Original Article

ANATOLIAN CURRENT MEDICAL

DOI: 10.38053/acmj.1263215

Anatolian Curr Med J. 2023;5(3):206-216

The evolution of hemorrhoids publications during 1980-2021: a global and medical view with bibliometric analysis

İsmail Sezikli, Orhan Aslan, Ramazan Topcu

Departmant of General Surgery Faculty of Medicine, Hitit University, Çorum, Turkey

Cite this article as: Sezikli İ, Aslan O, Topcu R. The evolution of hemorrhoids publications during 1980-2021: a global and medical view with bibliometric analysis. *Anatolian Curr Med J.* 2023;5(3):206-216.

Received: 10.03.2023 ◆ **Accepted**: 21.05.2023 ◆ **Published**: 28.07.2023

ABSTRACT

Aims: Hemorrhoids is a common anorectal disorder and significantly affects quality of life. Although the number of global studies on hemorrhoids has increased in recent years, there is still no bibliometric study in the literature. In this study, it aimed that analyzing the scientific articles published on hemorrhoids holistically.

Methods: The articles published between 1980 and 2021 were analyzed using bibliometric and statistical methods on hemorrhoids. Network visualization maps were used to identify trending topics and international collaborations. Spearman's correlation coefficient was used for correlation studies. The Exponential Triple Smoothing estimator was used to estimate the number of articles expected to be published in the coming years.

Results: A total of 3203 publications were found. 1863 (58.1%) of these publications were articles. The most active author is Gupta PJ. (n=26). The first 2 journals that published the most articles were Diseases of the Colon & Rectum (n=228) and Colorectal Disease (n=82). Singapore General Hospital (n=35) and University of Rome La Sapienza (n=19) were the 2 most active institutions. According to the average number of citations per article, the top 2 most influential journals were British Journal of Surgery and American Journal of Gastroenterology.

Conclusion: In this comprehensive study on hemorrhoids, a statistical analysis of 1863 articles was shared. It was determined that the trend topics in hemorrhoid researches were THD, mucopexy, transanal hemorrhoidal dearterialization, colorectal surgery, embolization, constipation, risk factors, Milligan-Morgan, classification, recurrence and randomized controlled trial. This article can be a useful resource for scientists and clinicians in terms of the global output of hemorrhoids yesterday, today and tomorrow.

Keywords: Hemorrhoids, haemorrhoids, bibliometric analysis, citation analysis, trends

INTRODUCTION

Hemorrhoidal disease is a common anorectal disorder that causes physical and psychological discomfort and significantly affects quality of life.[1,2] The main symptoms of hemorrhoids are bleeding, itching, soiling, pain, prolapse, and mucus discharge.[1-3] Especially a good history and careful physical examination can make an accurate diagnosis. Internal hemorrhoids that do not protrude can only be found during endoscopy.[1,2] Complete endoscopic evaluation of the colon is indicated in patients with rectal bleeding.[4]

Bowel habits and lifestyles can be risk factors for hemorrhoids.[3] A low-fiber diet and constipation are thought to increase the risk of hemorrhoids.[2] Dietary modification (rich in adequate fluid and fiber intake) and behavioral therapies such as defecation habits counselling, medical treatment (e.g. stool softeners, topical nitroglycerin), and warm water sitz baths typically constitute the first-line conservative treatment for patients with symptomatic hemorrhoid disease.[4,5] Medication for hemorrhoids is typically used for bleeding, pain, and swelling.[3]

A number of office-based interventions, such as rubber band ligation and infrared coagulation, are widely used and economically viable for the effective treatment of hemorrhoids resistant to medical treatments. Surgical procedures are effective in removing hemorrhoids, but can cause more pain and longer recovery time than office-based procedures.[2,5] Therefore, hemorrhoidectomy should be considered for recurrent or higher grade disease.[5] Internal hemorrhoids are traditionally graded I to IV according to the degree of prolapse.[5] Most grade I-II patients and patients with grade III internal hemorrhoidal disease for whom medical treatment has failed can be effectively treated with office-based

Corresponding Author: Ramazan Topcu, topcur58@gmail.com

procedures such as taping, sclerotherapy, and infrared coagulation (IRCHemorrhoidectomy should typically be offered to patients whose symptoms result from external hemorrhoids or combined internal and external hemorrhoids with prolapse (grade III-IV).[3-5]

Complications after surgical hemorrhoidectomy are low, the most common being post-procedural bleeding, with most larger series reporting an incidence of between 1% and 2%.[6] Acute urinary retention has been reported to occur between 1% and 15% and is the most common reason for surgical inability to discharge patients.[4,7]

Symptoms related to hemorrhoids are very common in the western hemisphere and other industrialized societies.[4] Although published prevalence estimates for hemorrhoids, which represent one of the most common medical and surgical diseases encountered in the United States, differ, more than 2.2 million outpatients per year; is the diagnosis of the third most common gastrointestinal pathology.[2,4] The overall prevalence in adults in Austria was reported as 39% by Riss et al.[1]

Bibliometrics is the analysis of scientific publications in the literature using various statistical methods.[8,9] Especially in recent years, in parallel with the increasing number of publications in the literature, bibliometric studies have been carried out on many important medical subjects.[8-14] Thanks to studies using bibliometric and statistical approaches, past and current trends, the most influential publications and journals, the most active authors and institutions can be determined about a subject or research area.

In addition, such studies give researchers the opportunity to dominate the literature in a short time.[8-14] Although the number of global studies on hemorrhoids has increased in recent years, there is still no bibliometric study in the literature. In this study, it was aimed to evaluate the scientific articles on hemorrhoids published between 1980 and 2021 holistically using bibliometric and statistical approaches. As a result of the analyzes, it was aimed to determine the most effective studies and journals, the most active countries, institutions and authors on hemorrhoids, to reveal cooperation between countries, and to identify past and current issues.

METHODS

The study is an open data study, does not contain human or animal material, and does not require ethics committee approval. All procedures were carried out in accordance with the ethical rules and the principles.

Web of Science (WoS) database (by Clarivate Analytics) was used for the literature review. The publication scan was performed only in the "title" section of the publications. All keywords related to hemorrhoid ("hemorrhoid*", "haemorrhoid*") were used for literature search in the WoS database. As a result of this search method, all articles containing any of the statements about hemorrhoids and other uses in the title were obtained and downloaded from the WoS database. The search process was determined as 1980-2021 (access date: 30.11.2021). Reproducibility codes (search findings may vary depending on different access dates) for researchers to access similar documents: (Title: (hemorrhoid*) or Title: (haemorrhoid*) Timespan: 1980-2021. Indexes: SCI-Expanded, SSCI, A&HCI, CPCI-S, CPCI-SSH, BKCI-S, BKCI-SSH, ESCI). VOSviewer (Version 1.6.17, Leiden University's Center for Science and Technology Studies) package program was used for bibliometric network visualizations and citation analysis (15). The Exponential Smoothing estimator was used in the Microsoft Office Excel program to estimate the number of publications in the coming years based on past publication trends. Statistical analysis were performed with SPSS (Version 22.0, SPSS Inc., Chicago, IL, USA) package program. The normal distribution of data was tested with the Kolmogorov-Smirnov test. The correlations between the publication productivity of the world countries on hemorrhoids and some economic development indicators (Gross Domestic Product (GDP), Gross Domestic Product per capita (GDP per capita)) of the countries (data obtained from the world bank) were investigated with Spearman's correlation coefficient in accordance with the data distribution (16). The statistically significant difference was considered to be $P<0.05$.

RESULTS

A total of 3203 publications were found in the literature review of the WoS database on hemorrhoids between 1980-2021. The distribution of these publications is Article (1863, 58.1%), Meeting Abstract (495, 15.4%), Letter (364, 11.3%), Review (165, 5.1%), Proceedings Paper (158, 4.9%), and the rest (n=158) were in other publication types (Editorial material, Book Chapter, Note, Correction, Early Access, News item, Book, Correction Addition, Discussion, Book review, Poetry, Reprint, Retracted publication). Bibliometric analyzes were carried out with 1863 articles from 3203 publications in total. 88% (1640) of these articles were in English, 5.2% (97) in German, 3.2% (60) in French, 1.5% (28) in Spanish, 1.1% (22) in Russian, and the rest in other languages. (Italian (6), Turkish (3), Japanese (2), Dutch (1), Hungarian (1), Korean (1), Portuguese (1), Ukrainian (1)) were published. The h-index of 1863 articles was 69, average citations per article 14.57, sum of times cited 27138 (without self citations: 13021).

Active Research Areas

The top 7 research areas with the most articles on hemorrhoids are Surgery (1028, 55.1%), Gastroenterology Hepatology (699, 37.5%), Medicine General Internal (284, 15.2%), Medicine Research Experimental (85, 4.5%), Pharmacology Pharmacy. (76, 4.0%), Integrative Complementary Medicine (23, 1.2%), and Radiology Nuclear Medicine Medical Imaging (22, 1.1%).

Development and Future Trend of Publications

The distribution of the number of published articles by years is shown in **Figure 1**. The estimation values of the results of the Exponential Smoothing estimation model, which is used to estimate the number of articles that can be published in 2021 and beyond, and the distribution of the number of published articles by years are shown in **Figure 1**. Since 2021 was not completed, it was excluded from the forecasting model. According to the estimation model results, it is estimated that 106 (Confidence Interval %: 83-128) articles will be published in 2021 and 113 (CI%: 81-145) articles will be published in 2025 (**Figure 1**).

Active Countries

The distribution of the number of articles by world countries is shown in **Figure 2**. Top 25 countries with the highest number of articles on hemorrhoids USA (250, 13.4%), Italy (210, 11.2%), UK (198, 10.6%), Germany (115, 6.1%), China (100, 5.3%), France (96, 5.1%), India (83, 4.4%), Japan (69, 3.7%), Turkey (62, 3.3%), Taiwan

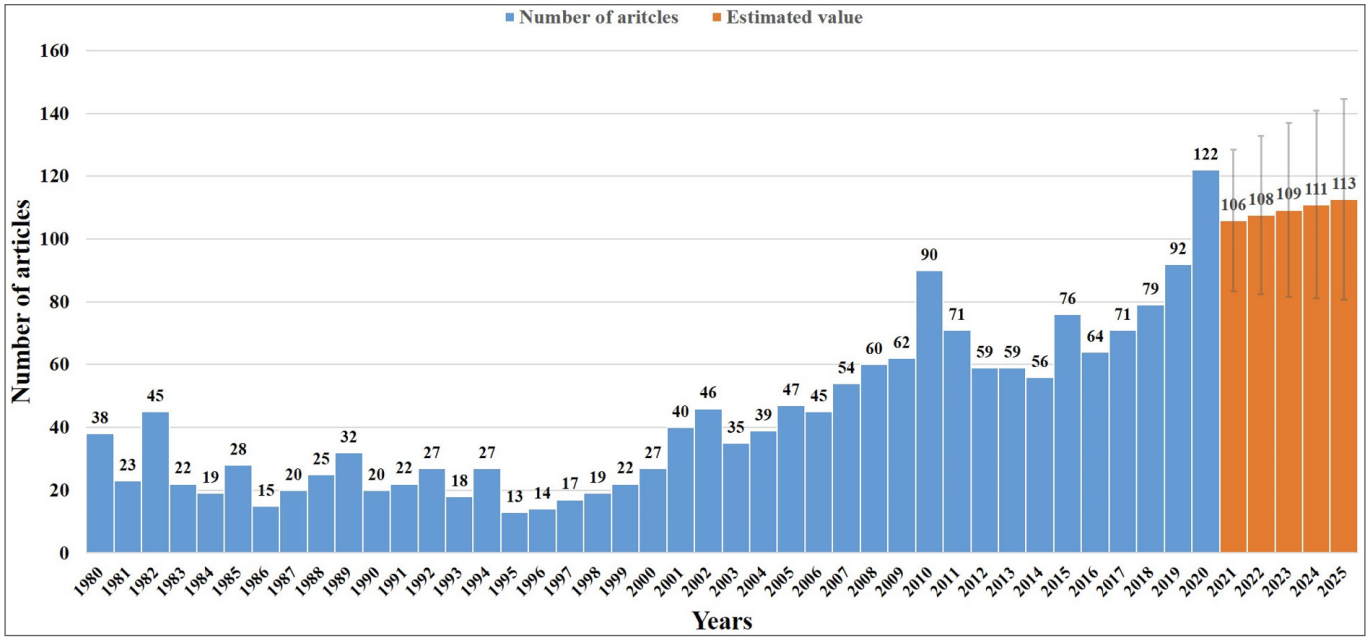

Figure 1. Distribution of articles on Hemorrhoids by years and estimation of articles in the coming years

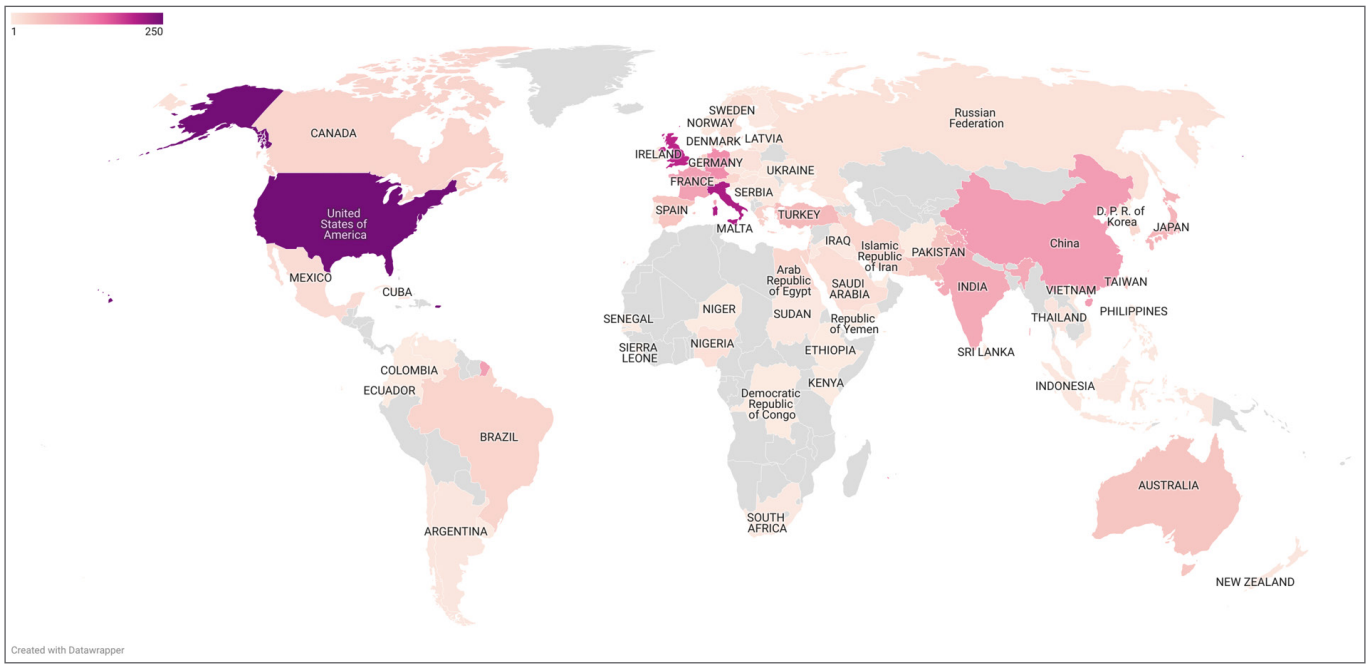

Figure 2. Top 20 countries in the world that have published the most articles on tracheostomy

(51, 2.7%), Spain (48, 2.5%), Australia (47 , 2.5%), Pakistan (47, 2.5%), Singapore (46, 2.4%), Netherlands (36, 1.9%), Israel (33, 1.7%), Switzerland (32, 1.7%), Greece (31, 1.6)), Brazil (28, 1.5), Canada (28, 1.5), Iran (27, 1.4%), Austria (24, 1.2%), Egypt (24, 1.2%), South Korea (24, 1.2%), Sweden (20, 1.0%). Network visualization map of cluster analysis, which was obtained as a result of cluster analysis among 35 countries that produced at least 5 articles from 103 countries producing publications on hemorrhoids and whose authors have international cooperation, is shown in **Figure 3.a.** According to the results of the analysis, 8 different clusters related to international cooperation were formed (Cluster 1: Belgium, Canada, France, India, Malaysia, Mexico, Russia, Thailand. Cluster 2: Denmark, Germany, Greece, Japan, Lithuania, Spain, Sweden. Cluster 3: Chile, Iran, Italy, Singapore, South Korea, Switzerland, USA Cluster 4: Netherlands, Poland, Turkey Cluster 5: Israel, China, Taiwan Cluster 6: England, Scotland, Wales Cluster 7: Australia, New zealand. Cluster 8: Austria, Nigeria). Total link strength scores showing the strength of cooperation were calculated for these 35 countries. The International collaboration density map created according to these scores is shown in **Figure 3.b.**

Correlation Analysis

There was a statistically positive and highly significant correlation between the GDP, and GDP per capita values of the world countries and the number of articles produced by the countries on Hemorrhoid (r=0.729, p<0.001; r=0.606, p<0.001).

Active Authors

The top 10 most active authors producing the most articles on hemorrhoids are Gupta PJ, respectively. (n=26), Eu KW. (18), Seow-Choen F. (17), Altomare DF. (15), HoYH. (14), Milito G. (13), Naldini G. (13), Ratto C. (13), Watson AJM. (13), Mascagni D. (11).

Active Institutions

The most active universities producing 10 or more articles on hemorrhoids are Singapore General Hospital (n=35), University of Rome La Sapienza (n=19), Tel Aviv University (18), University of Rome Tor Vergata (18), China Medical University (12), Raigmore Hospital (11), University Copenhagen (11), University Milan (11), University Illinois (10), Aristotle University Thessaloniki (9), Shanghai University of Traditional Chinese Medicine (9), University of California Los Angeles (9), University Palermo (9), and University of Sao Paulo (9).

Active Journals

1863 articles on hemorrhoids were published in 515 different journals. The first 35 most active journals producing 10 or more articles from these journals, the total number of citations received by the journals and the average number of citations per article are presented in **Table 1**. The citation network visualization map between these journals is presented in **Figure 4.**

Citation Analysis

The first 30 articles with the highest number of citations according to the total number of citations from 1863 articles published between 1980-2021 are presented in **Table 2**. The average number of citations received by the articles per year is given in the last column of **Table 2.**

Co-citation Analysis

There were a total of 14024 studies cited in the references section of all 1863 articles analyzed. The top 10 studies that received the most co-citations (more than 140 citations) were Longo (17) (NC: 227), Milligan (18) (NC:222), Thomson (19) (NC:219), Mehigan (20) (NC: 195), Macrae (21) (NC: 182), Johanson (22) (NC: 168), Morinaga (23) (NC:167), Rowsell (24) (NC:163), Cheetham (25) (Number of co-citations, NC: 141), Ganio (26) (NC: 140), were his works (17-26).

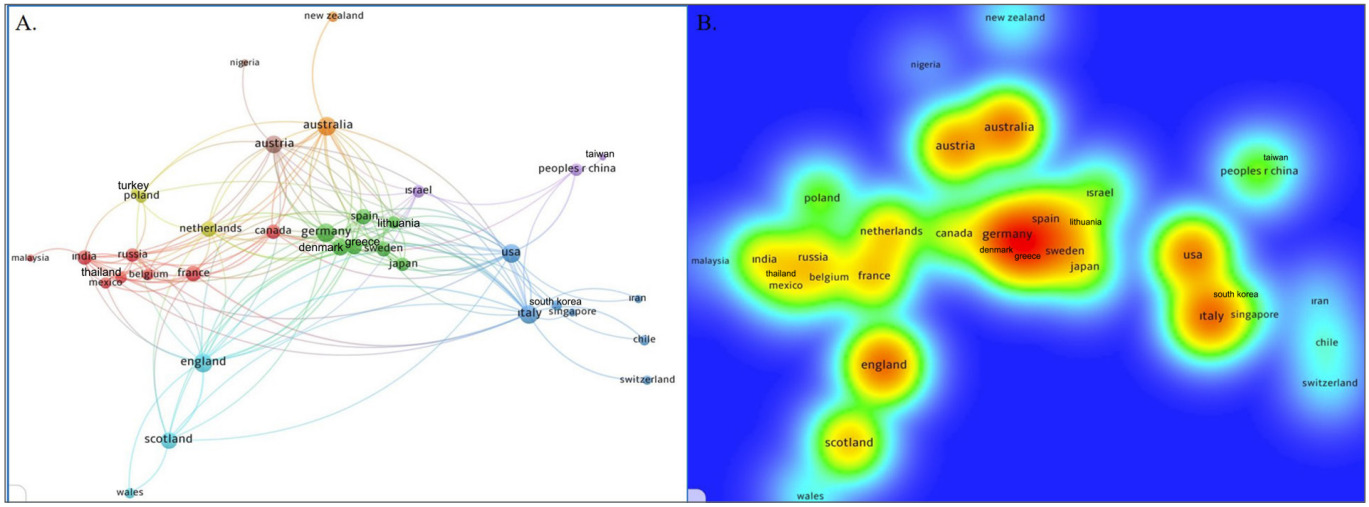

Figure 3. a. Network visualization map of cluster analysis on international collaboration between countries on Hemorrhoids. Footnote: Colors indicate clustering. The size of the circle indicates the large number of articles. b. Density map for international collaboration of countries on tracheostomy. Footnote: The strength of international collaboration score increases from blue to red (blue-green-yellow-red)

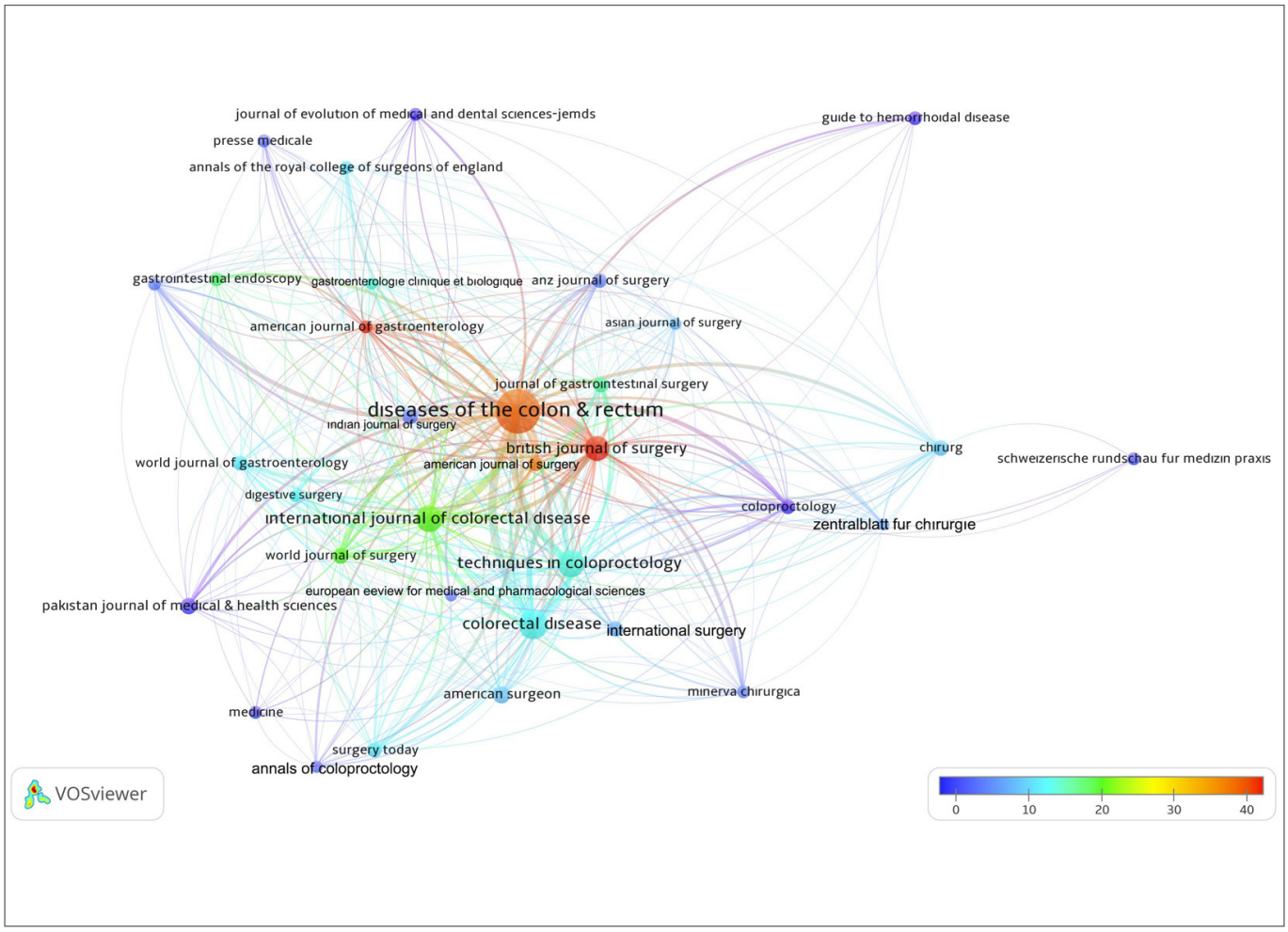

Figure 4. Network visualization map for citation analysis of active journals on Hemorrhoids. Footnote: The average number of citations per article by journals increases from blue to red (blue-green-yellow-red). The size of the circle indicates the large number of articles.

Table 1. The 35 most active journals that have published more than 10 articles on hemorrhoids

Journals	RC	C	AC	Journals	RC	C	AC
Diseases of the Colon & Rectum	228	8482	37.20	Guide to Hemorrhoidal Disease	14	1	0.07
Colorectal Disease	82	1106	13.49	American Journal of Gastroenterology	13	547	42.08
Techniques in Coloproctology	71	1018	14.34	Annals of the Royal College of Surgeons of England	13	142	10.92
International Journal of Colorectal Disease	67	1399	20.88	Annali Italiani Di Chirurgia	13	59	4.54
British Journal of Surgery	56	2674	47.75	Khirurgiya	13	3	0.23
American Surgeon	25	224	8.96	Journal of Evolution of Medical and Dental Sciences-Jemds	12	0	0.00
Pakistan Journal of Medical & Health Sciences	21	12	0.57	Medicine	12	17	1.42
Chirurg	19	182	9.58	Minerva Chirurgica	12	57	4.75
Journal of Gastrointestinal Surgery	19	310	16.32	Presse Medicale	12	40	3.33
World Journal of Surgery	19	384	20.21	Schweizerische Rundschau Fur Medizin Praxis	12	17	1.42
Indian Journal of Surgery	18	77	4.28	Annals of Coloproctology	11	34	3.09
International Surgery	18	129	7.17	Digestive Surgery	11	149	13.55
American Journal of Surgery	17	613	36.06	European Review for Medical and Pharmacological Sciences	11	51	4.64
Anz Journal of Surgery	17	76	4.47	Zentralblatt Fur Chirurgie	11	78	7.09
Coloproctology	17	6	0.35	Asian Journal of Surgery	10	83	8.30
World Journal of Gastroenterology	17	195	11.47	Gastroenterologie Clinique Et Biologique	10	145	14.50
Surgery Today	16	181	11.31	Prensa Medica Argentina	10	0	0.00
Gastrointestinal Endoscopy	15	267	17.80				

RC: Record Count, C: Number of Citation, AC: Average Citation Per Document

Table 2. The top 30 most cited articles on hemorrhoids by total number of citations

No	Article	Author	Journal	PY	TC	AC
1	The prevalence of hemorrhoids and chronic constipation - an epidemiologic-study	Johanson JF. et al.	Gastroenterology	1990	318	9.94
2	Stapling procedure for haemorrhoids versus milligan-morgan haemorrhoidectomy: randomised controlled trial	Mehigan BJ. et al.	Lancet	2000	296	13.45
3	Comparison of hemorrhoidal treatment modalities - a metaanalysis	Macrae HM. et al.	Diseases of The Colon & Rectum	1995	272	10.07
4	Circumferential mucosectomy (stapled haemorrhoidectomy) versus conventional haemorrhoidectomy: randomised controlled trial	Rowsell M. et al.	Lancet	2000	261	11.86
5	A novel therapy for internal hemorrhoids - ligation of the hemorrhoidal artery with a newly devised ınstrument (moricorn) ın conjunction wıth a doppler flowmeter	Morinaga K. et al.	American Journal of Gastroenterology	1995	238	8.81
6	Persistent pain and faecal urgency after stapled haemorrhoidectomy	Cheetham MJ. et al.	Lancet	2000	236	10.73
7	Postoperative complications after procedure for prolapsed hemorrhoids (pph) and stapled transanal rectal resection (starr) procedures	Pescatori M. et al.	Techniques in Coloproctology	2008	224	16
8	Prospective randomized multicentre trial comparing stapled with open haemorrhoidectomy	Ganio E. et al.	British Journal of Surgery	2001	223	10.62
9	Stapled hemorrhoidectomy - cost and effectiveness. Randomized, controlled trial ıncluding ıncontinence scoring, anorectal manometry, and endoanal ultrasound assessments at up to three months	Ho YH. et al.	Diseases of The Colon & Rectum	2000	208	9.45
10	Bupivacaine extended-release liposome ınjection for prolonged postsurgical analgesia ın patients undergoing hemorrhoidectomy: a multicenter, randomized, double-blind, placebo-controlled trial	Gorfine SR. et al.	Diseases of The Colon & Rectum	2011	202	18.36
11	Anal cancer ıncidence - genıtal warts, anal-fissure or fistula, hemorrhoıds, and smoking	Holly EA. et al.	Jnci-Journal of The National Cancer Institute	1989	196	5.94
12	Symptomatic hemorrhoids - current ıncidence and complications of operative therapy	Bleday R. et al.	Diseases of The Colon & Rectum	1992	188	6.27
13	Systematic review on the procedure for prolapse and hemorrhoids (stapled hemorrhoidopexy)	Tjandra Joe J. et al.	Diseases of The Colon & Rectum	2007	187	12.47
14	Randomized clinical trial of stapled versus milligan-morgan haemorrhoidectomy	Shalaby R. et al.	British Journal of Surgery	2001	175	8.33
15	Life threatening pelvic sepsis after stapled haemorrhoidectomy	Molloy RG. et al.	Lancet	2000	170	7.73
16	Stapled hemorrhoidopexy compared with conventional hemorrhoidectomy: systematic review of randomized, controlled trials	Nisar PJ. et al.	Diseases of The Colon & Rectum	2004	167	9.28
17	The prevalence of hemorrhoids in adults	Riss S. et al.	International Journal of Colorectal Disease	2012	156	15.6
18	Anorectal varices, hemorrhoids, and portal-hypertension	Hosking SW. et al.	Lancet	1989	151	4.58
19	A prospective, randomized, controlled multicenter trial comparing stapled hemorrhoidopexy and ferguson hemorrhoidectomy: perioperative and one-year results	Senagore AJ. et al.	Diseases of The Colon & Rectum	2004	141	7.83
20	Stapled vs excision hemorrhoidectomy - long-term results of a prospective randomized trial	Hetzer FH. et al.	Archives of Surgery	2002	135	6.75
21	Double-blind randomised controlled trial of effect of metronidazole on pain after day-case haemorrhoidectomy	Carapeti EA. et al.	Lancet	1998	134	5.58
22	Randomised controlled trial between stapled circumferential mucosectomy and conventional circular hemorrhoidectomy in advanced hemorrhoids with external mucosal prolapse	Boccasanta P. et al.	American Journal of Surgery	2001	133	6.33
23	Randomized clinical trial of stapled haemorrhoidopexy versus conventional diathermy haemorrhoidectomy	Ortiz H. et al.	British Journal of Surgery	2002	129	6.45
24	The pathogenesis of hemorrhoids	Haas PA. et al.	Diseases of The Colon & Rectum	1984	127	3.34
25	Stapled hemorrhoidopexy is associated with a higher long-term recurrence rate of ınternal hemorrhoids compared with conventional excisional hemorrhoid surgery	Jayaraman S. et al.	Diseases of The Colon & Rectum	2007	124	8.27
26	Randomized clinical trial of ligasure (tm) versus open haemorrhoidectomy	Palazzo FF. et al.	British Journal of Surgery	2002	122	6.1
27	Stapled hemorrhoidopexy versus milligan-morgan hemorrhoidectomy - a prospective, randomized, multicenter trial with 2-year postoperative follow up	Gravie, JF. et al.	Annals of Surgery	2005	113	6.65
28	Optimal nonsurgical treatment of hemorrhoids - a comparative-analysıs of ınfrared coagulatıon, rubber band ligation, and ınjectıon sclerotherapy	Johanson JF. et al.	American Journal of Gastroenterology	1992	112	3.73
29	A double-blind, randomized, active-controlled study for post-hemorrhoidectomy pain management with liposome bupivacaine, a novel local analgesic formulation	Haas, E. et al.	American Surgeon	2012	109	10.9
30	A randomized, controlled trial of diathermy hemorrhoidectomy vs. Stapled hemorrhoidectomy in an ıntended day-care setting with longer-term follow-up	Cheetham MJ. et al.	Diseases of The Colon & Rectum	2003	109	5.74

PY: Publication year, TC: Total citation, AC: Average citations per year

Trending topics

2102 different keywords were used in all 1863 articles on hemorrhoids. Among these keywords, the most used 75 different keywords (used in at least 7 different articles) are shown in **Table 3**. The cluster network visualization map obtained as a result of the clustering analysis performed between these keywords is shown in **Figure 5**. The trend visualization network map obtained as a result of the analyzes carried out to determine current topics and the most cited topics is presented in **Figure 6** and citation network visualization map **Figure 7**.

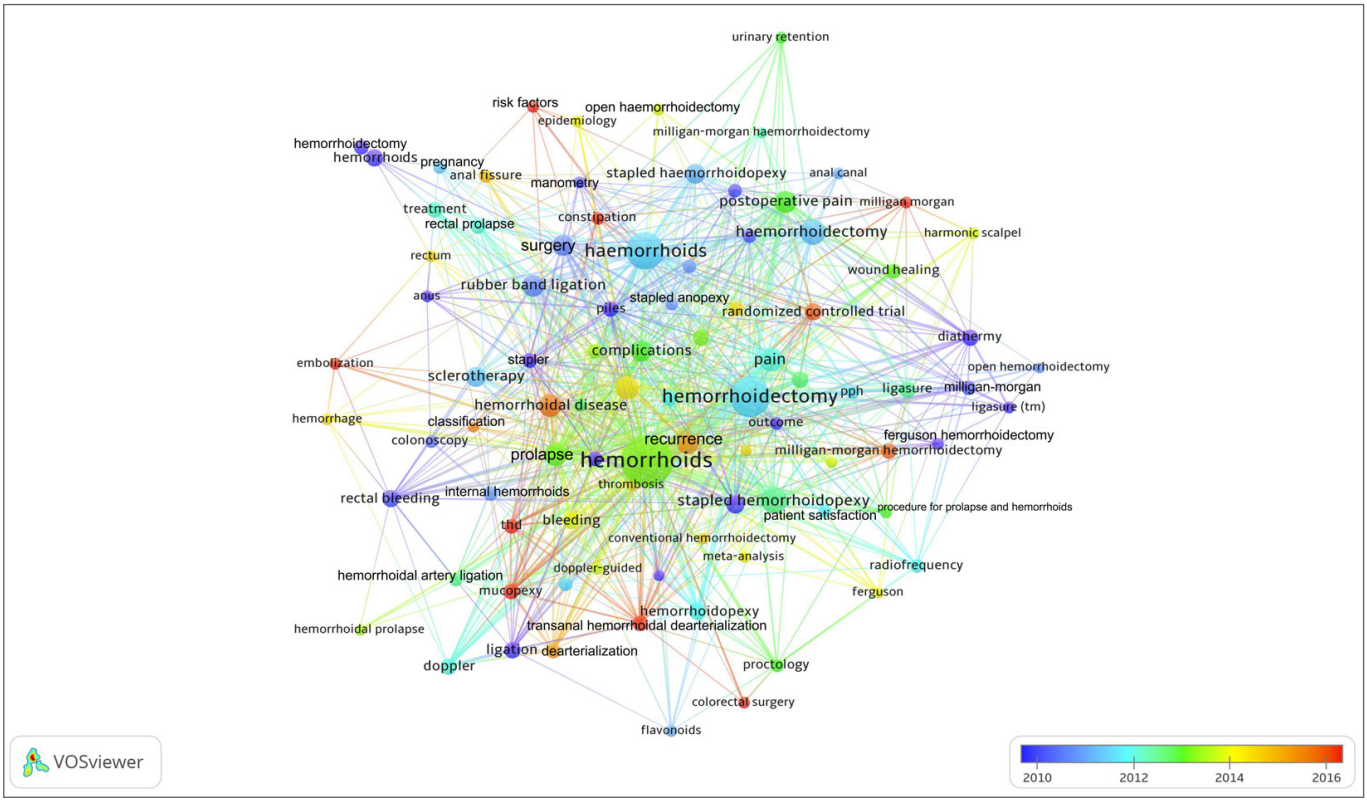

Figure 6. Network visualization map for trends on Hemorrhoids. Footnote: In the indicator given in the lower right corner of the figure, the topicality of the article increases from blue to red (blue-green-yellow-red). The size of the circle indicates the number of uses of the keyword.

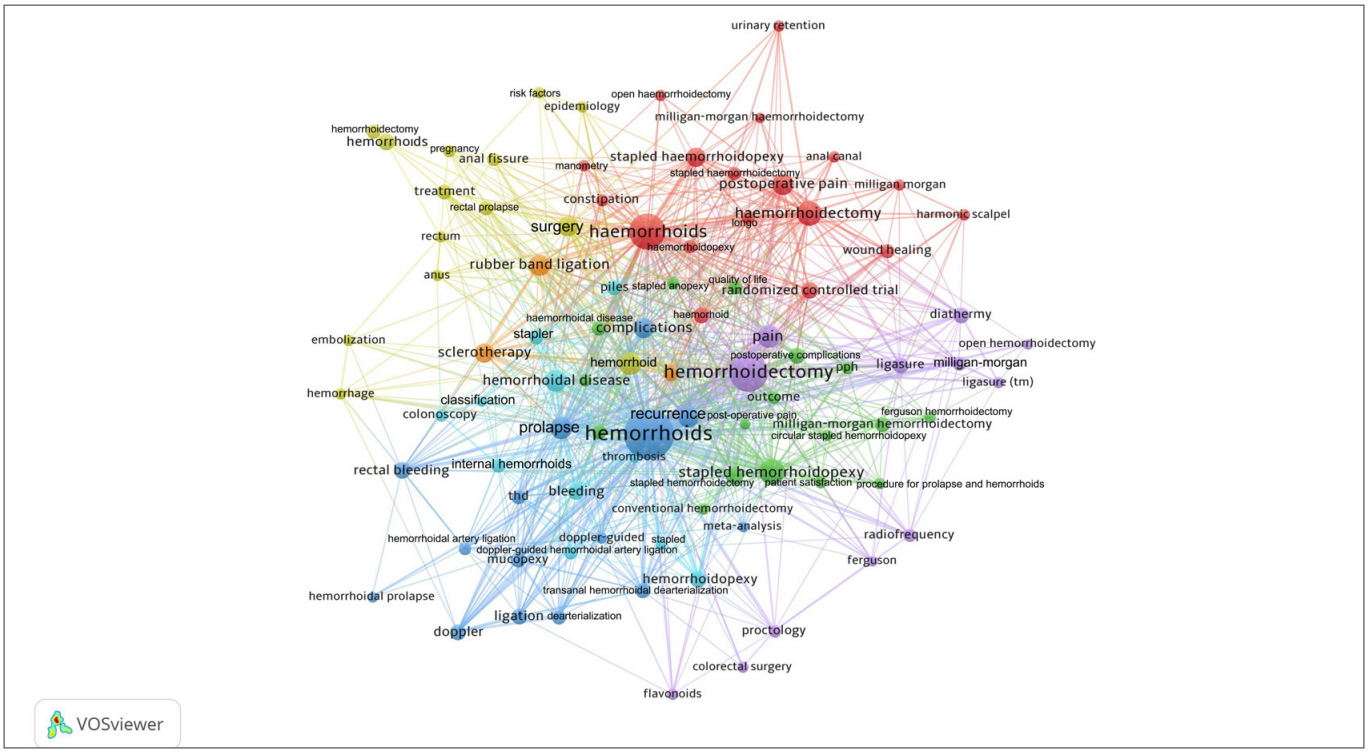

Figure 5. Network visualization map for cluster analysis based on keyword analysis on Hemorrhoids. Footnote: Colors indicate clustering. Keywords in the same cluster are of the same color. The size of the circle indicates the number of uses of the keyword.

Table 3. The 75 most frequently used keywords in articles about hemorrhoid

Keywords	Number of uses	Keywords	Number of uses	Keywords	Number of uses
hemorrhoids (or haemorrhoids)	646	mucopexy	17	pregnancy	10
hemorrhoidectomy (or haemorrhoidectomy)	283	transanal hemorrhoidal dearterialization	17	anal canal	9
stapled hemorrhoidopexy (or haemorrhoidopexy)	99	treatment	17	anus	9
hemorrhoidal disease (or haemorrhoidal disease)	63	quality of life	16	doppler-guided	9
complications	54	rectal prolapse	16	embolization	9
pain	54	open hemorrhoidectomy (or haemorrhoidectomy)	15	ferguson hemorrhoidectomy	9
postoperative pain (or post-operative pain)	49	THD	15	hemorrhage	9
prolapse	45	wound healing	15	urinary retention	9
rubber band ligation	43	dearterialization	14	circular stapled hemorrhoidopexy	8
stapled hemorrhoidectomy (or haemorrhoidectomy)	39	internal hemorrhoids	14	colorectal surgery	8
surgery	39	stapler	14	conventional hemorrhoidectomy	8
recurrence	36	surgical technique	14	epidemiology	8
sclerotherapy	34	anal fissure	12	flavonoids	8
milligan-morgan hemorrhoidectomy (or haemorrhoidectomy)	24	doppler-guided hemorrhoidal artery ligation	12	harmonic scalpel	8
bleeding	23	longo	12	ligasure (TM)	8
hemorrhoidopexy (or haemorrhoidopexy)	23	radiofrequency	12	manometry	8
milligan-morgan (or milligan morgan)	22	colonoscopy	11	procedure for prolapse and hemorrhoids	8
randomized controlled trial	22	constipation	11	rectum	8
rectal bleeding	22	hemorrhoidal artery ligation	11	risk factors	8
doppler	21	outcome	11	classification	7
ligation	21	PPH	11	ferguson	7
postoperative complications	20	proctology	11	hemorrhoidal prolapse	7
diathermy	19	stapled anopexy	11	meta-analysis	7
ligasure	19	haemorrhoidal artery ligation	10	stapled	7
piles	18	patient satisfaction	10	thrombosis	7

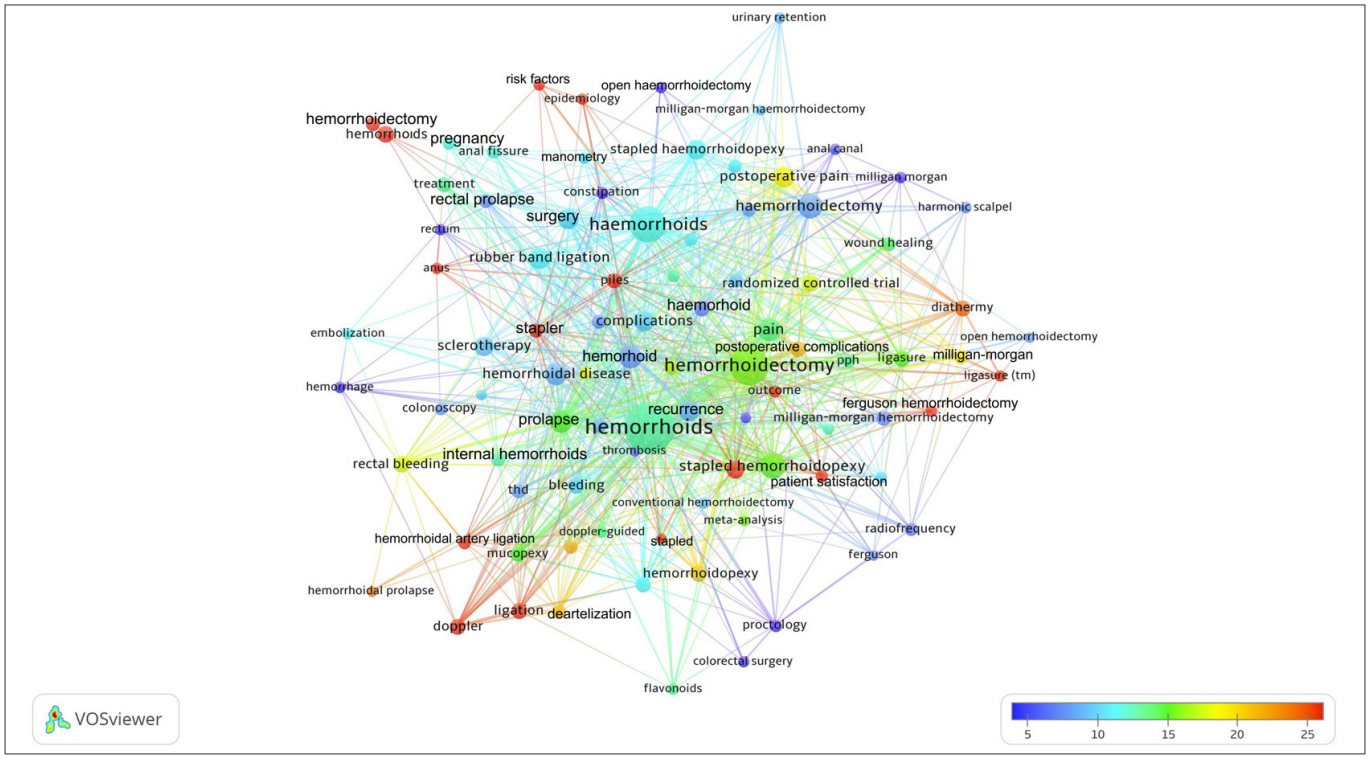

Figure 7. Network visualization map of the most frequently cited topics on Hemorrhoids. Footnote: In the indicator given in the lower right corner of the figure, the number of citations received by the topic increases from blue to red (blue-green-yellow-red). The size of the circle indicates the number of uses of the keyword.

DISCUSSION

An average of 28 articles were published on hemorrhoids between 1980 and 2006. Between 2007 and 2020, an average of 73 articles were published. A remarkable upward trend was observed in 2019 and 2020. A total of 92 articles were published in 2019 and 122 articles were published in 2020. When the Exponential Smoothing estimation results were evaluated, it was seen that the number of articles on Hemorrhoids would continue with an increasing trend.

When the publication distribution of the world countries is examined, it is seen that 18 of the first 25 countries that are most active in article productivity on hemorrhoids are developed countries, while the other 7 (India, Turkey, China, Brazil, Iran, Egypt, Pakistan) are developing countries. Although these 7 countries are developing, it is known that they are countries with large economies. According to the results of the correlation analysis in our study, a highly significant correlation was found between article productivity and economic development indicators. The reason for this is that the economic size of the countries is effective in the productivity of the article on hemorrhoids. Similar to our study results, it has been stated that economic power is effective in article productivity in bibliometric studies conducted on some medical subjects in the literature. When evaluated with the density map created according to the total cooperation score between the countries, the countries with the most intensive cooperation were England, Italy, Australia, USA, Germany, Austria, Denmark, Scotland, France, Greece, Netherlands, Spain, respectively. When the co-authorship cooperation of countries on hemorrhoids is examined, it seems that cooperation based on geographical countries is effective in the production of articles (England, Scotland, Wales), (Netherlands, Poland), (Italy, Switzerland), (Germany, Denmark, Spain, Sweden, Greece, Lithuania), (Canada, Mexico), (France, Belgium, Russia, India, Thailand, Malaysia), (Australia, New zealand), (China, Taiwan) are among the countries that do not have geographical proximity although they are in the same clusters (USA, Iran, Chile, South korea, Singapore), (Canada, France), (Germany, Japan), (Austria, Nigeria) etc. joint work has been done.

The journals that publish the most articles on hemorrhoids are Diseases of the Colon & Rectum, Colorectal Disease, Techniques in Coloproctology, International Journal of Colorectal Disease, British Journal of Surgery, American Surgeon, Pakistan Journal of Medical & Health Sciences, Chirurg, Journal of Gastrointestinal Surgery. and the World Journal of Surgery. It can be suggested that authors who want to publish on hemorrhoids should primarily consider these journals. When the citation analyzes of the journals are evaluated, the most effective journals according to the average number of citations per article they publish are British Journal of Surgery, American Journal of Gastroenterology, Diseases of the Colon & Rectum, American Journal of Surgery, International Journal of Colorectal Disease, World Journal of Surgery, Gastrointestinal. Endoscopy, Journal of Gastrointestinal Surgery, Gastroenterologie Clinique Et Biologique and Techniques in Coloproctology. Researchers who want their articles to be cited more can be recommended to consider these journals first. When the analyzed articles were evaluated according to the total number of citations they received, Johanson et al.'s[22] study titled "The prevalence of hemorrhoids and chronic constipation an epidemiologic study" was determined to be the most cited study. Mehigan et al.[20] article titled "Stapling procedure for haemorrhoids versus Milligan-Morgan haemorrhoidectomy: randomized controlled trial" published in the Lancet was determined to be the second most effective study. Macrae et al.[21] The article titled "Comparison of hemorrhoidal treatment modalities - a meta analysis" published in Diseases of the Colon & Rectum was determined as the third most influential study. The fourth most influential study is Rowsell et al.[24] published in the Lancet, titled "Circumferential mucosectomy (stapled haemorrhoidectomy) versus conventional haemorrhoidectomy: randomised controlled trial". The fifth most influential study is Morinaga et al.[23] published in the American Journal of Gastroenterology, titled "A novel therapy for internal hemorrhoids - ligation of the hemorrhoidal artery with a newly devised instrument (moricorn) in conjunction with a doppler flowmeter". Cheetham et al.[25] article titled "Persistent pain and faecal urgency after stapled haemorrhoidectomy" published in the Lancet was determined as the sixth most effective study. When the studies are evaluated according to the average number of citations per year, the most influential first article is Davis et al.[27] titled "The American society of colon and rectal surgeons clinical practice guidelines for the management of hemorrhoids" published in Diseases of the Colon & Rectum. The second most influential article is Gorfine et al.[28] published in Diseases of the Colon & Rectum. titled "Bupivacaine extended-release liposome injection for prolonged postsurgical analgesia in patients undergoing hemorrhoidectomy: a multicenter, randomized, double-blind, placebo-controlled trial". The third most influential study is Pescatori et al.[29] published in Techniques in Coloproctology.[29] The fourth most influential article is Riss et al.[1] published in the International Journal of Colorectal Disease titled "The prevalence of hemorrhoids in adults". The fifth most influential study is Mehigan et al.[20] The sixth most influential article is Brown et al.[30] published in the Lancet titled "Haemorrhoidal

artery ligation versus rubber band ligation for the management of symptomatic second-degree and third-degree haemorrhoids (HubBLe): a multicentre, open-label, randomized controlled trial". According to the co-citation numbers of all analyzed articles, Longo,[17] Milligan,[18] Thomson,[19] Mehigan,[20] Macrae,[21] Johanson,[22] Morinaga,[23] The studies of Rowsell,[24] Cheetham,[25] and Ganio[26] were identified as the most influential. It can be recommended that clinicians and researchers interested in this subject should first read these publications.

When the keyword analysis findings were evaluated as a result of the cluster analysis, it was seen that the hemorrhoids subjects were divided into clusters in 7 different colors (red, blue, green, yellow, orange, purple, turquoise). The most cited keywords are doppler, ligation, stapled hemorrhoidectomy, diathermy, piles, anus, stapler, hemorrhoidectomy, risk factors, epidemiology, stapled, hemorrhoidal artery ligation, patient satisfaction, ferguson hemorrhoidectomy, outcome and ligasure (tm), hemorrhoidal prolapse and determined as postoperative complications. According to the results of the analysis made to determine the trend topics, it has been determined that the keywords studied in recent years are THD, mucopexy, transanal hemorrhoidal dearterialization, colorectal surgery, embolization, constipation, risk factors, Milligan-Morgan, classification, recurrence and randomized controlled trial.

As a result of the literature review on hemorrhoids, no bibliometric study was found. In the literature, only Hureibi et al.[31] identified the 100 most cited studies on benign anorectal disease . Our research is the first comprehensive bibliometric study on hemorrhoids. Only WoS database was used in the literature review of our study. Pubmed and Schopus databases were not preferred due to the inability to perform citation and co-citation analysis. In addition, since studies published in journals with low impact levels are included in the Scopus database, it was not preferred. The WoS database indexes the articles published in journals with a higher impact factor than other databases, and comprehensive citation analyzes can be performed when data is downloaded from the WoS database.[13,14] In recent years, WoS has been preferred more in bibliometric analyzes.[8-14]

CONCLUSION

In this comprehensive bibliometric study on hemorrhoids, a summary information of 1863 articles published between 1980-2020 was shared. It has been determined that the trend topics in hemorrhoid research are THD, mucopexy, transanal hemorrhoidal dearterialization, colorectal surgery, embolization, constipation, risk factors, Milligan-Morgan, classification, recurrence, and randomized controlled trial. This article can be a useful resource for scientists and clinicians regarding the past, present and future of hemorrhoids global outcomes.

ETHICAL DECLARATIONS

Ethics Committee Approval: This article does not contain any studies with human participants or animals performed by any of the authors.

Informed Consent: The study is an open data study, does not contain human or animal material, and does not require informed consent.

Referee Evaluation Process: Externally peer-reviewed.

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

Financial Disclosure: The authors declared that this study has received no financial support.

Author Contributions: All of the authors declare that they have all participated in the design, execution, and analysis of the paper and that they have approved the final version.

REFERENCES

1. Riss S, Weiser FA, Schwameis K, et al. The prevalence of hemorrhoids in adults. *Int J Colorectal Dis.* 2012;27(2):215-220.
2. Sandler RS, Peery AF. Rethinking what we know about hemorrhoids. *Clin Gastroenterol Hepatol.* 2019;17(1):8-15.
3. Yamana T. Japanese Practice Guidelines for anal disorders I. hemorrhoids. *J Anus Rectum Colon.* 2018;1(3):89-99.
4. Davis BR, Lee-Kong SA, Migaly J, Feingold DL, Steele SR. The American Society of Colon and Rectal Surgeons Clinical Practice Guidelines for the management of hemorrhoids. *Dis Colon Rectum.* 2018;61(3):284-292.
5. Mott T, Latimer K, Edwards C. Hemorrhoids: diagnosis and treatment options. *Am Fam Physician.* 2018;97(3):172-179.
6. Bhatti MI, Sajid MS, Baig MK. Milligan-Morgan (Open) Versus Ferguson Haemorrhoidectomy (Closed): a systematic review and meta-analysis of published randomized, controlled trials. *World J Surg.* 2016;40(6):1509-1519.
7. Vinson-Bonnet B, Higuero T, Faucheron JL, Senejoux A, Pigot F, Siproudhis L. Ambulatory haemorrhoidal surgery: systematic literature review and qualitative analysis. *Int J Colorectal Dis.* 2015;30(4):437-445.
8. Golpinar M, Demir E. Global research output of the cerebellum: yesterday, today, and tomorrow. *J Anatomic Society India.* 2020;69(3):155-165.
9. Kiraz S, Demir E. Global scientific outputs of schizophrenia publications from 1975 to. 2020: a bibliometric analysis. *Psychiatr Q.* 2021;92(4):1725-1744.
10. Zengin M, Baldemir R. Investigation of the global outcomes of acute respiratory distress syndrome with the effect of COVID-19 in publications:a bibliometric analysis between 1980 and. 2020. *Kırıkkale University Med J.* 2021;23(2):279-292.
11. Muslu Ü, Demir E. Development of rhinoplasty:yesterday and today. *Med Sci.* 2019;23(97):294-201.

12. Doğan G, Karaca O. Análise bibliométrica no campo da anestesiologia no período de. 2009-2018 [A bibliometric analysis of the field of anesthesia during. 2009-2018]. *Braz J Anesthesiol.* 2020;70(2):140-152.
13. Kiraz M, Demir E, Özdemir Ö. An international bibliometric study of scientific articles on intracranial aneurysms. *Neuroradiol J.* 2021;34(5):482-493.
14. Yildirim E, Demir E. Comparative bibliometric analysis of fertility preservation. *Ann Med Res.* 2019;26(8):1622-8.
15. van Eck NJ, Waltman L. Software survey: VOSviewer, a computer program for bibliometric mapping. *Scientometrics.* 2010;84(2):523-538.
16. The World Bank. World Bank national accounts data, and OECD National Accounts data files. Available online: https://data.worldbank.org/indicator/NY.GDP.MKTP.CD. 2021.
17. Longo A. Treatment of haemorrhoidal disease by reduction of mucosa and haemorrhoidal prolapse with a circular suturing device:a new procedure. Proceedings of the 6th World Congress of Endoscopic Surgery Bologna, Italy, Monduzzi, Editore 1998:777-784.
18. Milligan ETC, Morgan CN, Jones L, Officer R. Surgical anatomy of the anal canal, and the operative treatment of haemorrhoids. *Lancet.* 1937;230(5959):1119-1124.
19. Thomson WHF. The nature of haemorrhoids. *J British Surg.* 1975;62(7):542-552.
20. Mehigan BJ, Monson JR, Hartley JE. Stapling procedure for haemorrhoids versus Milligan-Morgan haemorrhoidectomy: randomised controlled trial. *Lancet.* 2000;355(9206):782-785.
21. MacRae HM, McLeod RS. Comparison of hemorrhoidal treatment modalities. *Dis Colon Rectum.* 1995;38(7):687-694.
22. Johanson JF, Sonnenberg A. The prevalence of hemorrhoids and chronic constipation:an epidemiologic study. *Gastroenterology* 1990;98(2):380-386.
23. Morinaga K, Hasuda K, Ikeda T. A novel therapy for internal hemorrhoids:ligation of the hemorrhoidal artery with a newly devised instrument (Moricorn) in conjunction with a Doppler flowmeter. *Am J Gastroenterol.* 1995;90(4):610-613.
24. Rowsell M, Bello M, Hemingway DM. Circumferential mucosectomy (stapled haemorrhoidectomy) versus conventional haemorrhoidectomy: randomised controlled trial. *Lancet.* 2000;355(9206):779-781.
25. Cheetham MJ, Mortensen NJ, Nystrom PO, Kamm MA, Phillips RK. Persistent pain and faecal urgency after stapled haemorrhoidectomy. *Lancet.* 2000;356(9231):730-733.
26. Ganio E, Altomare DF, Gabrielli F, Milito G, Canuti S. Prospective randomized multicentre trial comparing stapled with open haemorrhoidectomy. *J British Surg.* 2001;88(5):669-674.
27. Davis BR, Lee-Kong SA, Migaly J, Feingold DL, Steele SR. The American Society of Colon and Rectal Surgeons clinical practice guidelines for the management of hemorrhoids. *Dis Colon Rectum.* 2018;61(3):284-292.
28. Gorfine SR, Onel E, Patou G, Krivokapic ZV. Bupivacaine extended-release liposome injection for prolonged postsurgical analgesia in patients undergoing hemorrhoidectomy:a multicenter, randomized, double-blind, placebo-controlled trial. *Dis Colon Rectum.* 2011;54(12);1552-1559.
29. Pescatori M, Gagliardi G. Postoperative complications after procedure for prolapsed hemorrhoids (PPH) and stapled transanal rectal resection (STARR) procedures. *Techniques in Coloproctol.* 2008;12(1):7-19.
30. Brown SR, Tiernan JP, Watson AJ, Biggs K, Shephard N, Wailoo AJ. HubBLe Study team. Haemorrhoidal artery ligation versus rubber band ligation for the management of symptomatic second-degree and third-degree haemorrhoids (HubBLe):a multicentre, open-label, randomised controlled trial. *Lancet.* 2016;388(10042):356-364.
31. Hureibi KA, Elzaidi EM, Suindar OA, Wong LS, Williams NMç One hundred citation classics in benign anorectal disease:a bibliometric analysis of seven decades (1950–2019). *J Coloproctology (Rio de Janeiro).* 2020;40(2):179-188.