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How did The COVID-19 Pandemic Affect Urology Outpatient Clinic Applications?

COVID-19 Pandemisi Üroloji Poliklinik Başvurularını Nasıl Etkiledi?

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Abstract

Objective: The Coronavirus Disease-2019 (COVID-19) is particularly more common and deadly among older men who also constitute a significant portion of urology patients. In this study, we aimed to evaluate the change in the diagnostic spectrum in urology outpatient applications after the declaration of pandemic compared to the pre- pandemic period.
Materials and Methods: All patients were enrolled between February 12 and May 6, 2020. Demographic, and clinical data of the patients were analyzed pertaining to the period of 4 weeks before, and the first, and second 4 weeks after declaration of the pandemic. Data obtained from the database such as age, gender, diagnoses were anonymized. Recurrent applications with the same diagnosis within ten days after the first presentation were excluded from the analysis.
Results: Compared to the pre-pandemic period a significant decrease in the number of patients applied to the urology outpatient clinics after declaration of the pandemic, and in the frequency of diagnoses of prostate diseases, and urine transport, storage and emptying disorders and a significant increase in the frequency of diagnoses of urinary system stone disease, benign or malignant bladder diseases, upper urinary system tumors, and sexual dysfunction were observed after declaration of the pandemic.
Conclusion: The risk perception of COVID-19 disease may cause changes in the diagnostic distribution of patients applied to the urology outpatient clinics. During periods of outbreak, the health system must be redesigned by focusing on outpatients.

Keywords: COVID-19, outpatient, urological diseases, diagnostic distribution, epidemiology

Öz

Amaç: Tüm dünyayı hızla etkisi altına alan Coronavirüs Hastalığı-2019 (COVID-19), özellikle üroloji hastalarının önemli bir bölümünün içinde yer aldığı yaşlı erkeklerde daha sık görülen ölümcül bir hastalıktır. Bu çalışmada, pandemi ilanından sonra üroloji poliklinik başvurularının tanı spektrumundaki değişimi pandemi öncesine göre değerlendirmeyi amaçladık.
Gereçler ve Yöntemler: 12 Şubat ile 6 Mayıs 2020 tarihleri arasında kayıt yaptıran tüm hastalar, pandemi ilanı öncesi 4 hafta ve sonrası 8 hafta olmak üzere 4 haftadan oluşan 3 bölümde (pandemi ilanı öncesi, sonrası ilk ve ikinci 4 hafta) analiz edildi. Veri tabanından elde edilen yaş, cinsiyet, tanı gibi veriler anonim hale getirildi. İlk başvurudan sonraki on gün içinde aynı tanı ile tekrarlayan başvurular dışlandı.
Bulgular: Pandemi ilanı sonrası üroloji polikliniklerine başvuran hasta sayısında pandemi öncesine göre anlamlı bir azalma izlendi. Pandemi ilanı sonrası, prostat hastalıkları ve idrar taşıma, depolama ve boşaltma bozuklukları ile ilişkili hastalıkların tanı sıklığında pandemi öncesine göre anlamlı azalma ve üriner sistem taş hastalığı, benign veya malign mesane hastalıkları, üst üriner sistem tümörleri ve cinsel işlev bozukluğu tanı sıklığında pandemi öncesine göre anlamlı bir artış saptandı.
Sonuç: COVID-19 risk algısı, üroloji polikliniğine başvuran hastaların tanısal dağılımında değişikliklere neden olabilir. Pandemi dönemlerinde sağlık sistemi ayaktan hastalara odaklanılarak yeniden tasarlanmalıdır.

Anahtar kelimeler: COVID-19, poliklinik, ürolojik hastalıklar, tanısal dağılım, epidemiyoloji

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Introduction

Cases of pneumonia caused by a newly identified virus began to be reported in the Wuhan Province of China on 31 December 2019 [1]. The clinical spectrum of the disease has ranged from asymptomatic infection to severe pneumonia. The disease has been defined as coronavirus disease-2019 (COVID-19) on 20 February 2020 by the World Health Organization (WHO) [2].

Although COVID-19 affects both genders and all age groups, it is particularly more common and more severe in the elderly, in men and in those with comorbidities [3-5]. In a China-based study involving 55924 COVID-19 patients, most patients were between the ages of 30-69 (77.8%), and only 2.4% of the patients were 18 years or younger, and the average age was reported as 51 years [6]. The male/female ratio of confirmed cases 1.06:1.00 in China [7]. On the other hand, the male population had a higher incidence rate than the female population in South Korea and Iceland [8,9]. Furthermore, men had experienced second incident of Covid-19 disease twice more frequently than women [10].

Initially emerging in China, COVID-19 has spread to many countries around the world. In Turkey, the first cases were recorded on 11 March 2020 on the date the WHO declared the disease as a pandemic [11]. After the first official cases, the government has started to implement gradually several social isolation measures to prevent regional spread. The curfew has been the first step of these measures to ensure social isolation. As another precaution, face-to-face education has been terminated in schools, and a distance education protocol was implemented. Venues such as worship areas, shopping centers, cinemas, etc., where people congregate have been closed indefinitely. While land, air and sea transportations through all borders of the country have been suspended, travels within the country were also limited. In the last week of March, a full-time curfew has been imposed on individuals under 20 and over 65 years of age. To limit social life in major cities of the country, a curfew has been declared on weekends. All over the country, citizens have been called to 'stay at home' via visual and social media. Despite all these measures, according to the website Worldometer, which provides real-time statistics from all over the world, as of 12 October 2020, there were more than 5,306,690 verified cases of COVID-19 patients in Turkey, and 48,428 of these patients had lost their lives [12].

In order to prevent the spread of the COVID-19, according to sanctions implemented by the government, the number of medical services provided in outpatient clinics of hospitals and elective surgical procedures were restricted until the pandemic was brought under control [13]. This approach may have affected the applications to the urology outpatient clinics, especially for elderly and male patients in the high-risk group. In this study, we aimed to investigate the effects of COVID-19 pandemic on the number of patient presentations and the distribution of diagnoses at the outpatient clinics of urology.

Materials and Methods

Study Design

The study was planned as a single-center cross-sectional retrospective study. Approval was obtained from the local ethics committee (2021/17-254). Outpatients who had applied to the urology outpatient clinics between February 2020 and May 2020 were included in the study. Demographic, and clinical data of the patients were analyzed pertaining to the period of 4 weeks before, and the first, and second 4 weeks after declaration of the pandemic. We found it appropriate to evaluate the first 4th weeks after declaration of the pandemic that lacked legal restrictions as a transition period. While evaluating the change in frequency distributions, we interpreted the results between "the last 4 weeks before the pandemic" and "the first and second 4th weeks after declaration of the pandemic" to reveal the differences in incidence rates more precisely.

Data Collection

The age, gender, presentation date and the ICD-10 (International Classification of Diseases-10) diagnostic codes were accessed from the electronic database. The presentation of the same patient within 10 days of the first presentation was regarded as a control visit. Patients with repetitive presentations for control or follow-up and their diseases were identified. However, repetitive presentations with the same diagnosis within ten days of the first visit were not included in the study.

In our retrospective study, since ICD-10 disease classification codes cannot designate some of the diseases encountered in the urology practice and the unique style of each urologist, standardization of the data was required. For this reason, the ICD-10 diagnosis codes of the patients recorded in the system were reconsidered. The diagnoses had been made based on diagnostic classification of diseases indicated in the 12th edition of Campbell-Walsh Wein Urology (2020) to achieve standardization [14]. A single diagnostic code was used for separate diagnoses that attempted to designate the diseases (for example, acute cystitis, pyelonephritis= infectious diseases of the urinary system; renal stone, bladder stone, renal colic= urinary system stone diseases; varicocele, orchitis= genital diseases, and overactive bladder, neurogenic bladder= urine transport, storage and emptying disorders, etc.). In patients with more than one unrelated diagnosis, the first diagnostic code was taken as reference. Consequently, more than 300 ICD-10 codes were simplified and organized under nine subheadings. Since the data processing staff anonymized the data of the patients, no individual consent was obtained.

Statistical Analysis

Statistical analysis was performed using IBM SPSS Statistics® 21.0 and MSExcel® 2010. Kolmogorov-Smirnov test was used for normality analysis, and Pearson's chi-square test for the analysis of categorical variables. Independent samples for normally distributed continuous variables were compared using Kruskal-Wallis H test or Mann-Whitney U test, when appropriate. A p value of <0.05 was considered statistically significant. After Kruskal -Wallis H and chi-square tests, Bonferroni correction was applied as post -hoc analysis.

Results

A total of 104142 visits had been made to outpatient clinics except for the COVID-19 outpatient clinics, and the urology

outpatient clinics were consulted for 5380 (5.1%) times during the 12-week period from February 12 to May 6, 2020. Among them 197 (3.6%) patients made more than one visit to the urology outpatient clinics. The change in the number of applications to urology outpatient clinics before and after the declaration of pandemic is shown in Figure 1. A significant decrease in the number of patients applied to the hospital and urology outpatient clinics within the first and second 4th weeks after declaration of the pandemic compared to the pre-pandemic period (25.5% and 10.8% vs 63.8%, p=0.001 for all outpatient clinics of the hospital, 14.7% and 7.9% vs 77.3%, p=0.001 for urology outpatient clinic).

The changes in the frequency of application and distribution of age and gender are summarized in **Table 1**. While mostly male (71%), and less frequently female (29%) patients had applied to the urology outpatient clinics before the pandemic, this difference between genders decreased after declaration of the pandemic (p<0.001). Compared to the pre-pandemic period, the mean age of female and male patients applied to the urology outpatient clinics decreased significantly after declaration of the pandemic (p=0.028, and p=0.032, respectively).

The distribution of the diagnoses of the patients who had applied to the urology outpatient clinic before and after declaration of the pandemic is shown in **Table 2**. Compared to the pre-pandemic period, there was a significant decrease in the frequency of diagnoses of prostate diseases and urine transport, storage and emptying disorders (p=0.003, p=0.001, respectively) and significant increase in the frequency of diagnoses of urinary system stone disease, benign or malignant bladder diseases, upper urinary system tumors (UUST), and sexual dysfunction after declaration of the pandemic (p=0.001, p=0.001, p=0.001, p=0.001, respectively). No significant difference was observed in the frequency of the diagnoses of genital disease, urinary infections and urinary system trauma after declaration of the pandemic relative to the pre-pandemic period (p=0.180, p=0.220, p=0.350, respectively).

Discussion

Countries around the world have taken a number of measures to delay the spread of the COVID-19 disease and prevent the increase in the number of COVID-19 patients [15,16]. First of all, some countries have begun screening travellers coming from China and/or endemic regions for fever [17]. Moreover, mass meeting events, including religious, sporting, musical and even medical conferences (European Association of Urology, American Society of Clinical Oncology, and American Urological Association annual meetings, etc.) were canceled or postponed [17-20]. After these measures, quarantine practices were implemented with the prohibition of entering or exiting metropolitan cities, international travels, face-to-face education, and ensuring that individuals over 65 years of age stayed at home. Some countries declared a national state of emergency [21,22]. Stricter health measures such as postponing all non-urgent elective surgeries [15] and the provision of inpatient and outpatient treatment services only for critically ill patients were also implemented [23,24].

The COVID-19 pandemic is a disease that is particularly

Table 1. Evaluation of age, gender and frequency of application before and after the declaration of the pandemic

Last 4-weeks		Before Pandemic	After Declaration of Pandemic		p-value
		1st 4-weeks	2nd 4-weeks		
Number of applications to all departments† (n=104142)		66418 (63.8%)	26518 (25.5%)	11206 (10.8%)	**<0.001**[a,b,c]
Number of applications to the urology (n=5380)		4160 (77.3%)	793 (14.7%)	427 (7.9%)	**<0.001**[a,b,c]
Age (year)	Male	50,95±15,03	37,44±14,9	32,2±10,2	**<0.028**[b,c]
	Female	39,08±15,6	33,2±10,5	32,8±12,1	**<0.032**[b,c]
Gender	Male	2988 (71.8%)	450 (56.7%)	230 (53.9%)	**<0.001**[a,b]
	Female	1172 (28.2%)	343 (43.2%)	197 (46.1%)	

Data are expressed as the number of applications to the outpatient clinic (percentage)

Kruskal-Wallis H and Pearson's chi-squared tests were used. Bonferroni correction was applied as post-hoc (Mann Whitney-U and z-test, respectively) after Kruskal Wallis-H and chi-square tests. Significant values were shown in bold.

† Other than COVID-19 outpatient clinics,

a: adjusted p value<0.05 for the difference between "last 4-weeks before the pandemic" and "1st 4-weeks after the declaration of pandemic"

b: adjusted p value<0.05 for the difference between "last 4-weeks before the pandemic" and "2nd 4-weeks after the declaration of pandemic"

c: adjusted p value<0.05 for the difference between "1st 4-weeks after the declaration of pandemic"; and "2nd 4-weeks after the declaration of pandemic"

Table 2. Comparison of the diagnosis frequencies of outpatients admitted to urology outpatient clinics before and after the declaration of the pandemic

Diseases	Before Pandemic	After Declaration of Pandemic		p-value
	Last 4-weeks (n=4160)	1st 4-weeks (n=793)	2nd 4-weeks (n=427)	
Prostate diseases	1305 (31.4%)	243 (30.6%)	100 (23.4%)	**0.003**[b,c]
Urinary system stone diseases	1252 (30.1%)	308 (38.8%)	155 (36.3%)	**<0.001**[a,b]
Genital diseases	206 (5.0%)	43 (5.4%)	13 (4.9%)	0.180
Benign and malignant bladder diseases	75 (1.8%)	26 (3.2%)	20 (4.7%)	**<0.001**[a,b]
Upper urinary tract tumors	21 (0.5%)	20 (2.5%)	21 (4.9%)	**<0.001**[a,b]
Urinary system infectious diseases	700 (16.8%)	41 (5.1%)	65 (15.2%)	**<0.001**[a,c]
Urine transport, storage and emptying disorders	412 (9.9%)	69 (8.7%)	20 (4.7%)	**0.001**[b,c]
Trauma	48 (1.2%)	7 (0.8%)	2 (0.5%)	0.350
Sexual dysfunction	141 (3.4%)	36 (4.5%)	31 (7.3%)	**<0.001**[b,c]

Data are expressed as the number of applications to the outpatient clinic (column percentage) Pearson's chi-square test was used. Bonferroni correction was applied as post-hoc (z-test) after chi-square tests. Significant values were shown in bold
a: adjusted p value<0.05 for the difference between "last 4-weeks before the pandemic" and "1st 4-weeks after the declaration of the pandemic"
b: adjusted p value<0.05 for the difference between "last 4-weeks before the pandemic" and "2nd 4-weeks after the declaration of the pandemic"
c: adjusted p value<0.05 for the difference between "1st 4-weeks after COVID-19"; and "2nd 4-weeks after the declaration of the pandemic"

more common and deadly among older men who also constitute a significant portion of urology patients. In this study, we aimed to examine the effects of the measures taken, bans imposed, and the effective "stay at home" calls broadcasted on local or national media during the COVID-19 pandemic, on the number of patient visits to the urology polyclinic, and the distribution of diagnoses in this patient population.

The first decrease in the number of patients presenting to the hospital occurred when news about refugees from Iran being quarantined spread. Furthermore, it was determined that the number of patients applied to the hospital increased rapidly with the announcement of positive updates. We observed a logarithmic decrease in the frequency of presentations to our outpatient clinics approximately two weeks after the announcement of the first confirmed case **(Figure 1)**. Compared with the pre-pandemic period a 5.1-fold decrease in urology outpatient clinic visits in the first 4th (the transition period) and a 9.7-fold decrease in the second 4th weeks were observed with corresponding 2.5- and 5.9-fold decreases in general hospital visits. Compared to hospital-wide patient flow, a significantly higher decrease in the urology outpatient clinic visits was observed. We believe that this marked decrease in urology outpatient clinic visits is due to relatively more pronounced perception of COVID-19 risk among men of advanced age. We think that compared to the pre-pandemic period this significant drop in hospital visits during the transition period when legal restrictions were not imposed, is due to the effective role of awareness campaigns running on visual and social media.

The decrease in the mean ages of both male and female patients who applied to the urology outpatient clinics after declaration of the pandemic was also noteworthy compared to the pre-pandemic period. We believe that the curfew imposed on individuals over the age of 65 in the early period after declaration of the pandemic, and especially the news in the media that men over 65 were more frequently affected by COVID-19 was effective.

Additionally, increase in the frequency of diagnosis of urinary system stone disease may be due to the severity of the symptoms of the disease being superior to the perception of the pandemic risk, and that the effective curfew applied in this period negatively affected the spontaneous fall of stones due to limited mobilization. We believe that the increase in diagnoses of benign or malignant bladder diseases is related to hematuria, which is one of the most common alarming symptoms of this disease group, and is a driving force for patients despite the "stay at home" calls. The fact that patients with diagnosed bladder tumors do not miss their control cystoscopy appointments may have also been effective in this increase. In addition, it should be emphasized that the decrease in the rates of less serious diseases after declaration of the pandemic may have caused a relative increase in the incidence of serious diseases.

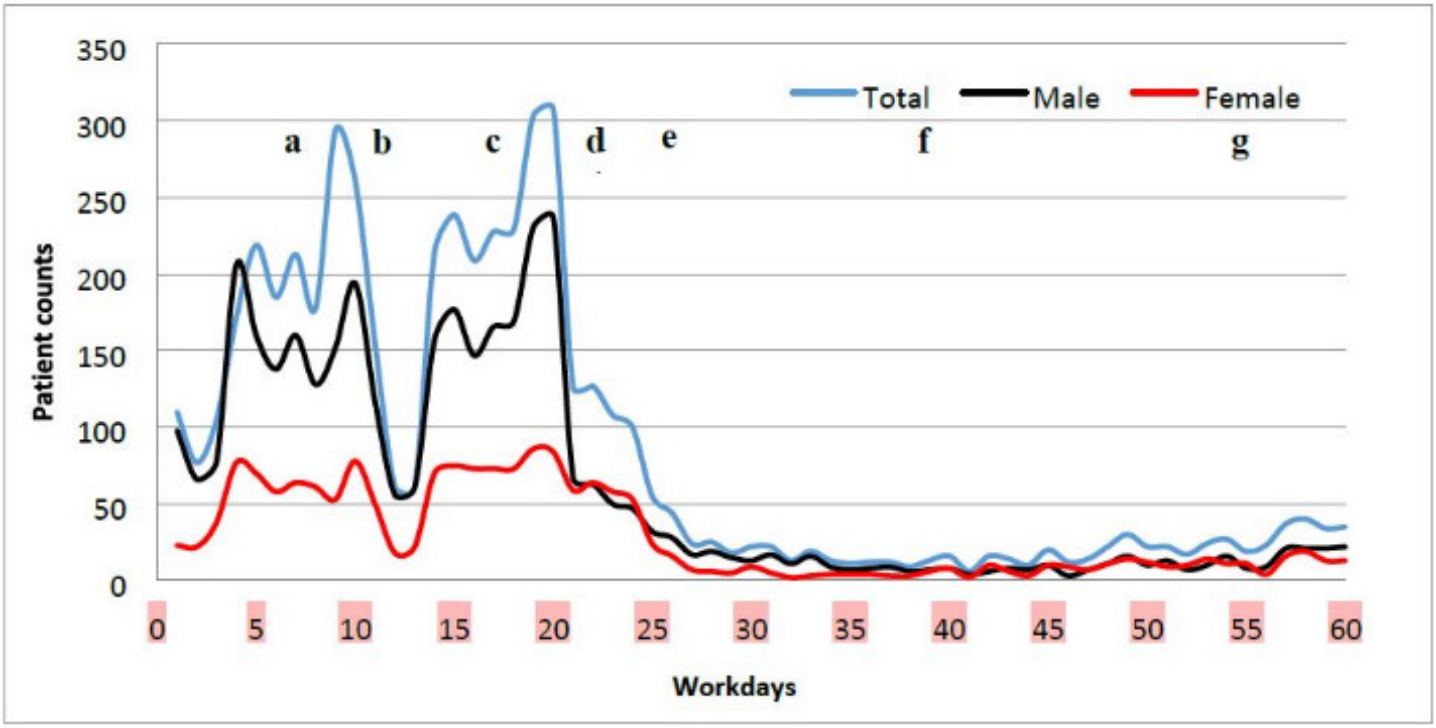

Figure 1. Change in daily patient frequency before and after COVID-19 outbreak
February 24: The period when refugees from the neighboring country Iran were quarantined in our city (**a**), February 28: It was announced that the PCR test (polymerase chain reaction) results of the refugees were negative (**b**), March 11: The first COVID-19 case was confirmed in Turkey, and the World Health Organization declared a pandemic (**c**), March 17: The first death due to COVID-19 was reported in Turkey (**d**), March 22: Curfew was declared indefinitely for individuals over the age of 65 (**e**), April 4: Curfew was declared indefinitely for individuals under the age of 20 (**f**), May 11: The normalization process has begun in Turkey (**g**).

Studies have shown an increase in the frequency of psychological diseases such as anxiety and depression in the community during the COVID-19 pandemic [25]. It is known that sexual dysfunction is accompanied by anxiety, depression, lack of self-confidence, a negative attitude towards life and emotional stress [26,27]. While there was no significant change in the diagnostic frequency of sexual dysfunction in the transition period compared to the pre-pandemic period, we observed a significant increase in the diagnostic frequency of sexual dysfunction after declaration of the pandemic relative to the pre- pandemic period. We believe that this is due to the patients' need for medical advice due to the stress factors outweighing the perception of the COVID-19 pandemic risk.

Prostate diseases can be accompanied by chronic diseases (chronic obstructive pulmonary disease (COPD), obesity, and metabolic syndrome, etc.) that are common among older men [28-30]. Although COVID-19 causes severe illnesses in healthy individuals of all ages, it is more common and more deadly in adult men with advanced age or medical comorbidities. During the pandemic, the media consistently published news that the COVID-19 had a worse course among the elderly and the government implemented an effective curfew for individuals older than 65 years of age. We believe that both the curfew imposed on individuals over 65 years of age and the effective use of the media may have led to the decrease in the number of patients diagnosed as prostate diseases by making the perception of the pandemic risk among elderly males outweigh the symptoms related to the disease.

Studies have reported that urine transport, storage, and emptying disorders negatively affect social life and reduce the quality of life of the patients. Although a presumptive rise in the number of diagnoses due to the increased stress factors after declaration of the pandemic was anticipated, we identified a decrease in the frequency of diagnoses of this disease group compared to the pre-pandemic period. We believe that the patients' perception of the pandemic risk outweighing the symptoms of the disease may have been effective in the decreased number of diagnoses made during prepandemic period. We think that the fact that effective calls to "stay at home," mainly broadcasted on the media increased the time spent at home and made the symptoms of the disease (such as urgency, and urinary incontinence) more tolerable, and also contributed to this decrease in the number of diagnoses made during pre-pandemic period.

There was no significant difference in the frequency of diagnoses of urinary system infections before and after declaration of the pandemic. However, in our analysis, we did identify a fluctuation in the frequency of diagnoses in this patient group before, and at the first and second 4th weeks after declaration of the pandemic (16.8%, 5.1%, and 15.2%, respectively). We believe that the referral of patients diagnosed with urinary tract infections to urology outpatient clinics from the outpatient clinics of infectious diseases, which had a primary role in managing the pandemic, may have been effective in this fluctuation.

In the literature scan we performed with regard to urological patients during the COVID-19 pandemic, we observed that research and guideline recommendations have focused on urological emergencies. This study was carried out to gain a better understanding of the reason why patients with urological diseases

presented to the hospital during a period of a deadly global pandemic, and we included all patient groups in our survey which constituted the strength of our study. Many factors that affect the quality of life, the perception of risk depending on the age and gender of individuals, and the increased burden of stress, have changed the diagnostic distribution of urology practices during the pandemic.

Considering lack of any reliable prediction assessment criteria about the duration, economic and social consequences of the pandemic, we believe that a fundamental issue in the practice of urology that needs to be addressed is how to prioritize outpatients without coronavirus disease who require treatment and how to manage these patients. We consider that telemedicine applications defined by the World Health Organization (WHO) as "The delivery of health care services, where distance is a critical factor, by all health care professionals using information and communication technologies" can fill this gap for the management of patients who cannot make applications to the outpatient clinics for any reason [31]. In the light of the data, we obtained as a result of this study, the pilot study that we initiated to evaluate the effectiveness of telemedicine applications recommended by the WHO in the pandemic period continues.

The limitations of our study are its retrospective design, failure to make detailed clinical examinations, and the lack of data relating to the quality of life, anxiety levels, treatments applied, and individual risk perception of COVID-19 by the patients. The patients often had unrelated complaints and symptoms and sharing patient complaints and symptoms without triaging can alter the prioritization of diagnoses in the database. Furthermore, due to the extreme variety of urological diseases, urologists work within a narrow diagnostic framework in clinical practice, depending on the ICD-10 diagnostic classification unable to cover all diagnostic entities in urology.

Conclusion

Males at an advanced age in whom the COVID-19 is more severe and mortal comprise a significant portion of patients applied to the urology outpatient clinics. The risk perception of COVID-19 may cause changes in the diagnostic distribution of patients applied to the urology outpatient clinics. During pandemic periods, the health system must be redesigned by focusing on outpatients.

Ethics Committee Approval: The study was approved by the Ethics Committee of University of Health Sciences, Erzurum Regional Training and Research Hospital (Approval date, and number: 2021/17-254).
Informed Consent: This study does not require informed consent.
Publication: The results of the study were not published in full or in part in form of abstracts.
Peer-review: Externally peer-reviewed.
Authorship Contributions: Any contribution was not made by any individual not listed as an author. Concept – A.E.C, N.C., I.K.; Design – A.E.C, N.C., S.A., O.P.; Supervision – I.K. S.A., O.P.; Resources – S.O.D, F.K.Y, S.G.U.; Materials – S.O.D, F.K.Y, S.G.U.; Data Collection and/or Processing – N.C., S.O.D., F.K.Y., S.G.U.; Analysis and/or Interpretation – A.E.C., I.K., S.A., O.P.; Literature Search – A.E.C., S.O.D., F.K.Y.; Writing Manuscript – A.E.C., N.C., I.K.; Critical Review – A.E.C., N.C., I.K., S.A., O.P.
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