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Research Article

Web-Based Bibliometric Evaluation of Robotic Radical Prostatectomy in Prostate Cancer: Analysis of Turkey Data

Prostat Kanserinde Robotik Radikal Prostatektominin Web Tabanli Bibliyometrik Değerlendirilmesi: Türkiye Verilerinin Analizi

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Abstract

Aim: Prostate cancers are the second most commonly diagnosed cancers in men. The developments in robotic surgery brought along a period in which all number of articles were written. This study, we researched the field and contribution of articles written in the world and in Turkey on robot assisted radical prostatectomy with bibliometric analysis in a web-based software.

Material and Methods: In our study, 1434 original articles in the world and 57 original articles in Turkey, which met the criteria, were scanned in ISI Web of Knowledge-Science (WoS) data base by using the keywords 'robot, prostate cancer, radical prostatectomy'. The parameters, country of the article, publication year of the article, WoS category of the article, the name of the journal where the article was published, type of the article (Original), language of the article (English) and WoS index (SCI-E), were evaluated with bibliometric analysis method.

Results: Analysis of countries points out that the United States of America ranked the first with 563 (39.2%) articles, while Turkey ranked in the 11th place with 57 (3.9%) articles. According to publication year, it was found that the highest number of articles published in the world was in 2020 with 173 (12.06%) articles, while it was in 2021 with 10 (17.5%) in Turkey. With respect to field categories in WoS data base, the world was found that the field of Urology-Nephrology ranked the first with 1042 (72%) articles, while similarly Urology-Nephrology ranked the first with 35 (61.4%) articles in Turkey. According to journal name, BJU International was the journal in which the highest number of articles were published in the world with 157 (10.9%), while Journal of Endourology was the journal in which the highest number of articles were published in Turkey with 10 (17.5%) articles. In the citations and H-index rates of articles by year, it was 78 in the world and 15 in Turkey which show rising curve over the last two decades.

Conclusion: Current developments in robotic surgery have a significant place in world scientific publication performance. Turkey has made valuable contributions to literature since 2014 with increasing number of articles and citations.

Keywords: Prostate cancer, robotic radical prostatectomy, bibliometric analyze

Öz

Amaç: Prostat kanserleri erkeklerde en sık teşhis edilen ikinci kanser türüdür. Robotik cerrahideki gelişmeler,çok sayıda makalenin yazıldığı bir dönemi beraberinde getirmiştir. Bu çalışmada robot yardımlı radikal prostatektomi konusunda Dünya'da ve Türkiye'de yazılmış olan makalelerin web tabanlı bir yazılımda bibliyometrik analiz yöntemi ile bilimsel literatürdeki durum ve katkıları araştırılmıştır.

Materyal ve Metot: Çalışmamızda kriterleri karşılayan dünyada 1434 orijinal makale ve Türkiye'de 57 orijinal makale ISI Web of Knowledge-Science (WoS) veri tabanında 'robot, prostat kanser, radikal prostatektomi' anahtar kelimeleri kullanılarak tarandı. Parametreler, makalenin bulunduğu ülke, makalenin yayın yılı, makalenin WoS kategorisi, makalenin yayınlandığı derginin adı, makalenin türü (Orijinal), makalenin dili (İngilizce) ve WoS indeksi (SCI-E), bibliyometrik analiz yöntemi ile değerlendirildi.

Bulgular: Ülkeler Wos veri tabanında bibliyometrik analizle incelendiğinde, Amerika Birleşik Devletleri 563 (%39,2) makale ile ilk sırada yer alırken, Türkiye 57 (%3,9) makale ile 11. sırada yer aldı. Yayınlanma yılına göre bibliyometrik analizde, Dünya'da en fazla yayınlanan makale sayısının 173 (%12,06) ile 2020 yılında, Türkiye'de ise 10 (%17,5) ile 2021 yılında olduğu tespit edildi. WoS veri tabanındaki alan kategorilerine göre Dünya'da Üroloji-Nefroloji alanının 1042 (%72) makale ile ilk sırada yer aldığı, benzer şekilde Türkiye'nin Üroloji-Nefroloji alanında 35 (%61,4) makale ile ilk sırada yer aldığı görüldü. Dergi adına göre yapılan bibliyometrik analizde, BJU International 157 (%10,9) ile Dünya'da en fazla makalenin yayınlandığı dergi olurken, Journal of Endourology 10 makale ile Türkiye'de en fazla makalenin yayınlandığı dergi olduğu gözlendi (%17.5). Makalelerin yıllara göre atıf ve H-indeks oranlarında son yirmi yılda yükselen bir eğri göstererek Dünyada H-index 78, Türkiye'de H-İndex 15 olarak değerlendirildi.

Sonuç: Robotik cerrahideki güncel gelişmeler, Dünya bilimsel yayın performansında önemli bir yere sahiptir. Türkiye 2014 yılından itibaren artan makale ve atıf sayısı ile literatüre değerli katkılar sağlamıştır.

Anahtar Kelimeler: Prostat kanseri, robotik radikal prostatektomi, bibliyometrik analiz

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INTRODUCTION

Prostate cancer is the second most common cancer in men (1). It is estimated that approximately 1.4 million men were diagnosed with prostate cancer in the world in 2020. Mortality rates in the world are higher in African origin populations than America and Central Asia (1,2). Rapid developments in diagnosis and treatment due to technological innovations have shown an increasing momentum in the last two decades. In the meantime, robotic assisted prostatectomy (RARP) has become an increasingly used surgical option in the treatment of prostate cancer in the last decade (3). The rates of erectile dysfunction and urinary incontinence inherent in radical prostatectomy play an important role in preferring robotic surgery (4). Positive developments in the diagnosis and treatment of prostate cancer attract the attention of urologists, and thus it provides a lot of written articles with in a period of the last 10 years.

Scientific publications are important areas where scientific academic activities of countries are evaluated. The effectiveness of scientific publications is evaluated with a large number of factors such as the country of the publication, name of the journal, impact factor of the journal and Q classification of the journal (5). Web of Science (WoS), which belongs to Clarivate Analytics®, is a database that analyzes scientific publications consisting of citation indexes and covers scientific journals with high impact around the world (6). Science Citation Index (SCI) was introduced in 1961 for bibliographic access for journals to provide and publish a large data base in their analysis. Science Citation Index Expanded (SCI-E) was expanded by adding various parameters (7). The concept of citing articles is the use of data such as articles, reports and statistics of other studies conducted by other researchers to benefit from different opinions about the subject of the relevant article and to strengthen the study. H-Index (Hirsch Index) is an internationally valid numerical indicator which measures the efficiency, productivity and citation impact of publications by scientists (8).

In this study, our aim was to investigate the place and contribution of Turkey in world literature by evaluating articles on robot-assisted radical prostatectomy in WoS data base with bibliometric analysis method.

MATERIAL AND METHOD

This study was conducted by using WoS database after 674 numbered and local ethics committee approval was taken on 28/07/2022. In order to analyze prostate cancer and robotic radical prostatectomy data, the country of the article, publication year of the article, WoS category of the article, the name of the journal where the article was published, type of the article (Original), language of the article (English) and WoS index (SCI-E) parameters were searched in ISI Web of Knowledge-Science data base. In addition to these parameters, the cities in which the articles were written were also added to study data as a separate parameter. The year of 1998, in which Da Vinci robotic system developed by Intuitive® was started to be used in the field of medicine, was considered as the starting date, the keywords 'robot, prostate cancer, radical prostatectomy' were scanned retrospectively in WoS between 1998 and 2022 and it was found that 1434 original articles were suitable for bibliometric analysis. Of these articles, 57 original articles published in Turkey meeting the criteria were evaluated with bibliometric analysis. Exclusion criterion was more than one published in the same clinic with the same name but different method. In addition, articles which were not written in English, those the full-text of which were not accessed, those which were not SCI-E, those which were not original and those which were multinational were not included in the study.

The data collected in the study were evaluated with SPSS 26.0 (IBM Inc., Armonk, NY, US) program. As descriptive statistical method, the parameters were shown as number and percentage.

RESULTS

In our study, conducted in WoS data base of countries in the bibliometric analysis, it was found that United States of America made the highest contribution to literature with 563 (39.2%) articles, while Turkey contributed to world literature in the 11th place with 57 (3.9%) articles. The contributions of countries to world literature in this field are shown in Figure 1.

When the articles were analyzed bibliometrically according to publication year (between 1998 and 2022) in WoS data base, it was found that the highest number of articles published in the world was in 2020 with 173 (12.06%) articles, while it was in 2021 with 10 (17.5%) articles in Turkey (Figure 2).

When the articles were analyzed with respect to field categories in WoS data base, it was found that the field of Urology-Nephrology ranked the first with 1042 (72%) articles, while similarly Urology-Nephrology ranked the first with 35 (61.4%) articles in Turkey (Figure 3).

When the articles were analyzed according to journal name in WoS data base, it was found that BJU International was the journal in which the highest number of articles were published in the world with 157 (10.9%), while Journal of Endourology was the journal in which the highest number of articles were published in Turkey with 10 (17.5%) articles (Table 1).

In the bibliometric analysis of the cities in which 57 articles conducted in Turkey were published in WoS data base, it was found that Istanbul was the city in which the highest number of articles was published with 30 (53%) articles (Table 2).

The citations and H-index rates of the articles by years were analyzed bibliometrically in WoS data, and the number of citations, which started in 2000 and increased by year until 2022 and H-index were summarized in Figure 4 and Figure 5. It was found that while the H-index of articles published in the world was 78 (Figure 4), the H-index of articles published in Turkey was 15 (Figure 5).

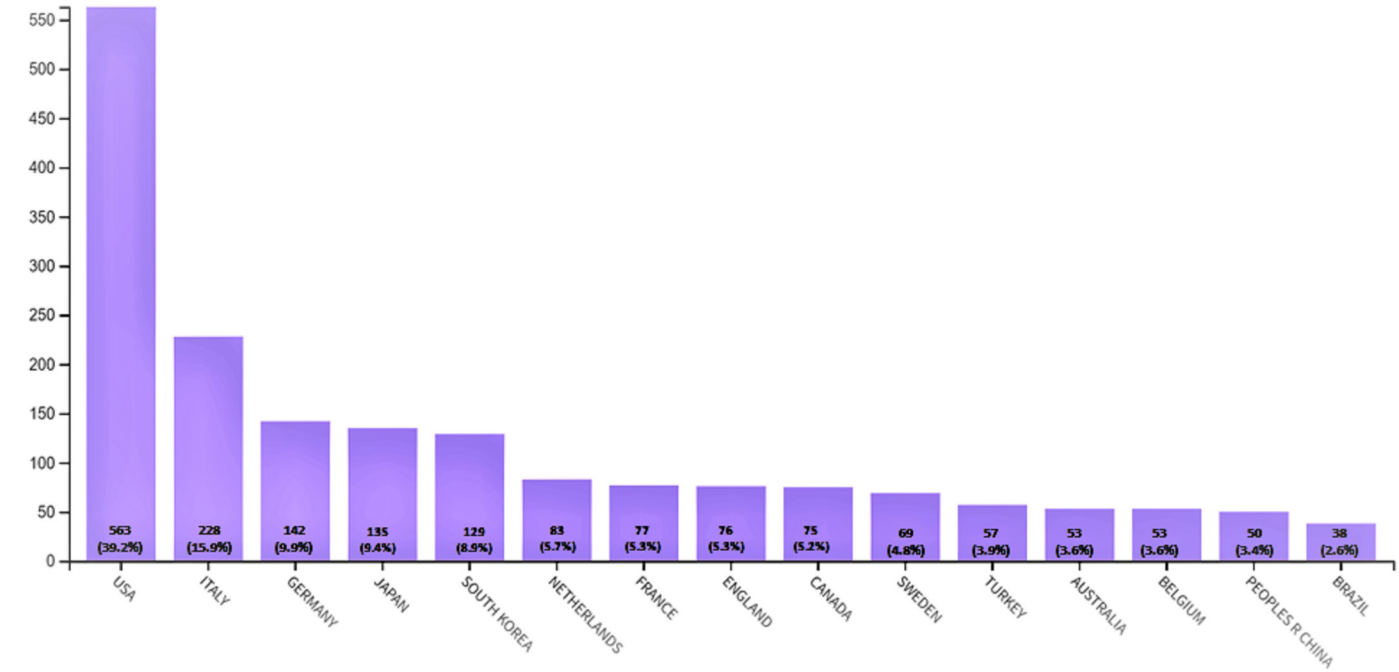


Figure 1. Distribution of articles published by countries on robotic radical prostatectomy in world literature according to WoS data base

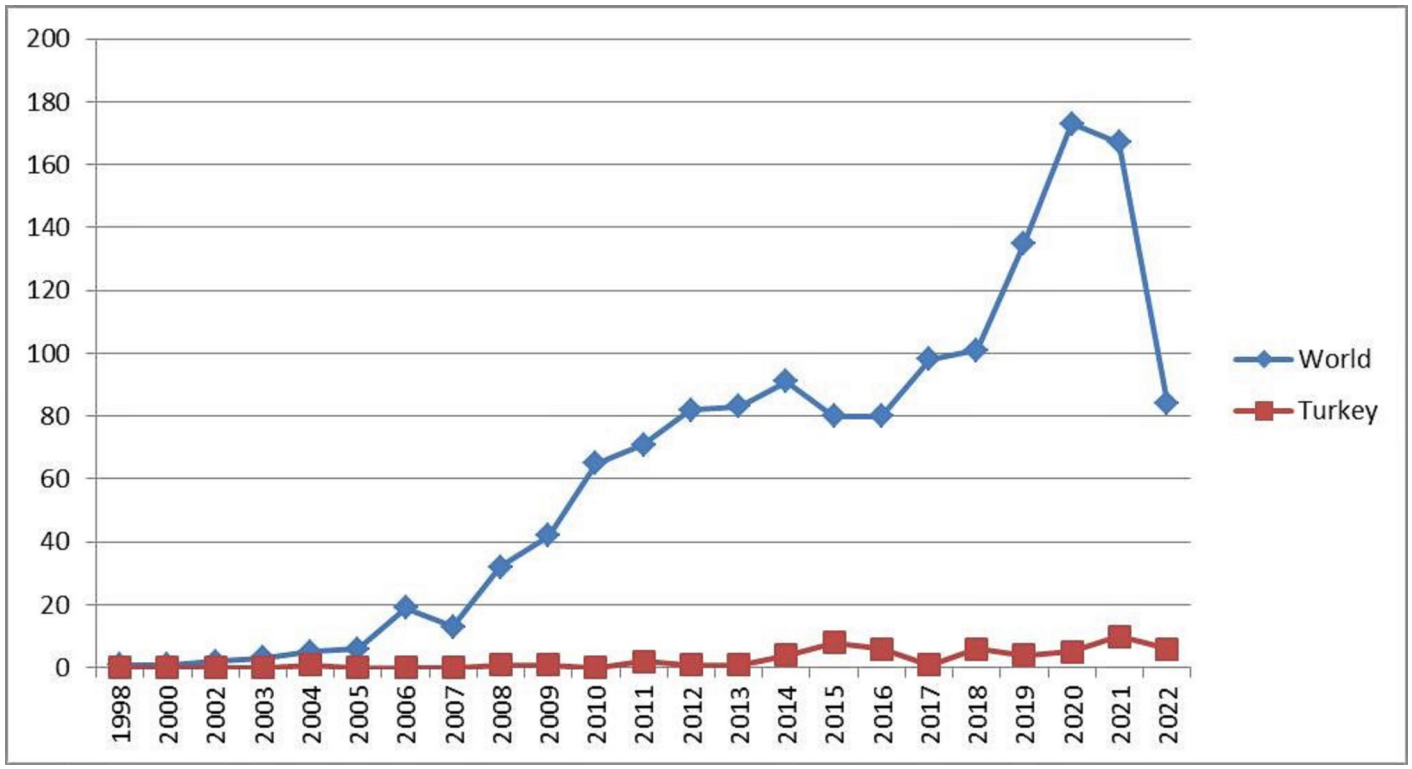
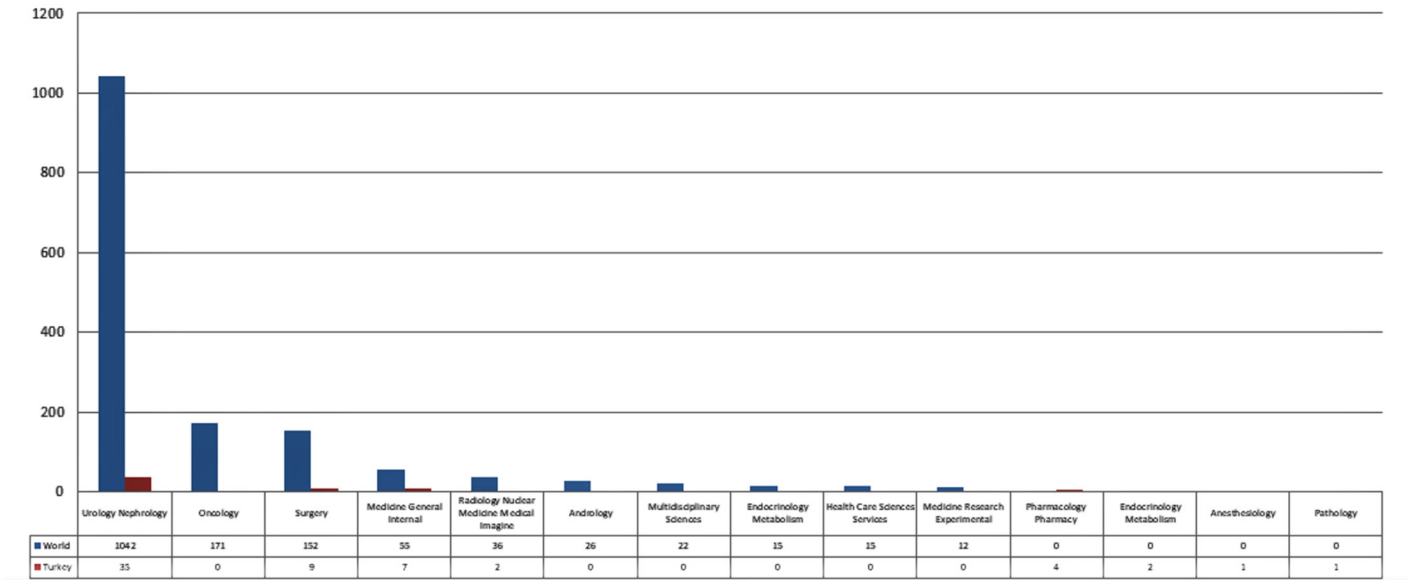


Figure 2. Distribution of number of articles published in the world and Turkey on robotic radical prostatectomy according to WoS data base by years



	Urology Nephrology	Oncology	Surgery	Medicine General Internal	Radiology Nuclear Medicine Medical Imagine	Andrology	Multidisciplinary Sciences	Endocrinology Metabolism	Health Care Sciences Services	Medicine Research Experimental	Pharmacology Pharmacy	Endocrinology Metabolism	Anesthesiology	Pathology
World	1042	171	152	55	36	26	22	15	15	12	0	0	0	0
Turkey	35	0	9	7	2	0	0	0	0	0	4	2	1	1

Figure 3. Distribution of number of articles published in the world and Turkey on robotic radical prostatectomy according to WoS data base by field category

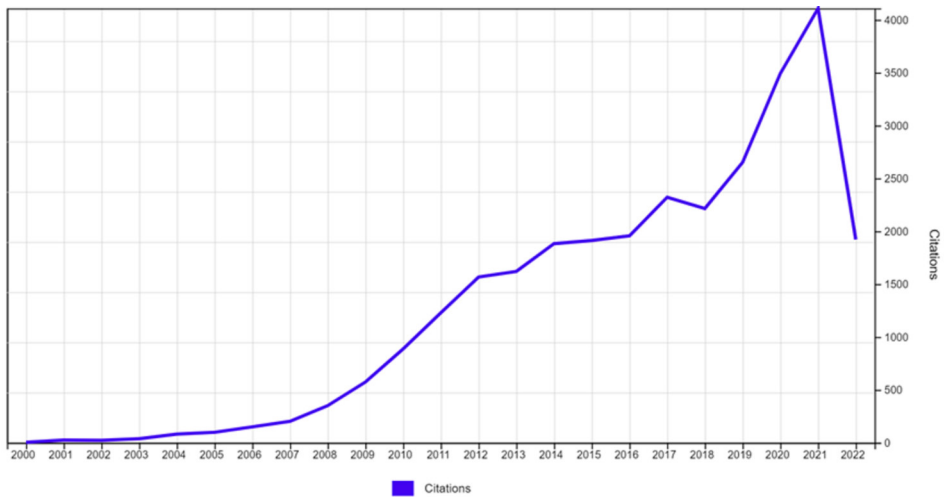


Figure 4. The distribution of citation numbers of articles published in the world on robotic radical prostatectomy according to WoS data base

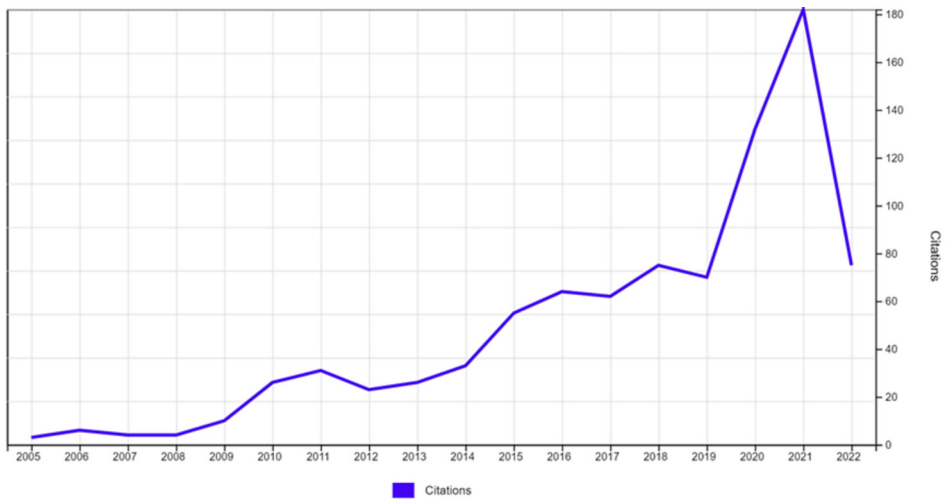


Figure 5. The distribution of citation numbers of articles published in Turkey on robotic radical prostatectomy according to WoS data base

Table 1. Distribution of number of articles published in the world and Turkey on robotic radical prostatectomy according to WoS data base by the names of journals

Journal	n	%
Journals publishing by authors from World		
BJU International	157	10.9
Journal of Endourology	151	10.5
European Urology	106	7.4
World Journal of Urology	70	4.9
Urology	64	4.5
Journals publishing by authors from Turkey		
Journal of Endourology	10	17.5
Archivos Espanoles de Urologia	4	7
European Urology	4	7
Journal of The Society of Laparoendoscopic Surgeons	4	7
Journal of Laparoendoscopic Advanced Surgical Technique	3	5.3
World Journal of Urology	3	5.3

Table 2. Distribution of number of articles published in Turkey on robotic radical prostatectomy according to WoS data base by the cities in which they were published

Cities	n	%
Istanbul	30	53
Ankara	19	33
Izmir	4	7
Other	4	7

DISCUSSION

In this study, we evaluated the articles in Turkey which used the data of cases who underwent robot-assisted radical prostatectomy for prostate cancer by using bibliometric analysis method in WoS data base and researched their place in world literature. To the best of our knowledge, this is the first bibliometric study conducted in Turkey evaluating articles written and published by Turkish authors based on robotic radical prostatectomy in prostate cancer.

As of July 2022, total number of Da Vinci Robotic Surgical Systems installed in the world is 7135. As of the end of year 2021, the number of minimal invasive robotic surgeries performed in the world so far is over 10.000.000. As of July 2022, total number of Da Vinci Robotic Surgical Systems installed in Turkey is 39. These 39 systems are in 7 cities. Robotic surgery system was first used in Turkey in 2004 at "Şişli Florence Nightingale Hospital". Robotic surgery data began to be collected in Turkey as of 2004 and Turkish authors contributed to world literature as co-authors in 2004, 2008 and 2009. The first urological article sent from Turkey was published in "Journal of the Society of Laparoendoscopic Surgeons" in 2011 (9-11).

It can be seen that the data in Turkey began to be collected with the use of robotic radical prostatectomy in prostate cancer in 2004 and since 2011 with the publication of articles using these first data, contributions have been made to world scientific literature with an increasing speed in recent years.

When the articles were examined by publication year, it was found that the number of articles in the world increased rapidly in the last 5 years, with the highest number of articles in 2021. A similar situation can be observed in Turkey, too. In parallel with the increasing data, the highest number of articles published was in 2021.

When the citation and H-index of articles is examined by year, it can be seen that the world and Turkey show a similar graph and there is an increase especially in 2021. However, a decrease was found in the number of articles and citations in 2022. We think that this decrease was caused by decreasing in the number of data due to Covid-19 Pandemic which caused a serious recession in world health sector.

When the articles were evaluated in WoS category, it was found that in the world authors in this field were mostly interested in journals of Urology/Nephrology category, which is their field of science. A similar tendency can be seen in Turkey and journals in Urology/Nephrology category come to the fore.

When all data were evaluated as a whole, it can be said that the number and rates of robot acquisition in Turkey over the years, the spread of robotic surgeries, creation of data and publication of qualified articles that contribute to literature has shown an increasing momentum. Turkish authors have not only taken a position in the world according to technological developments, but they have also contributed to literature with an increasing number of articles and citations.

Especially North American and European publications are examined, multicentred articles can be seen. It can be said that multicentered studies can be planned in Turkey, thus the number of studies can be increased and more contributions can be made to literature.

Limitations of our study included the fact that robotic surgical procedures performed with a single brand were evaluated since only Da Vinci robotic surgical model exists in the world and in Turkey and robotic surgical systems of other brands are not in clinical use. Another limitation is the fact that since it is an expensive treatment modality, it is not applied in all cities in our country and sufficient number of surgeons cannot perform this procedure. We believe that these limitations are other factors that play a role in the decrease in numbers of data and articles in Turkey.

CONCLUSION

Information and analyses of internet data based software which evaluate scientific activities of countries are followed with interest and attention in the academic world. Turkey has been making valuable contributions to literature especially since 2014 with increasing number of articles

and citations. Considering the scientific cyclical structure of its geography, Turkey is moving towards becoming an important country in the field of robotic urological surgery.

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Conflict of interest: *The authors declare that they have no competing interest.*

Ethical approval: *In order to carry out the research, ethical approval was obtained from the Non-Invasive Clinical Research Ethics Committee of the İzmir Bakırçay University (No: 28.07.2022/674).*

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