

## ORIGINAL RESEARCH

# The Impact of the First Covid 19 Pandemic on Urology Residency Training in Iran

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**Abstract:** **Introduction:** During the pandemic, Iranian healthcare system had faced many challenges including the continuation of medical education. In this time, almost all elective surgeries have been suspended, outpatient visits have been limited to seriously ill patients, and academic meeting have been cancelled. This process has caused a significant decrease in clinical and surgical practice in the field of urology. In this article, we assess as to what extent and how this pandemic has impacted the urology residency training in Iran. **Methods:** A 15-item-long questionnaire was designed and sent to all Iranian urology residents via social network and/or email from the 10th of MAY to the 10th of Jun 2020. This questionnaire assessed different training activities, including on-call duty, outpatient visits, diagnostic procedures such as cystoscopy, endoscopic procedures, and open major surgeries, prior and during the pandemic. The results were evaluated using t-test and ANOVA. **Results:** The percentage of urology resident's involvement in each training activity, including on-call duty, outpatient visits, diagnostic procedures such as cystoscopy, endoscopic procedures, and open major surgeries, demonstrated a significant decline ( $p < 0.001$ ) during this time compared to the pre-COVID-19 period. **Conclusion:** Urology residency training significantly decreased during the COVID-19 period. In order to address the second and third waves of COVID-19 outbreak, long-term action plans, such as telemedicine and stimulation, can help prepare training programs and residents during these unprecedented times.

**Keywords:** COVID-19, Residents, Training, Urology

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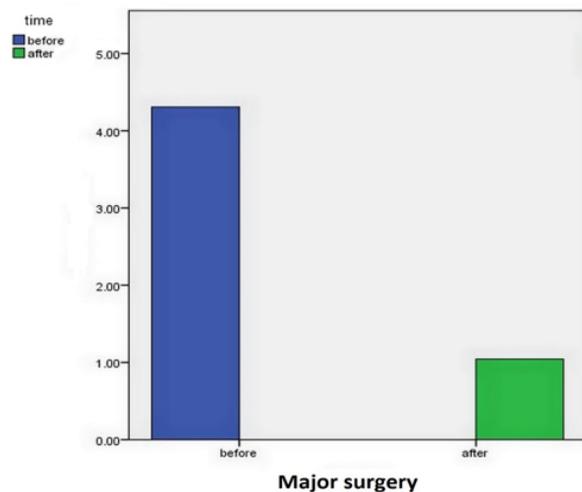
## 1. Introduction

The first case of highly contagious pneumonia caused by COVID-19 (Coronavirus disease 2019) was reported in China In December 2019 [1]. Subsequently, due to the rapid spread of COVID-19 in a short period of time, the healthcare systems faced the surge of patients world-wide [2]. Eventually, COVID-19 was confirmed a pandemic by the World Health Organization (WHO) on March 11, 2020 [3]. Healthcare systems throughout the world face the greatest challenge caused by COVID-19. Addressing this challenge required strong steps to divert healthcare resources for the treatment of patients with COVID-19. Therefore, unprecedented measures like the suspension of all elective surgeries [4] were taken to

limit the spread of COVID 19 [4, 5]. All surgical fields including urology try to prioritize their surgical procedures and limit inpatient and outpatient services to critically ill patients [6, 7]. Furthermore, all undergraduate teaching activities (for residents and undergraduates) were converted to online platforms in response to the COVID-19, to facilitate social distancing [8]. In addition to the significant decrease in surgical and clinical practice, in-person conferences have been cancelled and residency exams are being rescheduled [9]. This process had led to a significant decrease in clinical and surgical activities in the field of urology during this period. Our purpose is to assess clinical practice and education of urology residents in Iran during the COVID-19 outbreak, and to provide comments as to what extent and how this pandemic has impacted the urology residency training in Iran.

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**Figure 1:** Significant difference regarding diagnostic procedure in COVID-19 period compared to the pre-pandemic period. (Hdiag=diagnostic procedure).

## 2. Material and methods

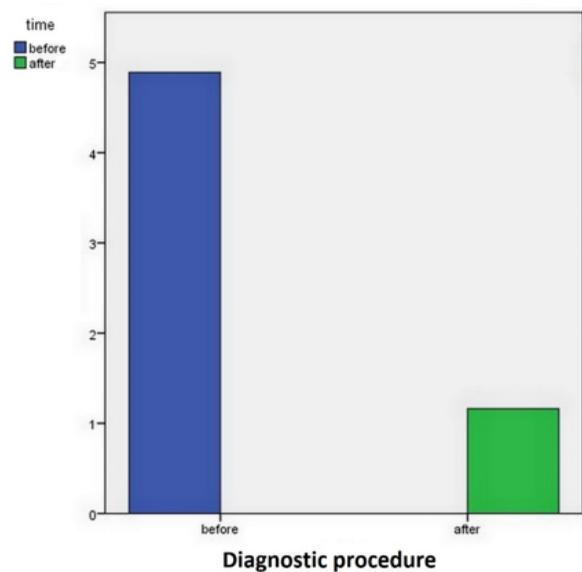
We developed a 15-item-long questionnaire that was sent to all Iranian urology residents by social network and/or email from the 10th of MAY to the 10th of Jun 2020. Our proposal was approved by the ethical committee in the Shahid Beheshti University of Medical Sciences. (Ethical code: IR.SBMU.RETECH.REC.1399.173).

the questionnaire comprised an introduction section followed by demographic information. Then, open-ended questions about the weekly numbers of clinic and emergent patient visits as well as elective (minor and major) and endoscopic surgeries during (from the 4th of march 2020 to the 20th of April 2020) and before the pandemic (from the 10th of January 2020 to the 3rd of march 2020).

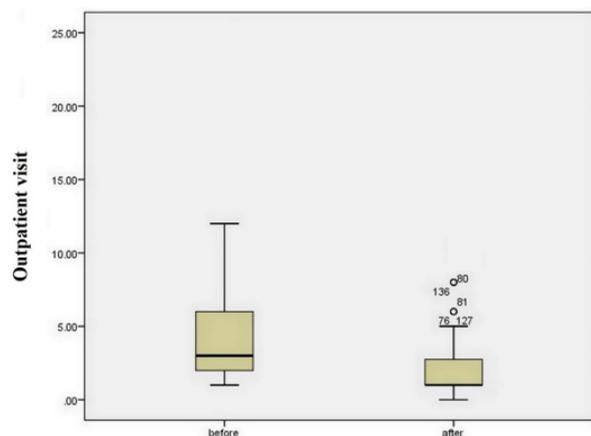
Demographic data included center of training, gender, age, and residency year. For the purpose of this study, residents were asked to evaluate their mean time involvement in different training activities per week prior and during COVID-19, including on-call duty, outpatient visits, diagnostic procedures such as cystoscopy, endoscopic procedures, open major surgeries), and probable differences across residency years regarding both baseline involvement in each activity and proportions of residents experiencing decrease in such activities during covid 19 period were evaluated using t-test and ANOVA.

## 3. Results

Overall, 69/140 residents from 14 centers responded. 4 centers contributed the most to our survey (59.4% of responders). 63 of all responders were male. The percentage of responders attending the first, second, third, and final year



**Figure 2:** Distribution of major surgery during the pandemic compared to the pre-COVID-19 period (Hmajor=major surgery).



**Figure 3:** Significant difference regarding outpatient visits during the pandemic compared to the pre-COVID-19 period. (hv=outpatient visit).

were 23.2%, 29%, 27.6%, and 20.2%, respectively. This figure represents 49.2% of all eligible urology residents for training. No difference was found between responders regarding age, year of residency.

Prior to the pandemic, the mean time for which urology residents were involved in on-call duty, outpatient visit, diagnostic procedure, endoscopic procedure, and open surgery were  $12.45 \pm 4.5$ ,  $5.26 \pm 5.1$ ,  $4.89 \pm 4$ ,  $4.23 \pm 3.9$ , and  $4.3 \pm 3.3$  hours per week, respectively. While, the percentages of urology residents involvement in each training activity during the pandemic are  $6.9 \pm 5.4$  hours per week for call duties, which showed 43.5% decline,  $2.8 \pm 4.4$  hours for outpatient visit per week, which showed 45.4% decline (figure 3),  $1.16 \pm 1.1$  hours

for diagnostic procedure per week which showed 76.07% decline (figure 1), 1.37±3.1 hours for endoscopic procedure per week which showed 75.6% decline, and 1.04±1.7 hours per week for open surgery which showed 74.4% decline (figure 2). All of these parameters showed significant decline ( $p<0.001$ ) during the pandemic compared to before the outbreak.

The residents' involvement in each activity by year of training in the pre-pandemic period and proportion of their activity during this time are as follow; there was no significant difference across residency years regarding the proportion of residents routinely involved in on-call duty, outpatient visit and diagnostic procedure. First year residents were highly involved in only on-call duties and outpatient visits (14.59 and 4.56 hours per week); beyond these activities, second year residents were highly involved in diagnostic procedures (5.93 hours a week); third year residents were mostly involved in endoscopic (3.42 hours a week) and open major surgeries (3.86 hours a week); and fourth year residents were highly involved in all the activities mentioned above.

During the pandemic, there was a significant difference between first year and senior residents (third and fourth year residents) regarding the proportion of residents routinely involved in on-call duty (11.1 hour v. 4.7 hours a week,  $P=0.001$ ), but there is no significant difference across years of training in the proportion of residents who involved in outpatient visits, diagnostic procedures ( $p=0.5$ ), endoscopic procedures ( $p=0.9$ ), and open surgery ( $p=0.97$ ), going from the first to the final year.

First year residents did not experience any significant impairment in their activities ( $p=0.2$ ), while 2nd, 3rd, and final year residents' trainings were significantly affected ( $p<0.0001$ ).

## 4. Discussion

The Iranian healthcare system suffered from significant strain caused by the recent pandemic [10]. To address this challenge, several methods have been deployed to divert healthcare resources for the management of COVID-19 patients. These include, but are not limited to, the cancellation of elective surgeries, redeployment of urology and other residents to "frontline services," and the increased use of telemedicine. Additionally, in-person academic conferences have been cancelled to enforce social distancing. We sought to characterize urology resident education and clinical practice. Our study showed that urology practice was significantly affected through on-call duty, outpatient visits, diagnostic procedures, endoscopic procedures, and open major surgeries. Therefore, exposure of Iranian residents to both clinical and surgical training activities decreased during this time. Performing surgery is an important factor of urology residency education. However, upon the start of the pandemic, there was a sharp decline in operative volume and participa-

tion of residents in operations per week [9, 11]. Senior residents reported higher levels of worries regarding their training in the operation room [2]. Reduction of diagnostic procedures as well as endoscopic and open surgeries, can be explained by deferring these non-emergent procedure and surgeries to decrease exposure of medical personnel to the virus, and facilitate social distance. Many departments issued different protocols for surgical triage [12]. With a lack of cases for surgery, there may be a role for at-home surgical simulation. Virtual reality simulators at hospital and home laparoscopy box trainers have been used to train residents in important surgical skills for open, endoscopic, laparoscopic, and robotic procedures [13, 14]. While these simulations are not ideal learning examples for live surgeries, they may allow residents to maintain their technical skillset.

Outpatient clinic visits are one of the tasks performed by urology residents which have educational benefit. There has been a sharp decline in outpatient visits by urology services since the onset of the pandemic. The use of strategies like telemedicine is mandatory to keep exposure of residents to these activities, therefore, telemedicine platforms for patients who do not need physical examinations should be encouraged [15]. Given the reasonable probability that increased telehealth usage will continue after the pandemic, urology residents would be likely to take advantage of telemedicine training. Although there are no studies about the incorporation of telemedicine into urology residency curriculum, a few studies have reported telemedicine clinics for urologic conditions is feasible and beneficial [16-19].

As urology resident has been "redeployed to a frontline COVID-19 service", most commonly to the ICU, medical floors, and emergency rooms, they have received the unique opportunity to enhance their exposure to other services that can improve their medical knowledge base outside of urology and in other fields such as health policy [20, 21].

Given the indefinite duration of this pandemic, and the likelihood of multiple waves of infection, [21] long-term plans can help residency training programs during these unprecedented times.

Our study has some limitation. The suspension of surgical procedures due to COVID-19 is partly coincident with Iranian holiday due to Nowrouz holidays. The residents were asked to compare this period with the period which surgical procedure was not suspended.

## 5. Conclusion

Our study showed that urology practice has been significantly affected by the recent pandemic, in areas such as on-call duty, outpatient visits, diagnostic procedures, endoscopic procedures, and open major surgeries. Regarding the possibility of second and third waves of infection, long-term



action plans can help prepare training programs and residents during these unprecedented times.

## 6. Appendix

### 6.1. Acknowledgements

None.

### 6.2. Author contribution

All the authors have the same contribution.

### 6.3. Funding/Support

None.

### 6.4. Conflict of interest

The authors declare that there is no conflict of interests regarding the publication of this paper.

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