ORIGINAL PAPER

Investigating the articles on HIV/AIDS from Turkey with bibliometric methods

Sevil Alkan[1], Mustafa Serhat Şahinoğlu[2]

[1]Department of Infectious Diseases and Clinical Microbiology, Canakkale Onsekiz Mart University, Canakkale, Turkey
[2]Manisa City Hospital, Infectious Diseases and Clinical Microbiology, Manisa, Turkey

Abstract

Introduction: The purpose of the study was to determine the volume and extent of general human immunodeficiency viruses (HIV)/acquired immunodeficiency syndrome (AIDS) research in Turkey as well as the coverage of national HIV/AIDS research agenda.

Material and methods: Web of Science (WoS) Core Collection advanced search engine was applied to conduct bibliometric search. "HIV or AIDS or HIV/AIDS or Human immunodeficiency virus or HIV-1 or HIV-2 or acquired immunodeficiency syndrome" and "Turkey" were used as search key words. In addition, the study included "Language = English", "Document area = medicine" and "Document type = Article". We also selected science citation index expanded (SCI-EXPANDED) and social sciences citation index (SSCI) as Web of Science indexes. The data in WoS improved all information on publications, including fields of study, institutions, group authors, funding agencies, journals, citations, and co-authorship.

Results: In total, 313 articles were found. The first document was published in 1996, and 310 (99%) papers were published in the last 20 years. The documents were mostly (62.300%) published in science citation index expanded (SCI-EXPANDED) indexed journals. Most of the publications were from medicine general internal (33.866%) area. The top-ranked affiliations from Turkey in HIV/AIDS research were Istanbul University (19.169%), Ege University (10.863%), University of Health Sciences (9.265%), and Hacettepe University (8.626%). ACTHIV-IST (ACTion against HIV in Istanbul) study group (n = 3, 0.958) was Turkey's most productive HIV/AIDS research group. 87.220% of the studies were not funded.

Conclusions: According to the findings, Turkey has limited HIV/AIDS research output. Furthermore, the majority of investigations were conducted by only a few centers. Because the study covered the entire country, and there are more centers that follow HIV/AIDS patients, these centers should also take part in the research. As a result, the current study emphasizes the importance of increasing targeted financing for HIV/AIDS research.

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Key words: HIV/AIDS, Turkey, articles, bibliometric analysis.

Address for correspondence: Sevil Alkan, Department of Infectious Diseases and Clinical Microbiology, Canakkale Onsekiz Mart University, Canakkale, Turkey, phone: +90-5066873768, e-mail: sevil3910@gmail.com

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Introduction

Human immunodeficiency viruses (HIV) are two lentivirus (a retrovirus sub-group) species that infect people. Over time, they can turn into acquired immunodeficiency syndrome (AIDS) [1]. HIV infection causes systemic T-cell depletion and a reduction in cell-mediated immunity, which leads to a variety of opportunistic infections and malignancies. Mononuclear cell infection and activation cause direct harm to many tissues, including the gut, brain, and lungs. Moreover, it can cause more subtle systemic organ damage, such as chronic cardio-vascular, hepatic, pulmonary, and central nervous system disease, through immune activation and effects on endothelia [2].

In some parts of the world, HIV remains a severe health problem. In 2019, over 1.7 million new HIV infections were reported worldwide, and around 38 million people worldwide were HIV-infected. In 2019, an estimated 690,000 people have died as a result of AIDS-related illnesses. Since the beginning of HIV/AIDS epidemic, an estimated 33 million individuals have died from AIDS-related illnesses. Eastern and Southern Africa is the world's most HIV-affected region, accounting for nearly half of all new HIV infections. Asia and the Pacific, Western and Central Africa, Western and Central Europe, North America, and Latin America are also highly affected by HIV [3]. HIV is a sexually transmitted infection, which spreads through contact with or transmission of blood, pre-ejaculate, sperm, and vaginal fluids. HIV is untransmittable through condomless sexual intercourse if HIV-positive partner has a persistently undetectable viral load, according to a research (for both same-sex and opposite-sex couples) [4]. HIV treatment cascade is included in the framework of the Joint United Nations Program on HIV/AIDS (UNAIDS) 90-90-90 objectives, which spans prevention, diagnosis, linkage to care, medication adherence, and retention to viral suppression (and well-being beyond viral suppression [5].

In Turkey, HIV/AIDS is on the list of notifiable diseases, and surveillance has been carried out since the first case reported in 1985. According to data from the Republic of Turkey's Ministry of Health, from 1985 to November 15, 2021, there were 29,284 HIV-infected individuals and 2,052 AIDS cases in our country. 81.2% of the cases are men, 18.8% are women, and 16% are foreign nationals. The highest incidence of cases are reported in age groups between 25 and 29 years and 30 and 34 years. Considering the distribution according to the mode of transmission, it is known that 46.1% of the cases are sexually transmitted, and 68.6% of these reported sexually transmitted cases are through a heterosexual intercourse. In addition, transmission route for 1% of the cases is intravenous drug use, and transmission route for 52.57% of the cases is unknown [6]. An increase of more than two times was observed in the number of HIV/AIDS-infected patients reported between 2009 and 2018 in Turkey. Considering that, there has been no change in death reporting system or HIV/AIDS surveillance during this period, and this increase can be interpreted as a real increase. In addition, the European Centre for Disease Prevention and Control (ECDC) reported that the number of newly diagnosed HIV-infected cases in the central European region, including Turkey, increased faster than in the remaining regions [7].

The purpose of the study was to determine the volume and extent of general HIV/AIDS research in Turkey as well as the coverage of national HIV/AIDS research agenda. The primary purpose was to identify high-priority areas of HIV/AIDS research that need to be enhanced and addressed in order to provide a novel viewpoint on academic studies.

Material and methods

Research model

Bibliometric analysis is a way of screening of scientific books, papers, and journals for certain features using mathematical and statistical methods, and then presenting the structure and dynamics of field by analyzing performances of institutions, countries, and authors. Researchers can detect the accumulation between particular years using bibliometric analysis. This method allows guiding information to be offered to other researchers in the field, allowing them to attain knowledge faster and more accurately [8-16].

Search strategy

Web of Science (WoS) Core Collection advanced search engine was used to conduct the bibliometric search, which provides a standard dataset for analyzing and tracking bibliographical factors, such as authors' names, country, journal title, affiliation, key words, number of citations, and subject areas. Between 1970 and 2021, data for this bibliometric analysis was obtained from the WoS Core Collection. "HIV or AIDS or HIV/AIDS or Human immunodeficiency virus or HIV-1 or HIV-2 or acquired immunodeficiency syndrome" and "Turkey" were the key words chosen for use in the WOS search engine. In addition, the study included "Language = English", "Document area = medicine", and "Document type = Article". Science citation index expanded (SCI-EXPANDED), and social sciences citation index (SSCI) as Web of Science indexes were selected. Data in WoS improved all information on publications, including fields of study, institutions, group authors, funding agencies, journals, citations, and co-authorship. All electronic searches were completed on May 1, 2022, and the year 2022 was not included in the study, because complete data for that year was unavailable.

Data collection

Titles, document types, years of publication, names of authors, affiliations, key words, group authors, names of publishing journals, abstracts of each record, and citations within the WoS publications were saved as TXT files, and imported into Microsoft Office Excel 2019 (Los Angeles, CA, USA). We accessed material using the online library and digital resources of Çanakkale Onsekiz Mart University.

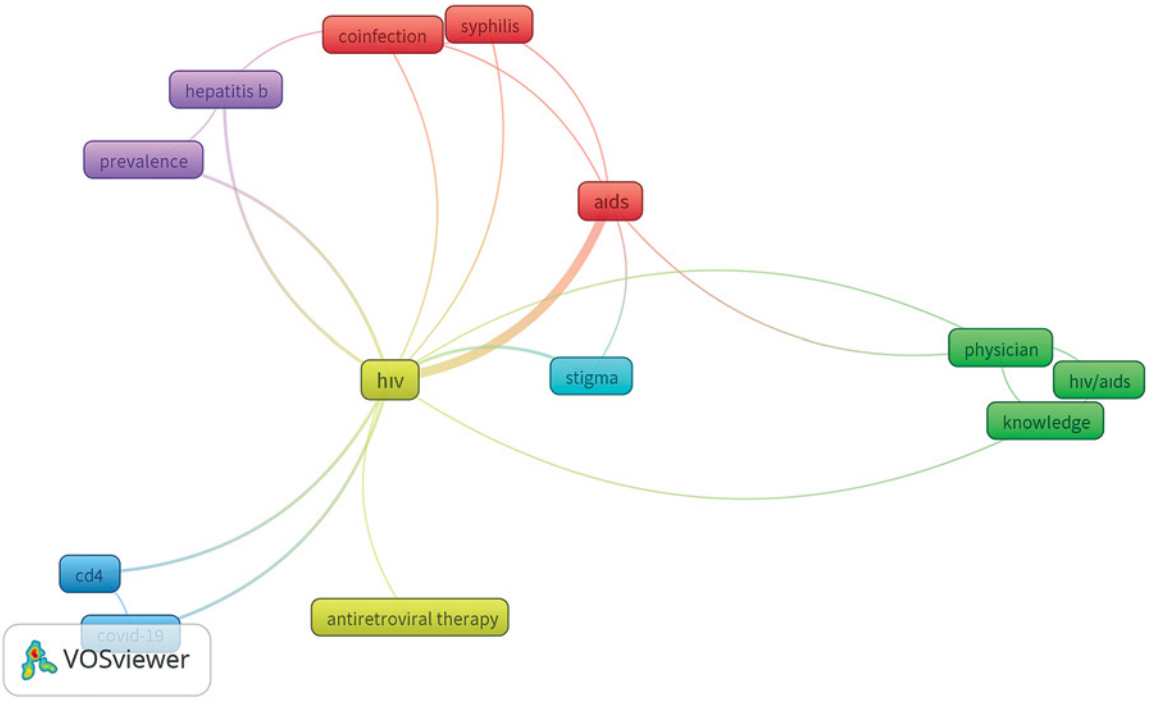

Figure 1. Key word visualization map of articles with a minimum of five occurrence

Table 1. Research areas

Research area	Record count	Percentage of 313 articles
General internal medicine	106	33.866
Microbiology	84	26.837
Infectious diseases	54	17.252
Immunology	25	7.987
Public environmental occupational health	18	5.751
Virology	13	4.153
Cardio-vascular system cardiology	8	2.556
Neuro-sciences neurology	8	2.556
Pharmacology pharmacy	8	2.556
Dermatology	7	2.236
Gastroenterology hepatology	6	1.917
Healthcare sciences services	6	1.917
Mycology	6	1.917
Ophthalmology	5	1.597
Pediatrics	5	1.597
Biophysics	4	1.278
Hematology	4	1.278
Rheumatology	4	1.278
Psychiatry	3	0.958
Respiratory system	3	0.958

Showing 25 out of 47 entries

Table 2. Top five ranked affiliations (according to first author's affiliations)

Affiliation	Record count	Percentage of 313 articles
Istanbul University	60	19.169
Ege University	34	10.863
University of Health Sciences Turkey	29	9.265
Hacettepe University	27	8.626
Istanbul University Cerrahpasa	26	8.307

Table 3. The first ranked authors from Turkey in HIV/AIDS research

Author(s)	Record count	Percentage of 1.725
Hayat Kumbasar Karaosmanoglu	23	7.348
Özlem Altuntaş Aydin	22	7.029
Deniz Gokengin	22	7.029
Alper Gunduz	17	5.431
Serhat Ünal	17	5.431
Birgül Mete	15	4.792
Fatma Sargın	14	4.473
Figen Kaptan	13	4.153
Murat Sayan	13	4.153
Fehmi Tabak	13	4.153
Ayse Inci	12	3.834
Ozcan Nazlıcan	12	3.834
Ali Agacfidan	11	3.514
Selçuk Kaya	11	3.514
Mustafa Kemal Celen	10	3.195
Şükran Köse	10	3.195
Haluk Eraksoy	10	3.195
Aydın Deveci	10	3.195
Muzaffer Fincancı	10	3.195
Dilara İnan	10	3.195

**Showing authors with ≥ 10 articles.*

Bibliometric and visualized analysis

Basic functioning of the WoS database was used to describe the basic qualities of eligible articles, which were previously indicated. Hirsch (H)-index was presented as an alternative to conventional bibliometric indicators as the best assessment for evaluating the impact of scientific research.

Density of the network was determined by the thickness of lines between characters in a map, which was obtained using the VOS viewer version 1.6.16 software tool (Leiden University, Leiden, The Netherlands). Co-occurrence networks from the obtained publications' bibliographic metadata were created, including nations, institutions, MeSH terms, and key words. This technique was assessed to provide various bibliometric indicators, such as co-citation, co-authorship, key word, and co-occurrence analysis in publications.

Ethical approval

As no humans or animals were involved in bibliometric investigations, no ethical approval was necessary.

Results

In total, 313 articles were retrieved, and the only articles analyzed in the current study were from the area of medicine from Turkey. The first paper was published in the year 1996 [17], and the number of studies from Turkey on HIV/AIDS tended to increase in the recent 5 years. 310 (99%) papers were published in the last 20 years (Figure 1). 156 (49.840%) of the studies were published as an open access, and 205 (65.495%) were written in English and 108 (34.505%) in Turkish languages. The studies were mostly (62.300%) published in science citation index expanded (SCI-EXPANDED), as a result of the Web of Science categories. Most of the publications were from medicine general internal (33.866%), microbiology (26.837%), and infectious diseases (17.252%) areas (Table 1). The top-ranked affiliations from Turkey in HIV/ AIDS research were Istanbul University (19.169%), Ege University (10.863%), University of Health Sciences (9.265%), and Hacettepe University (8.626%) (Table 2). ACTHIV-IST (ACTion against HIV in Istanbul) study group (n = 3, 0.958%), the Euro guidelines in Central and Eastern Europe (ECEE) network group (n = 2, 0.639%), and the HIV TR study group (n = 2, 0.639%) were Turkey's the most productive HIV/AIDS research groups. The authors who published articles from Turkey on HIV/ AIDS are given in Table 3.

'Klimik Journal' was the top-ranked journal that published the highest number of studies (10.543%) on HIV/ AIDS in Turkey (Figure 2). The top 5 journals that published the most papers on HIV/ AIDS from Turkey were also published from Turkey. 87.220% of the studies were not funded, and the Istanbul University was the institution that funded the highest number (1.597%) of studies from Turkey.

Citing analysis

The articles were cited 2,480 times in total, and 7.92 on average per article. H-index was 19. The number of citations has increased since 2014 (Figure 3). The number of articles, citations, and H-indexes according to years are presented in Table 4.

Figure 1 illustrates the analysis of the most used terms, eliminating those related to HIV/AIDS and adherence. There were mainly studies on sero-prevalence and co-infections. Network visualization map of co-authorship among

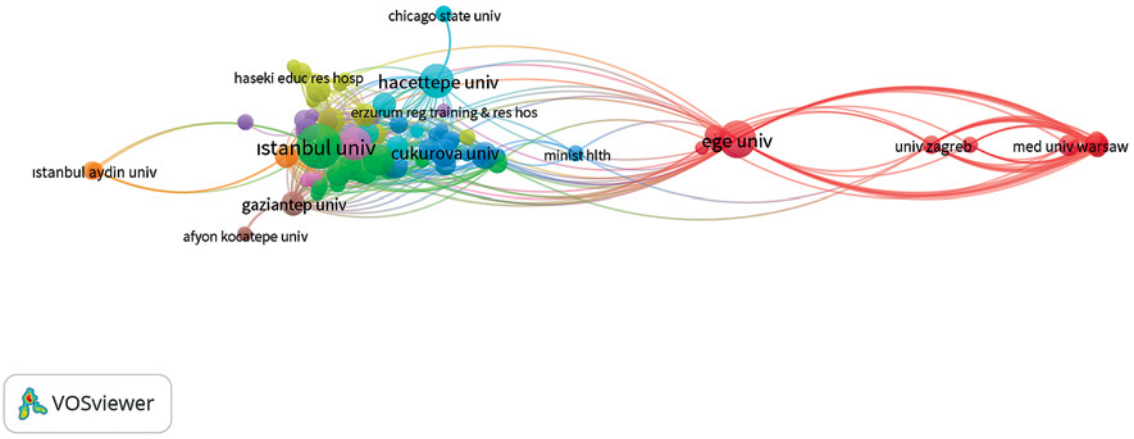

Figure 2. Citation visualization map among affiliations with a minimum of 3 publication and 1 citation. Citations are shown by lines connecting affiliations. Affiliations with a greater circle size or font size had a higher number of citations

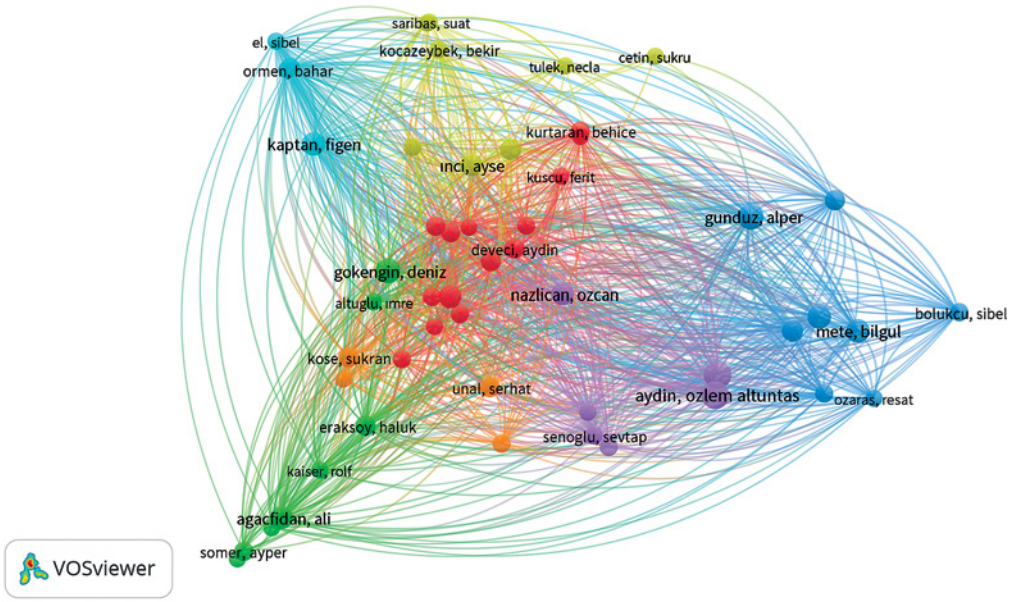

Figure 3. Network visualization map of bibliographic coupling among authors. Collaboration is indicated with lines connecting authors. Stronger cooperation are indicated by thicker lines. Authors with a larger circle or text size had a higher level of collaboration

affiliations and citation map among authors are shown in Figures 2 and 3.

Discussion

It was observed that the growing rate of HIV/AIDS literature is becoming more and more rapid. In addition, the number of languages and nations represented in this literature has grown dramatically. Some scholars have decided to conduct bibliometric studies as a result of this growth. Bibliometric analyses of HIV/AIDS studies were conducted in the available literature. Although there are studies that analyze publications on different subjects and from different countries under the title of HIV/AIDS, these studies arose from descriptive and quantitative reviews of the HIV/AIDS literature. However, most bibliometric studies have been conducted to analyze the HIV/AIDS literature production situation in developed countries [18-26], but no similar study could be found that analyzes publications from Turkey. Our study can help the researchers in terms of reflecting

Table 4. The number of articles, citations, and H-indexes according to years

Publishing date	Number of articles	Number of citations	Citation per article	*H*-index
2014-2021	214	1,570	7.34	13
2006-2013	88	682	7.75	14*
2005-1996	11	228	20.73*	10

**Maximum number according to the article's own time publishing period.*

on the scientific output of HIV/AIDS in Turkey. An earlier report confirmed South Africa's leadership role in HIV/AIDS research, but also emphasized contributions of Uganda, Malawi, Botswana, Zimbabwe, and Mozambique [20]. In the current study, only articles from Turkey were analyzed according to search criteria.

Apart from its' personal consequences, HIV/AIDS is one of the world's most serious public health issues since it can be transmitted from person to person and is widely dispersed due to its' high socio-ecological burden. HIV infection is not only a health issue, but also a social concern that affects the entire society and every individual who lives in it [22]. "Elimination of HIV infections, HIV-related fatalities, and HIV-related prejudice by creating a world where HIV-infected individuals live longer and better lives" is the 2030 vision of the action plan for HIV infection [27]. However, the number of HIV/AIDS-infected people have increased in the recent years in Turkey [6]. This study aimed to provide a perspective on this topic and help HIV/AIDS researchers from Turkey. In parallel with the increase in the number of infected patients, there has been an increase in both the number of publications and citations in our country. However, the current study revealed that HIV/AIDS research began in 1996, eleven years after the first case of HIV/AIDS was recorded in Turkey (i.e., in 1985).

The first paper was published in the year 1996 [17], and the number and citations of the papers from Turkey on HIV/AIDS tended to increase over the years, especially after the 2000s; 310 (99%) studies were published in the last 20 years. The articles were cited 2,480 times in total, and 7.92 on average per article. H-index was 19. The number of citations has increased since 2014.

The analysis of our records revealed that the main participating authors were from the Istanbul University (19.169%), Ege University (10.863%), University of Health Sciences (9.265%), and Hacettepe University (8.626%). In other words, the publications were most frequently published from three major cities (Istanbul, Ankara, and Izmir). This may be due to the diagnosis/treatment opportunities in these provinces, population density, referral of patients from surrounding provinces, density of HIV/AIDS patients, and the fact that these institutions are well-established universities.

Finally, 'Klimik Journal' and 'Mikrobiyoloji Bulteni' were the journals that published the most articles on HIV/AIDS from Turkey. The top 5 journals that published the most publications on HIV/AIDS from Turkey were also from Turkey. Clusters of themes reflecting HIV/AIDS networks and maps have been obtained from citation investigations as well as important institutions and scientists [28]. In our study, we used cluster analysis (Figures 1-3). According to the findings, Turkey has a significant HIV/AIDS research output. However, the national research agenda on HIV/AIDS does not go far enough. Furthermore, the majority of the studies were conducted by only a few centers. Because the current study covered the entire country and there are more centers that follow HIV/AIDS patients, these centers should also take part in the research. Basic and preventive interventions as well as national planning are also major research shortages. Some of the research priorities on the national HIV/AIDS research agenda, such as high priority research areas, are hardly covered by a single study. As a result, the current study emphasized the importance of increasing targeted financing for HIV/AIDS research, particularly in places where the most critical gaps exist.

Limitations

The current research has certain limitations. In this current study, a single database was utilized using the bibliometric method to provide baseline information, and to highlight research gaps for future studies and funding. Other than WoS, it was not possible to incorporate publications from journals that were not indexed in other databases. Furthermore, because all of the key words were in English, it is possible that publications in other languages went unnoticed. Furthermore, the fact that scientific papers are updated on a daily basis may affect the study's findings in future similar investigations. In addition, advanced analyzes, such as content analysis and analysis of the most cited publications, were not included in the present study.

Conflict of interest

The authors declare no conflict of interest.

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