TURKISH JOURNAL of ONCOLOGY

Turk J Oncol 2025;40(3):200–206
doi: 10.5505/tjo.2025.4577

ORIGINAL ARTICLE

Bibliometric Analysis of Theses Published in the Field of Radiation Oncology Specialization in Türkiye

Eda ERDİŞ,[1] Ezgi AĞADAYI[2]

[1]Department of Radiation Oncology, Sivas Cumhuriyet University Faculty of Medicine, Sivas-Türkiye
[2]Department of Medical Education, Sivas Cumhuriyet University Faculty of Medicine, Sivas-*Türkiye*

OBJECTIVE

This study aims to conduct a bibliometric analysis of radiation oncology residency theses written in Türkiye. It examines the distribution of theses by year and institution, research designs, topic diversity, and their conversion rates into scientific publications.

METHODS

A total of 202 radiation oncology theses published between 1988 and 2024 and listed in the National Thesis Center of the Council of Higher Education were included in the study. Each thesis was evaluated based on research design, topic, type of institution, publication status, and distribution over time. Publication rates and citation counts were analyzed. Data analysis was performed using SPSS version 23, employing descriptive statistics, chi-square tests, and post-hoc analyses.

RESULTS

77.7% of theses were prepared at universities and 22.3% were prepared at training and research hospitals. The most common study design was retrospective descriptive (63.7%). A total of 30.7% of the theses were published in international indexed journals; excluding 2024 theses, this rate increased to 33.0%. The median time to publication was 3 years, and the median annual citation count was 0.2. A statistically significant difference was observed in publication rates based on study design and thesis year ($p<0.05$), while no significant association was found with institution type or cancer type.

CONCLUSION

One-third of radiation oncology residency theses in Türkiye are converted into scientific publications. Study design and thesis year significantly influence publication likelihood. These findings provide strategic insight for shaping educational policies and research priorities, and serve as a guide for enhancing scholarly output in the field.

Keywords: Bibliometric analysis; publication rate; radiation oncology; research design; residency thesis.

INTRODUCTION

The aim of this study is to analyze theses written in the field of radiation oncology in Türkiye using bibliometric methods to reveal academic trends in this field, diversity of research topics, publication language, distribution among institutions and changes over time. Such an analysis aims to guide future studies by providing a systematic map of academic production in Türkiye. Bibliometric analysis is important in understanding

Received: May 07, 2025
Revised: July 16, 2025
Accepted: August 07, 2025
Online: September 03, 2025

Accessible online at:
www.onkder.org

Dr. Eda ERDİŞ
Sivas Cumhuriyet Üniversitesi Tıp Fakültesi,
Radyasyon Onkolojisi Anabilim Dalı,
Sivas-Türkiye
E-mail: dr.erdiseda@gmail.com

trends in academic outputs, especially during the specialist training process, and can contribute to the shaping of research policies.[1,2]

The scientific basis of this study is the literature that demonstrates the effectiveness of bibliometric methods in the evaluation of academic production in the field of medicine. Bibliometric analyses are frequently used in the evaluation of research quality, monitoring of information flow and determining collaboration networks. [3] In particular, analyses conducted on institutional productions such as specialization theses contribute to the determination of academic standards in medical education and the measurement of research capacity.[4]

Radiation Oncology is a branch of science that aims to treat cancer using ionizing radiation, examines the effects of radiation, tumor behavior, and conducts education and research on these subjects. Shortly after Marie Curie discovered Radium, gamma rays were used in the treatment of various types of cancer. Radiotherapy has been used in cancer treatment for over 100 years. Radiation oncology has a rich potential in terms of academic research with its rapidly developing technical infrastructure and interdisciplinary structure. Theses produced during radiation oncology specialization training are not only an output of education but also a part of scientific production. However, the lack of systematic data on the scope, quality and rate of conversion of theses into scientific output in this field in Türkiye is striking. The conversion of theses into scientific publications is an important indicator of both academic productivity and quality of education. Therefore, this study aims to shed light on questions such as the development of the field, the change in focus in research topics and the extent to which current trends are reflected.[5,6] In addition, the need for such analyses is increasing in health policies, academic planning and the structuring of educational content.

The scarcity of national or international bibliometric studies specifically on radiation oncology makes this research even more meaningful. In this context, we believe that the content and structural analyses of theses can provide strategic data for future research directions.

MATERIALS AND METHODS

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards.

Informed Consent

Our study was approved by the independent ethics committee/institutional review board at Sivas Cumhuriyet University Faculty of Medicine Ethical Committee. (Date 24/04/2025, No: 2025-04/28).

This study was planned as a descriptive study aiming to evaluate the bibliometric properties of medical specialization theses published in the field of radiation oncology in Türkiye. The data source of the study consists of radiation oncology theses approved by the Medical Specialization Board (TUK) and included in national thesis databases. The parameters of the study consist of bibliometric criteria such as the publication year of the theses, institutional distribution, research type, classification of the research topic and their transformation into internationally indexed publications. The theses were found by applying the "Radiation Oncology Department" filter via the search engine in the National Center of the Council of Higher Education. All accessible theses without selecting a year range were examined. The data collection sources of the study are YÖKTEZ, PubMed. Specialization theses published in YÖKTEZ and with "permission and unpermission" access in the Field of Radiation Oncology were included in the study.

Statistical Analysis

SPSS (Statistical Package for Social Sciences) for Windows Version 23 was used for data analysis. Descriptive statistics, Chi-square test (χ^2), and post-hoc comparisons were employed. For non-parametric variables such as publication time and annual citation count, the median and interquartile range (Q1–Q4) were calculated. A p-value of less than 0.05 was considered statistically significant.

RESULTS

In our study, 202 theses uploaded to the national thesis center and published between 1988–2024 were reached. 20.8% (n=42) of these theses have abstracts. The distribution of the number of theses completed in the field of radiation oncology specialization by year is shown in Figure 1.

When we look at the educational institutions where these specialization theses were prepared and studied, it is seen that 77.7% (n=157) were prepared in universities and 22.3% (n=45) in training and research hospitals. The most frequently used study design is retrospective descriptive research (63.7%; n=128). This is followed by prospective studies with

Turk J Oncol 2025;40(3):200–206
doi: 10.5505/tjo.2025.4577

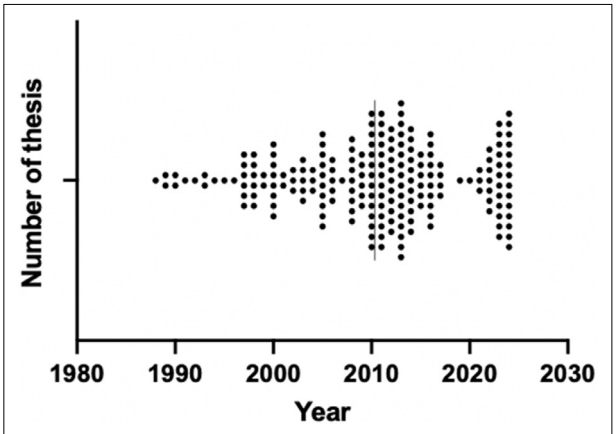

Fig. 1. Distribution of the number of theses completed in the field of radiation oncology specialization by year.

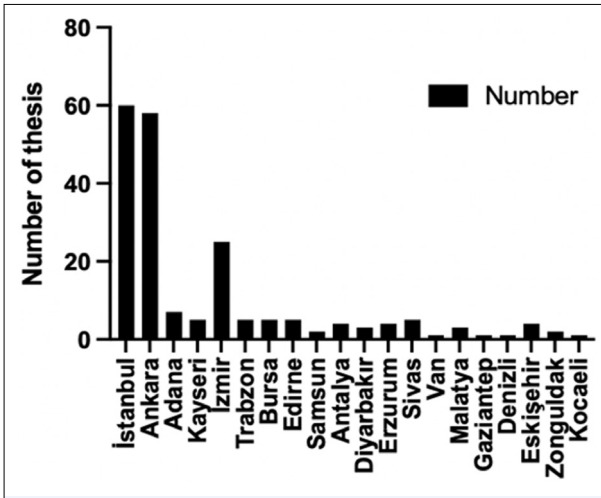

Fig. 2. Distribution of theses by province.

27.2% (n=55) and experimental studies with 5.5% (n=11). Less frequently used designs are cross-sectional studies with 2.0% (n=4) and *in vitro* studies with 1.0% (n=2). 98% (n=198) of the studies were conducted in a single center. The distribution of theses by province is shown in Figure 2. It was observed that 30.7% (n=62) of the theses were published in SCI Expended, AHCI, SSCI or ESCI index. Since the theses published in 2024 have a low probability of being published yet, when theses from 2024 are excluded, this rate increases to 33.0% (n=62). The median publication time of theses published as articles was 3.0 (Q1: 1 - Q4: 18) years. When the number of citations they received per year was calculated to eliminate the time effect, the median value was found to be 0.2 (Q1: 0.0- Q4: 5.5).

No difference was observed in the distribution of designs used in theses over time (p=0.777). The distribution of research designs by year is shown in Figure 3.

The most frequently studied cancer types were; Breast cancer (n=24), Lung cancer (n=21), Cervix cancer (n=19), Prostate and Rectum cancer (n=10). The distribution of thesis topics according to cancer types is shown in Figure 4.

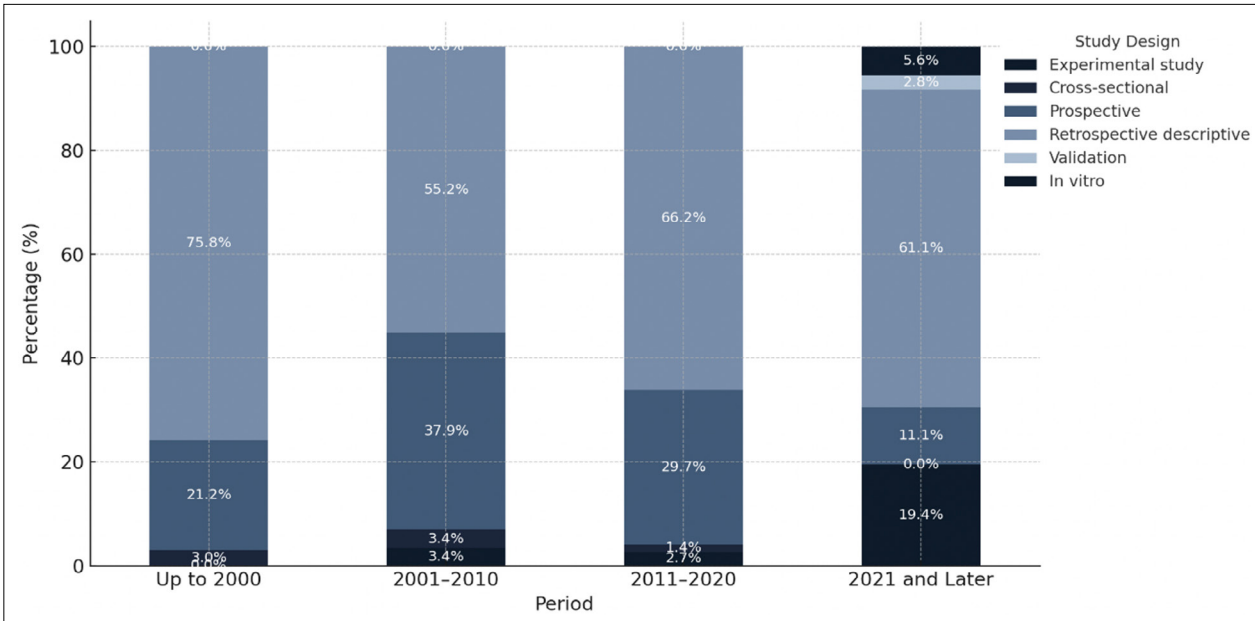

Fig. 3. Study design distribution by period.

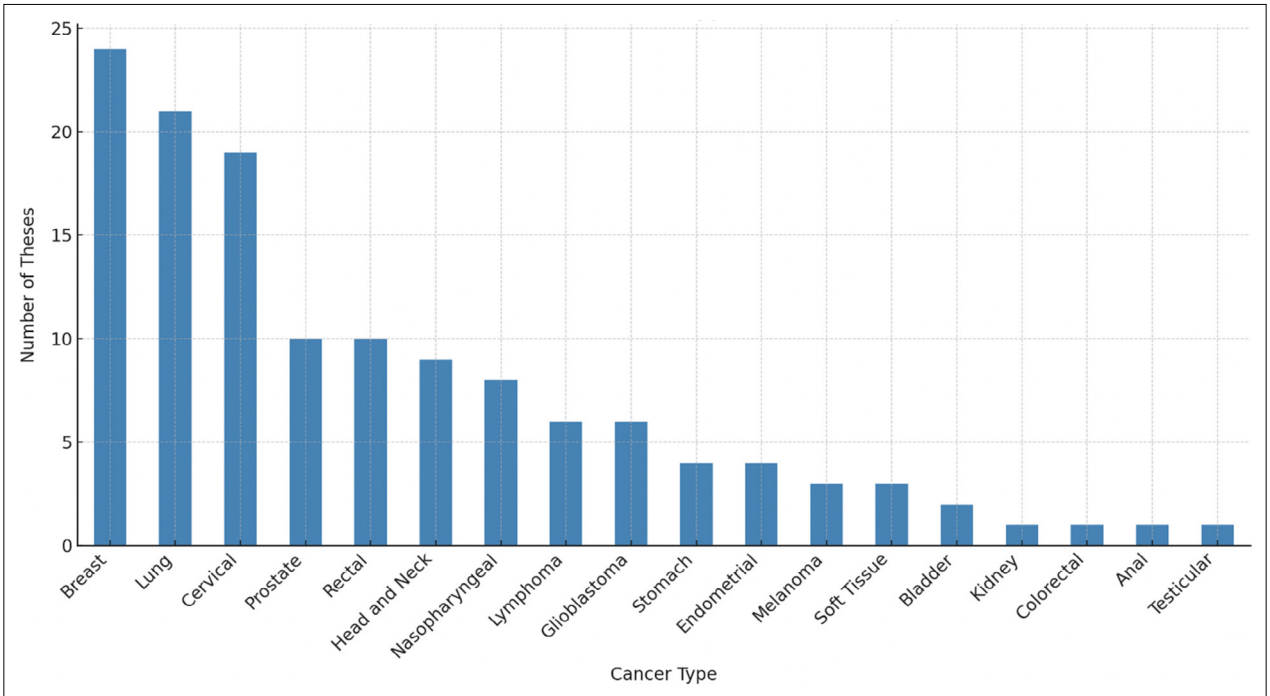

Fig. 4. Cancer type frequency in thesis topics.

There is a statistically significant difference between the study design and the publication status of theses (p=0.040). This difference was found to be between experimental research-retrospective descriptive (p=0.03) and prospective-retrospective descriptive study types in post-hoc analysis (p=0.03). A significant difference was found between thesis years and the publication status as an article (p<0.001). In post-hoc analysis, a statistically significant difference was found only between the 2011–2020 and 2000 and before groups (p<0.001). There is no statistically significant difference in thesis publication rates between universities and training and research hospitals (p=0.397). The type of cancer constituting the study subject did not significantly affect the publication status of theses as an article (p=0.927). Variables related to the publication status of theses are shown in Table 1.

DISCUSSION

The most important indicator of scientific production today is the number of publications in indexed journals. Specialization theses are also one of the most important sources of scientific publications. In Türkiye, completion of a thesis is mandatory for Radiation Oncology specialization training in both university and education and research hospitals. However, the scientific quality of the thesis is debatable. Converting a specialization thesis into a journal article is a reliable indicator of the scientific quality of the thesis. Data on the publication rate of specialization theses are limited.[7] Özgen et al.[7] In their study to determine the conversion rate of medical specialization theses into scientific articles in Türkiye, they examined 22,625 medical specialization theses completed between 1980 and 2005. They found that only 6.2% of theses were published. However, publishing in international journals increases the visibility and reliability of Turkish researchers within the global scientific community.

Medical oncology and radiation oncology are rapidly developing and technology-related specialties. For example, in a study where bibliometric analyses of research trends in targeted therapy for breast cancer were conducted from 2003 to 2022, it was found that the number of publications has been increasing over the years and that the most productive country in this regard is the USA.[8] Similarly, global research trends in the field of radiotherapy are also noteworthy in the literature. In a study that conducted a bibliometric analysis of 62,550 articles published in the Web of Science database between 2001 and 2015, it was emphasized that despite radiotherapy developing rapidly in terms of technical aspects, it has become the focus of less research compared to other areas of cancer treat-

Turk J Oncol 2025;40(3):200–206
doi: 10.5505/tjo.2025.4577

Table 1 Variables related to the publication status of theses

	Published		Not published/ undetermined		p
	n	%	n	%	
Study design					
Experimental study	6	54.5	5	45.5	**0.040**
Cross-sectional	2	50.0	2	50.0	
Prospective	22	40.0	33	60.0	
Retrospective descriptive	30	23.4	98	76.6	
Validation	1	100	0	0	
In vitro	1	50.0	1	50.0	
Theses year					
Up to 2000	3	8.8	31	91.2	<0.001
2001–2010	16	27.6	42	72.4	
2011–2020	34	45.9	40	54.1	
2021 and later	9	25.0	27	75.0	
The institution type					
University	51	32.5	106	67.5	0.397
Training and research hospital	11	24.4	34	75.6	
Cancer type					
Breast	8	33.3	16	66.7	0.927
Lung	6	28.6	15	71.4	
Cervical	4	22.2	14	77.8	
Head and neck	3	37.5	5	62.5	
Rectal	3	30.0	7	70.0	

ment. In the analysis, 32.3% of the publications came from the USA, 8% from Japan, and 7.7% from Germany. While approximately half of the studies focused on application-oriented issues, critical topics such as health services research, palliative care, and quality of life were represented at very low rates. In addition, significant differences in research types were observed across countries, and a striking discrepancy was found between the number of publications and citation impact. This draws attention to radiotherapy research as an area that needs to be supported more, especially in low- and middle-income countries, and suggests that it should guide future national strategies.[9]

For the application to associate professorship in the basic field of Health Sciences; the declared works and academic activities are required to be published from postgraduate theses in the application. This indicates that this rate will increase in the future.

Our analysis showed that there were 202 theses published in the national database between 1988–2024. This may be because collecting sufficient data requires cooperation and usually takes several years. In addition, there may be a limited number of positions opened for Radiation Oncology specialist students.

According to the research results, it was seen that the most preferred research method in the examined articles was quantitative research, and the most preferred research design was retrospective descriptive research. It was determined that the statistically significant difference between the study design and the publication status of the theses was between the experimental research-retrospective descriptive and prospective-retrospective descriptive study types.

In our dataset, a statistically significant difference was found between thesis years and the status of publication as an article between the groups 2011–2020 and 2000 and before. As in all WoS-based bibliometric studies, it is not possible to evaluate journals that have ended their publication life before 2013. In addition, this study may not show the absolute scientific activity of the authors and institutions. An evaluation made by considering articles published in SciVerse, Scopus, Pubmed or other search engines, in journals outside the study and within the country may provide better information. The publication numbers of institutions and authors may differ due to the fact that they do not use standard names or abbreviations during publication submission. In this study, all institution and author

names in the literature were examined and analyzed to prevent this. Bibliometric analyses provide objective data in showing the scientific activities of countries in that branch of science or any subject and in comparing them with other countries.[10] The most important counterpart of the validity and scientific value of the publications is the scientific citations made to the publication. A strong and positive correlation was found between the number of articles published by journals and the number of articles cited. It was thought that the high number of publications in journals caused them to be viewed more in search engines and that this may be due to the increased recognition among authors due to the high number of accepted articles.[11,12] When the number of citations received by the theses published in our study was calculated per year, it was seen that the median value was 0.2 (Q1: 0.0- Q4: 5.5).

The findings of this study indicate that approximately one-third of radiation oncology residency theses in Türkiye have been published in internationally indexed journals. When compared with similar studies conducted at the international level, this proportion appears relatively low. For example, in a study conducted by Verma et al.[13] on 334 radiation oncology residents who graduated in the United States between 2014 and 2015, a total of 659 first-author publications were identified, corresponding to an average of 2.0 publications per resident. In that study, 66% of residents had published at least one article, while 45% had published at least two. Notably, 75% of these publications were original research articles.

Similarly, in a study by Rowley et al.[14] including 909 residents who graduated from 89 different training programs in the U.S. between 2015 and 2019, the average number of publications per resident was found to be 2.90. During this period, a 44% increase in publication output was observed. Among the identified publications, 69.7% were original research articles. The only statistically significant factor associated with higher publication productivity in that study was training in a residency program with a larger number of residents.

In another study conducted in Canada by Mutsaers et al.,[15] the research productivity of Canadian radiation oncology residents was evaluated over a 12-year period (2005–2016). A total of 363 publications were identified during this interval. Notably, 82% of the publications occurred during the fourth year of residency or later, indicating a concentration of research output in the latter stages of training. Furthermore, larger institutions—defined as those graduating more than three residents per year—were associated with higher publication rates.

These findings suggest that research productivity among radiation oncology residents is higher in the United States and Canada, which may be attributed to systemic factors such as strong academic mentorship, statistical support, publication incentives, and a robust institutional research culture. In this study, experimental and prospective research projects were more likely to be published than retrospective studies, indicating that journals may favor certain methodological designs. These study types typically require greater resources and time investment, which may reflect the presence of stronger research infrastructure and academic mentoring in the institutions where they are conducted. In Türkiye, some institutions may benefit from factors such as adequate laboratory access, availability of clinical data, and supervisors with publication experience, which may facilitate publication. Conversely, challenges such as limited supervisor availability, language barriers, and underdeveloped incentive structures may hinder the transformation of theses into publishable manuscripts. These findings highlight that not only individual motivation but also institutional and systemic conditions play a critical role in promoting research dissemination.

Limitations

There are some limitations to the study. Firstly, our analysis focused primarily on quantitative aspects such as the number of publications, citation impact, and collaboration networks. Qualitative aspects such as specific research questions, methodological quality, and clinical implications of individual studies were not investigated in depth. Secondarily, theses included in the National Thesis Center database in Türkiye were included. Therefore, it may be wrong to generalize the results to all theses. In addition, we could not detect the change in thesis title to an article and we could not detect that some other theses may have reached publication or may be currently in the peer-review process or in press. Another limitation is that we focused on published articles and did not conduct a search for oral or poster presentations at a medical congress.

CONCLUSION

In conclusion, bibliometric studies are powerful tools to evaluate a country's research performance in a particular field and provide valuable information about past achievements and future directions. In this context, we believe that our study paves the way for future bibliometric analyses in the Turkish radiation oncology literature.

Turk J Oncol 2025;40(3):200–206
doi: 10.5505/tjo.2025.4577

Ethics Committee Approval: The study was approved by the Sivas Cumhuriyet University Faculty of Medicine Ethics Committee (no: 2025-04/28, date: 24/04/2025).

Informed Consent: Informed consent was obtained from all participants.

Conflict of Interest Statement: The authors have no conflicts of interest to declare.

Funding: This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

Use of AI for Writing Assistance: No AI technologies utilized.

Author Contributions: Concept – E.E., E.A.; Design – E.E., E.A.; Supervision – E.E., E.A.; Funding – E.E.; Materials – E.A.; Data collection and/or processing – E.E., E.A.; Data analysis and/or interpretation – E.E., E.A.; Literature search – E.E., E.A.; Writing – E.E.; Critical review – E.E., E.A.

Peer-review: Externally peer-reviewed.

REFERENCES

1. Donthu N, Kumar S, Mukherjee D, Pandey N, Lim WM. How to conduct a bibliometric analysis: An overview and guidelines. J Bus Res 2021;133:285–96.
2. Aria M, Cuccurullo C. Bibliometrix: An R-tool for comprehensive science mapping analysis. J Informetr 2017;11(4):959–75.
3. Ellegaard O, Wallin JA. The bibliometric analysis of scholarly production: How great is the impact? Scientometrics 2015;105(3):1809–31.
4. Zupic I, Čater T. Bibliometric methods in management and organization. Organ Res Methods 2015;18(3):429–72.
5. Ninkov D, Frank JR, Maggio LA. Bibliometrics: Methods for studying academic publishing. Perspect Med Educ 2022;11(3):173–6.
6. Gasparyan AY, Ayvazyan L, Blackmore H, Kitas GD. Writing a narrative biomedical review: Considerations for authors, peer reviewers, and editors. Rheumatol Int 2011;31(11):1409–17.
7. Özgen Ü, Eğri M, Aktaş M, Sandıkkaya A, Öztürk ÖF, Can S, et al. Publication pattern of Turkish medical theses: Analysis of 22625 medical theses completed in years 1980–2005. Turk Klin J Med Sci 2011;31(5):1122–31.
8. Wu D, Pan C, Hu Y, Shi Z, Zhou Y, Xiao M, et al. Bibliometric and visualization analysis of research trends and hotspots on targeted therapy for breast cancer from 2003 to 2022. Front Oncol 2024;14:1366900.
9. Aggarwal A, Lewison G, Rodin D, Zietman A, Sullivan R, Lievens Y, et al. Radiation therapy research: A global analysis 2001–2015. Int J Radiat Oncol Biol Phys 2018;101(4):767–78.
10. Patsopoulos NA, Analatos AA, Ioannidis JP. Relative citation impact of various study designs in the health sciences. JAMA 2005;293:2362–6.
11. Alıcılar HE, Çöl M. Usage of artificial intelligence in public health. Uludag Univ Tip Fak Derg 2021;47(1):151–5. [Article in Turkish]
12. Tamer HY, Övgün B, Yalçıntaş A. Academic big data and scientific knowledge production: The case of dergipark. Ankara Univ Sos Bilim Derg 2020;11(1):93–110. [Article in Turkish]
13. Verma V, Burt L, Gimotty PA, Ojerholm E. Contemporary trends in radiation oncology resident research. Int J Radiat Oncol Biol Phys 2016;96(4):915–8.
14. Rowley JP, Sindhu KK, Smith WH, Nehlsen AD, Smith AW, Lehrer EJ, et al. Radiation oncology resident research productivity in the United States: 2015 to 2019. Int J Radiat Oncol Biol Phys 2021;109(4):1111–8.
15. Mutsaers A, Jia S, Warner A, Nguyen TK, Laba JM, Palma DA. Research productivity of Canadian radiation oncology residents: a time-trend analysis. Curr Oncol 2020;28(1):4–12.