0.829 | 0.92 | 0.455 | 3.58 | 0.167 |

SD: Standard deviation, COVID: Coronavirus disease

Mean = 3.00, *P* = 0.007), 40–50 (Median = 3.28, SD = 1.01, Mean = 3.00, *P* = 0.022) and more than 60 (Median = 3.00, SD = 1.04, Mean = 3.00, *P* = 0.022) [Table 2].

Another comparison of the telemedicine usage experience questionnaire was done based on the physicians' years of experience through ANOVA and a Kruskal–Wallis test for items 3 and 10, due to violation of ANOVA. Regarding item 3 ("telemedicine improves patients' access to me,") the participants with 5–10 years of experience (Median = 3.31, SD = 1.09, Mean = 3.00) agreed that telemedicine improves patient access to a significantly lower extent than participants with more than 10 years of experience (Median = 3.94, SD = 0.80, Mean = 4.00, *P* = 0.006). Additionally, respondents with 5–10 years of experience (Median = 2.39, SD = 1.13, Mean = 2.00) scored significantly lower on item 9 ("using telemedicine, I can see patients as well as if we met in person") compared to respondents with more than 10 years of experience (Median = 3.14, SD = 1.10, Mean = 3.00, *P* = 0.002) [Table 2].

## DISCUSSION

Since COVID-19 was first reported in Wuhan, China in December 2019, the COVID spread rapidly worldwide.[9] On the January 30, 2020, the World Health Organization declared a public health emergency of international concern.[10,11] On the March 02, 2020, Saudi Arabia announced its first case of COVID-19.[12] On the August 16, the number of confirmed cases in Saudi Araba reached around 300,000.[13] A major measure that has been implemented to control the spread of the disease is telemedicine, which was intended to enable the continuity of consultations and follow-ups while maintaining physical distancing through virtual clinics.[14]

In the present study, half of the participants had never used any means of telemedicine prior to the pandemic. However, of those who had never used telemedicine, 72.4% started utilizing telemedicine during the pandemic. Consequently, the total percentage of urologists who had experience with telemedicine rose to over 85%. Similarly, data from Italy showed the rapid adoption of telemedicine, where most appointments were either done using telemedicine platforms or canceled altogether. A small portion of face-to-face visits (<10%) were preserved mostly for suspected malignancy or potentially life-threatening conditions.

Our results show a significant increase in the utilization of telemedicine in outpatient settings during the pandemic. This is consistent with local and global recommendations regarding the use of telemedicine for urological care during the COVID-19 crisis. Connor *et al*. concluded that pandemics pose a challenge to everyone involved in the delivery of healthcare, and that utilizing a targeted virtual clinic approach will keep the pathway moving for patients with high-risk urological malignancies and enable urologists to resume services in an improved position.[15] Moreover, Larson *et al*. demonstrated that telemedicine intervention in cancer patients is comparable with face-to-face interaction insofar as quality of life is concerned.[16] Thus, telemedicine appears to be a solution that offers contact-free continuity of care during the COVID-19 pandemic as well as any other crisis.[17]

We found that most used platforms for telemedicine were through phone calls and Zoom. In the United States, all telemedicine platforms prior to the pandemic had to adhere to strict health insurance portability and accountability act (HIPAA) technical specifications. However, during the pandemic, the emergency provisions of the law allowed for the use of non-HIPAA compliant platforms.[8] In the United Kingdom, the use of electronic health records within the National Health Service (NHS) enabled the delivery of virtual clinic consultations within

the NHS.[15] The circumstances of the present pandemic could introduce an opportunity to establish telemedicine platforms which can uphold patients' privacy standards and utilize better methods of conveying data.

When comparing responses based on age groups, we found that urologists younger than 35 agreed more with the following: they preferred interacting with patients through telemedicine, they can see more patients using telemedicine, telemedicine saves more time, and telemedicine is simple to use [Table 2]. This could be due to the easier adaptation of technology among younger physicians. However, more than half of the respondents of all groups agreed that telemedicine saves more time. According to Calton *et al*., patients who receive palliative care through telemedicine are typically very satisfied with the convenience and time-saving nature of care provided via video call. Telemedicine has been found to save valuable drive-time for home-visiting palliative care clinicians and increases capacity at brick-and-mortar clinics.[18] Furthermore, the preliminary data of Viers *et al*. suggests that telemedicine has the potential to reduce costs and travel time for patients, improve patient satisfaction, and facilitate quality care for complex patients.[19]

Our data showed that most urologists agree with the statement that telemedicine is a cost-effective substitute for in-person consults [Table 2]. However, a systemic review of the cost-effectiveness of telemedicine concluded that data on this topic remains inconclusive.[20] Miller *et al*. stated that practitioners in states with lower reimbursement may be unmotivated to implement telemedicine in their practice given the expense and time associated with obtaining the hardware and software required for connectivity.[3]

Almost all respondents agreed that physical examination is difficult when using telemedicine, which resulted in the highest mean value among the questionnaire items [Table 2]. This result was expected and is supported by the literature. When discussing telemedicine, Miller *et al*. stated that the most obvious limitation thereof is physical examination, as providers must rely primarily on sight and sound. Hence, they suggested that the most appropriate setting for telemedicine consultations is when physical examination is not critical, and the primary goal of the consult is to review a test result or evaluate a response to therapy.[3]

## CONCLUSION

Many studies revealed that telemedicine is safe, equivalent to face-to-face consultations, time-saving, and likely to be cost-effective.[15,21] It could be utilized in screenings or for follow-up visits which do not require physical examination.[22] Furthermore, close monitoring of a patient's clinical progression is achieved by telehealth, which has a low threshold for additional evaluation.[23] However, the implementation of telemedicine is still full of challenges, and requires patience, persistence, and the ability to remain positive.[1] The COVID-19 pandemic has forced many urologists to use telemedicine, and our results show that it has generally been met with positive feedback. Therefore, implementing the use of telemedicine when the pandemic is over should be considered due to its many benefits. Nonetheless, more studies with regard to patient perspectives are also needed. However, the limitations of telemedicine should be respected to avoid compromising patient safety.

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## Conflicts of interest

There are no conflicts of interest.

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