

GLOBAL RESEARCH TRENDS ON VAGINISMUS AND FEMALE SEXUAL DYSFUNCTION IN 1980-2019: A SCIENTOMETRIC ANALYSIS

1980-2019 Yıllarında Vajinismus ve Kadın Cinsel İşlev Bozukluğu Üzerine Küresel Araştırma Eğilimleri: Bir Siyentometrik Analiz

Engin YILDIRIM¹, Mehmet Kürşat DERİCİ², Can TÜRKLER³

¹Hittit University Faculty of Medicine, Department of Obstetrics and Gynecology, ÇORUM, TÜRKİYE

²Kırıkkale University Faculty of Medicine, Department of Medical Pharmacology, KIRIKKALE, TÜRKİYE

³Erzincan Binali Yıldırım University Faculty of Medicine, Dept. of Obstetrics and Gynecology, ERZINCAN, TÜRKİYE

ABSTRACT

ÖZ

Objective: Physiological and psychological conditions can cause female sexual dysfunction (FSD). It is called vaginismus when sexual dysfunction occurs with vaginal cramps and spasms. The aim of our research is to present the research topics and trends about FSD and vaginismus to the reader in a global context

Material and Methods: We used the terms 'female sexual dysfunction' and 'vaginismus' as keywords and we determined the articles indexed in the Web of Science database. We included all the articles in the database between 1980 and 2019. Documents of 2020 were excluded from this study. Gunnmap free open web-based application was used to visualize global research productivity. Vos-viewer 2019 program was used to determine the scientific relevance of the data.

Results: We reached 2212 documents in total, 95.6 % of these articles were written in English, and 64.4% of the documents were original articles. Articles about vaginismus and FSD increased in the 1995s, the most productive year was 2019. The most productive country in genital cosmetics and aesthetics was the United States (USA), the most productive university was The University of British Columbia. The most productive writer was Goldstein I.

Conclusion: Studies on vaginismus and FSD have increased over the past decade, and non-invasive psychiatric interventions appear to be popular. Our analysis is an identity provider for articles covering vaginismus and FSD.

Keywords: Female sexual dysfunction, vaginismus, bibliometry, scientometry

Amaç: Fizyolojik ve psikolojik durumlar kadın cinsel işlev bozukluğuna (CİB) neden olabilir. Vajinal kramplar ve spazmlar ile cinsel işlev bozukluğu meydana gelmesine vajinismus denir. Araştırmamızın amacı, CİB ve vajinismus ile ilgili araştırma konularını ve eğilimlerini okuyucuya küresel bir bağlamda sunmaktır.

Gereç ve Yöntemler: "Kadın cinsel işlev bozukluğu" ve "vajinismus" terimlerini anahtar kelime olarak kullandık ve Web of Science veritabanında dizine eklenen makaleleri belirledik. Veri tabanında 1980-2019 yılları arasında yayınlanmış tüm makaleleri dahil ettik. 2020 tarihli belgeler bu çalışmadan çıkarıldı. Gunnmap ücretsiz açık web tabanlı uygulama, küresel araştırma verimliliğini görselleştirmek için kullanıldı. Verilerin bilimsel uygunluğunu belirlemek için Vos-viewer 2019 programı kullanılmıştır.

Bulgular: Toplam 2212 belgeye ulaştık, bu makalelerin % 95,6'sı İngilizce yazılmıştır ve belgelerin % 64,4'ü orijinal makalelerdir. Vajinismus ve CİB ile ilgili makaleler 1995'lerden itibaren arttı, en üretken yıl 2019'du. Genital kozmetik ve estetikte en verimli ülke Amerika Birleşik Devletleri (ABD), en verimli üniversite British Columbia Üniversitesi idi. En üretken yazar Goldstein I idi.

Sonuç: Vajinismus ve CİB ile ilgili çalışmalar son on yılda artmıştır ve noninvaziv psikiyatrik müdahalelerin popüler olduğu görülmektedir. Analizimiz vajinismus ve CİB'ni kapsayan makaleler için bir kimlik sağlayıcıdır.

Anahtar Kelimeler: Kadınlarda cinsel işlev bozukluğu, vajinismus, bibliometri, scientometri



Correspondence / Yazışma Adresi:

Kırıkkale University Faculty of Medicine, Department of Medical Pharmacology, KIRIKKALE, TÜRKİYE

Phone / Tel: +90 532 3480767

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ORCID NO: ¹0000-0001-7937-4141, ²0000-0002-8260-7492

Dr. Mehmet Kürşat DERİCİ

E-mail / E-posta: kursatderici@gmail.com

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³0000-0003-2716-0322

INTRODUCTION

Comprehensive physiological and psychiatric approach are required to understand female sexuality (1). Female sexual functions can be affected by arousal, physiological condition, psychological and social conditions. In cases where female sexual dysfunction (FSD) develops, reproductive dysfunction and adjustment problems also develop between couples. Sexual dysfunction with vaginal cramps and spasm that causes stress and anxiety disorders in women is called vaginismus (2).

It is difficult to standardize FSD since the somatic and neuroendocrinological conditions of individuals vary according to their age, social environment and reproductive period (3). FSD is a description that covers many symptoms and it is difficult to determine the frequency of this disorder. Distress occurring during sexual functions, symptoms that persist for at least three months and observed in 75% of sexuality make a diagnosis for FSD (1). The menarche and menopause periods are the most critical thresholds for FSD, and the intermenstrual ovulatory period has a positive effect on FSD (4). It is known that the advancing female age is the most important factor that disrupts sexual functions (5). Systemic diseases, neurological diseases, cancer, drugs and psychiatric disorders that affect women's life also affect sexual functions negatively (6-10). Although the frequency of FSD varies according to geographic regions, it was found to be 43% in women aged 18-59 in the USA (11).

The term vaginismus describes involuntary vaginal contraction during sexual intercourse and it can be evaluated within the scope of female sexual pain disorders (12). The frequency of vaginismus is difficult to determine. Huge differences are shown between countries, and previous studies have shown the frequency to be between 1 and 68.2% (13-16). Primary vaginismus describes dyspareunia that occurs when a woman has never had sex before, secondary vaginismus describes dyspareunia that occurs after healthy sexual

life. Vaginismus has psychosocial bases; systemic desensitization, sexual therapy, hypnotherapy, vaginal dilatation, benzodiazepines, botilismus toxin applications and some surgical interventions are tried for treatment (17-20).

The aim of our research is to present the research topics, most productive disciplines and trends about vaginismus and FSD to the reader in a global context. For this purpose, bibliometric analysis method was used. Bibliometric analyzes are reviews that show the impact of research on a particular subject, changing research trends, and the tendencies of countries or authors by years (21). This analysis is the first article to examine the bibliometric features of vaginismus and FSD literature.

MATERIALS AND METHODS

The source of our study is the Web of Science (WoS) database and includes the Korean journal database, Core collection index, Russian Science Citation Index and Sci ELO citation index. The articles indexed between 1980-2019 were included in our research in the database, and the studies of 2020 were not included since the effect factors are not clear yet. While searching the database, the words "vaginismus" or "female sexual dysfunction" were used as keywords. GunnMap free open web-based application was used to visualize global research productivity. Vos-viewer 2019 program was used to determine the scientific relevance of the data.

RESULTS

1. General Features and Global Productivity: In our search in the WoS database, we found a total of 2212 documents between 1980-2019. The documents obtained were written in 12 different languages; 95.6% of them were produced in English, followed by French with 1.4 % and Turkish with 0.9%. The majority of the documents found were original articles, followed by

meeting abstracts and reviews respectively (Table 1). We compared the disciplines investigating vaginismus and female sexual dysfunction; it was mostly studied by urology, gynecology and psychology (Table 2). The first article about vaginismus and female sexual dysfunction, in WoS, was written by Fuchs K. It is the article titled "Therapy of Vaginismus by Hypnotic Desensitization" and was published in American Journal of Obstetrics and Gynecology (19).

Table 1: Publication types of vaginismus and female sexual dysfunction literature between 1980-2019

Research Areas	Number of Publication	% of 2212
Article	1426	64.4
Meeting Abstracts	374	16.9
Review	248	11.2
Proceedings Papers	95	4.2
Editorial Material	89	4.0
Letters	35	1.5
Book Chapter	25	1.1
News Item	7	0.3
Corrections	6	0.2
Early Access	6	0.2

The number of articles about vaginismus and female sexual dysfunction began to increase in 1995. The upward trend has continued until today. The year in which the highest number of documents were published and the most cited year was 2019 (Figure 1,2). We analyzed the document productivity of countries in the

WoS database and found that the most productive country was the United States of America (USA), producing 702 articles. Following USA, Italy was the second productive country with 190 articles, and Turkey was the third productive country with 158 publications. The total number of documents from the three most productive countries made up 47.4% of the publications worldwide (Figure 3). We found that the scientific productivity of African countries and Central Asian Countries countries on vaginismus and female sexual dysfunction were very low. The most productive countries were in North America and Europe (Figure 4).

Table 2: The top ten research areas of documents in Web of Science database between 1980-2019.

Research Areas	Number of Publication	% of 2212
Urology Nephrology	911	41.1
Obstetrics Gynecology	420	18.9
Psychology	283	12.7
General Internal Medicine	182	8.2
Psychiatry	130	5.8
Public Environmental Occupational Health	104	4.7
Social Sciences Other Topics	90	4.0
Family Studies	89	4.0
Pharmacology Pharmacy	83	3.7
Endocrinology Metabolism	70	3.1

Total Publications
2.212 Analyze

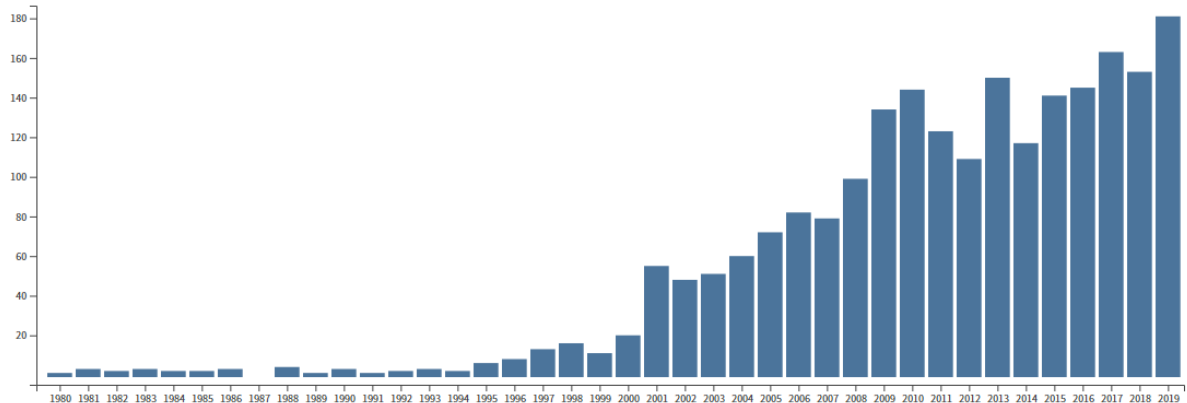


Figure 1: Graph of publications about vaginismus and female sexual disorders by years

Sum of Times Cited per Year

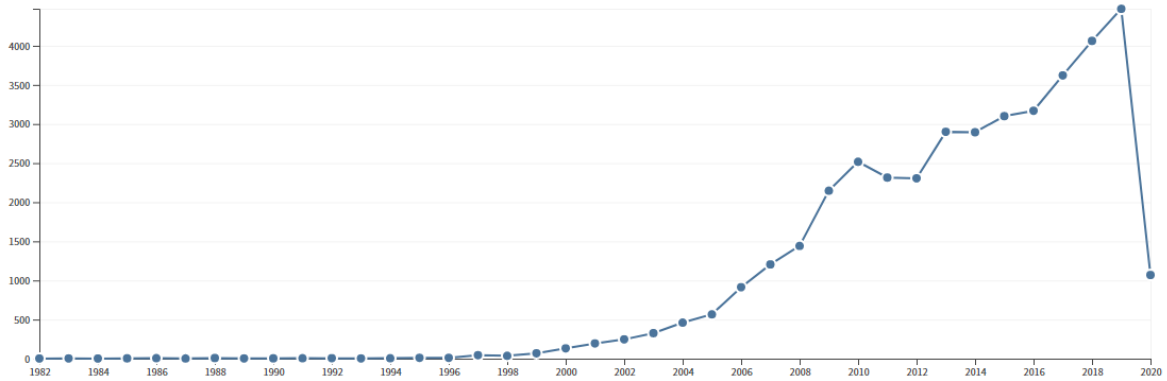


Figure 2: Graph of citations about vaginismus and female sexual disorders by years

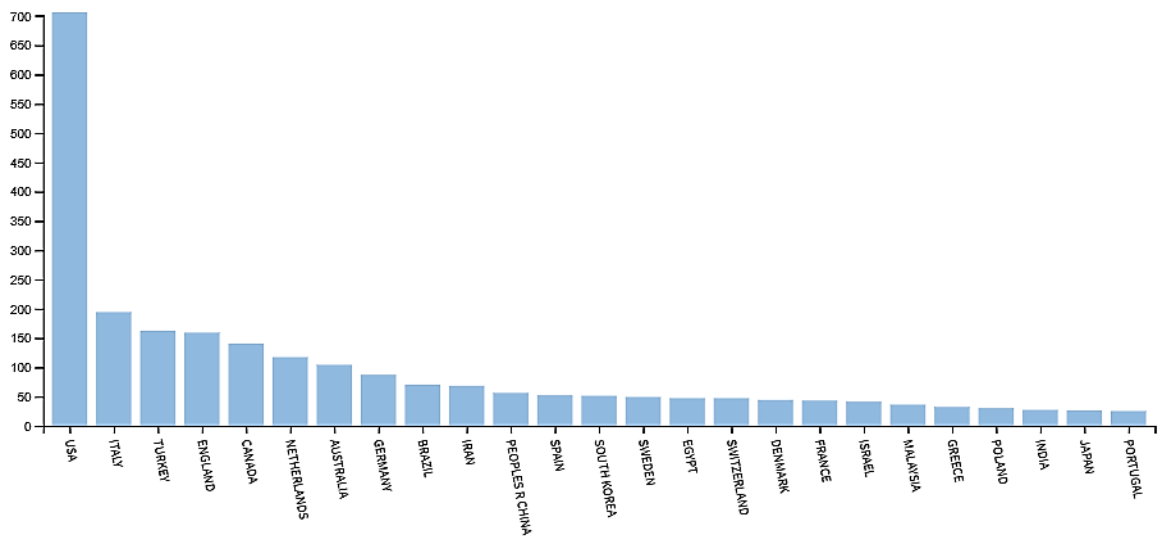


Figure 3: The top ten publishing country charts on vaginismus and female sexual disorders

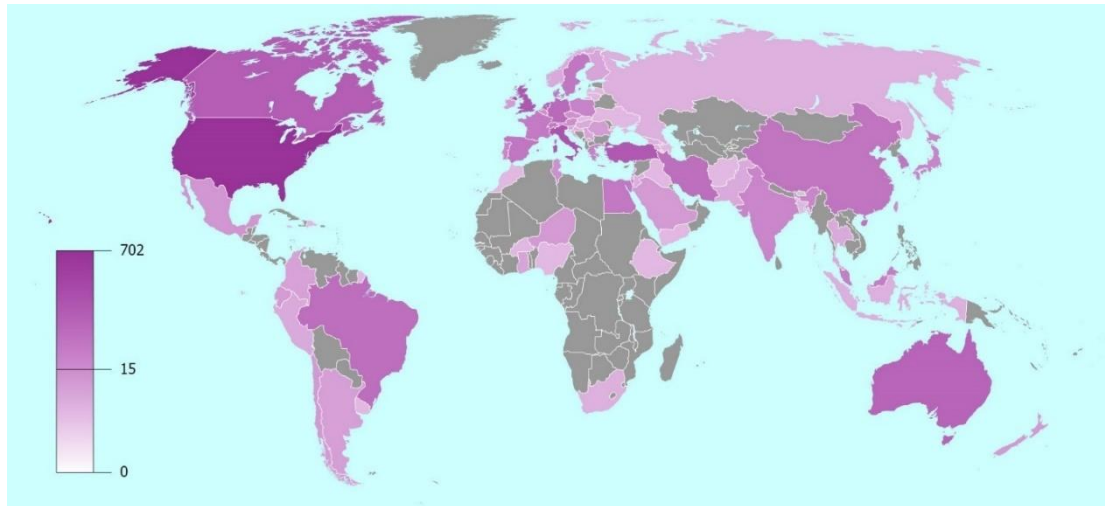


Figure 4. Global genital aesthetic and cosmetic publication density according to the countries

Table 3. The first ten authors by research count about vaginismus and female sexual dysfunction between 1980-2019

Authors	Institution	Record Count	% of 2212	H-index
Goldstein I	Alvarado Hosp, San Diego, CA USA	58	2.6	40
Nappi RE	University of Pavia, Pavia, Italy.	31	1.4	34
Clayton AH	University of Virginia USA.	28	1.2	36
Davis SR	Monash Univ., Melbourne, Vic, Australia	26	1.1	60
Graziottin A	Hosp San Raffaele Resnati, Milan, Italy	24	1.0	26
Burri A	European Institute Sexual Health, Hamburg, Germany	22	1.0	22
Sidi H	Pusat Perubatan Univ Kebangsaan Malaysia.	22	1.0	13
Vignozzi L	Univ Florence, Florence, Italy	21	0.9	46
Basson R	Univ British Columbia, Vancouver, BC, Canada	21	0.9	38
Jannini Ea	Univ Roma Tor Vergata, Rome, Italy	21	0.9	51

Hosp: Hospital; Univ: University; USA: United States of America

2. *Productivity of Authors and Institutions:* We compared authors' productivity, institutions, and H-Index. Goldstein I, from the Institute for Sexual Medicine, Austin, Texas, USA was found to be the most productive researcher. The 10 most productive authors and countries are presented in Table 3. We also compared the productivity of universities and organizations in the WoS database. The most productive university was the University of British Columbia and hosted 39 publications in the field of vaginismus and female sexual dysfunction (Table 4).

3. *Authorship and Institutions Co-citation:* We have determined that 6560 authors had research about genital

cosmetics and aesthetics in the WoS database. When the citation analysis between the operators was examined with Vosviewer, we found that there was a cluster around Goldstein I, Clayton Anita H, Nappi Rosella E and Bruri Andrea (Figure 5). A total of 2063 organizations publishing at least 10 documents and 30 citation fields were evaluated with bibliometric analysis. Sixty-five active universities were identified. In terms of the citation relationship, University of British Columbia, University of Pavia, Case Western Reserve University, University of Florence, Kings College of London, and University of Amsterdam were at the center (Figure 6).

Table 4: The top ten institutions by number of vaginismus and female sexual dysfunction literature

Institutions	Number of Publication	% of 2212
The University of British Columbia	39	1.7
Case Western Reserve University	36	1.6
University of Pavia	33	1.4
University of Florence	32	1.4
University of Virginia	32	1.4
Monash University	31	1.4
University of Amsterdam	31	1.4
Leiden University	28	1.2
University of Groningen	27	1.2
Boston University	25	1.1

4. *Significant Publications:* Totally 2212 articles' H index was 85 in WoS database and average citations per item were 18.24. The number of articles referring to vaginismus and female sexual dysfunction was 16390, and the total number of citations was 40,361. The most cited documents about vaginismus and female sexual dysfunction were analyzed. The most cited document was the article of Wiegel et al. The ten most cited articles are presented in Table 5 with citation data. When the most cited publications were examined, the relationship created by the citations gathered around the authors Wiegel, 2005 and Basson, 2000. These publications have a strong relationship among themselves in terms of citations (Figure 7).

5. *Productivity of Journals:* We analyzed the productivity of the journals and found that Journal of Sexual Medicine was the most productive journal, and 25.3% of all documents were published in this journal. The second most productive journal was Journal of Sex Marital Therapy and the third journal was International Journal of Impotence Research. The top three journals published 32.4% of all publications (Table 6). We selected at least 30 cited journals that published about vaginismus and female sexual dysfunction. We found 294 active journals, among which, "Journal of Sexual Medicine" was found as the most efficient and most cited journal (Figure 8).

6. *International Collaboration:* International document collaboration is developing around the USA. Britain, Sweden, Netherlands, Australia and the Canada are the countries that have the most relations in terms of documents. When international cooperation is valued by the collaboration of the authors, USA is also in the center. However, after 2010, the joint working trends of Turkey, Germany, Italy and Switzerland became evident (Figure 9).

7. *Trend Topics:* We found that 2770 repetitive words were used in bibliometric analysis of publications about vaginismus and female sexual dysfunction. We have found that 183 words were used very frequently after filtering in order to detect words that were repeated at least five times in a publication. Our analysis has shown that the keywords intersecting in all publications were "female sexual dysfunction, sexual dysfunction, dyspareunia, vaginismus, menopause, hypoactive sexual desire and depression" in order of frequency (Figure 10).

Table 5: The top ten most cited manuscripts about vaginismus and female sexual dysfunction

No	Article	Author	Journal Name/Published	TC	ACY
1	The Female Sexual Function Index (FSFI): Cross-validation and development of clinical cutoff scores	Wiegel M, Meston C, Rosen R.	Journal of Sex & Marital Therapy, 2005	1108	60.2
2	Report of the international consensus development conference on female sexual dysfunction: Definitions and classifications	Basson R, Berman J, Burnett A et al.	Journal of Urology, 2000	802	38.1
3	Definitions/Epidemiology/Risk Factors for Sexual Dysfunction	Lewis RW, Fugl-Meyer KS et al.	Journal of Sexual Medicine, 2010	390	35.4
4	The Female Sexual Distress Scale: Initial validation of a standardized scale for assessment of sexually related personal distress in women	Derogatis LR, Rosen R Leiblum S et al.	Journal of Sex & Marital Therapy, 2002	386	20.3
5	Epidemiology/risk factors of sexual dysfunction	Lewis RW, Fugl-Meyer KS. et al.	Journal of Sexual Medicine, 2004	332	19.5
6	Prevalence of male and female sexual dysfunction is high following surgery for rectal cancer	Hendren SK, O'Connor BI et al.	Annals of Surgery, 2005	323	20.1
7	Diabetic Neuropathy: A Position Statement by the American Diabetes Association	Pop-Busui R, Boulton AJ et al.	Diabetes Care, 2015	300	75
8	Definitions of women's sexual dysfunction reconsidered: advocating expansion and revision	Basson R, Leiblum S, Brotto L et al.	J of Psychosomatic Obstetrics and Gynecology, 2003	298	16.5
9	Cognitive behavior therapy via the Internet: a systematic review of applications, clinical efficacy and cost-effectiveness	Hedman E, Ljotsson B, Lindfors N	Expert Review of Pharmacoeconomics Outcomes Res,2012	283	31.4
10	Female androgen insufficiency: the Princeton consensus statement on definition, classification, and assessment	Bachmann G, Bancroft J, Braunstein G et al.	Fertility and Sterility, 2002	263	13.8

TC: Total Citation; ACY: Average Citations per Year

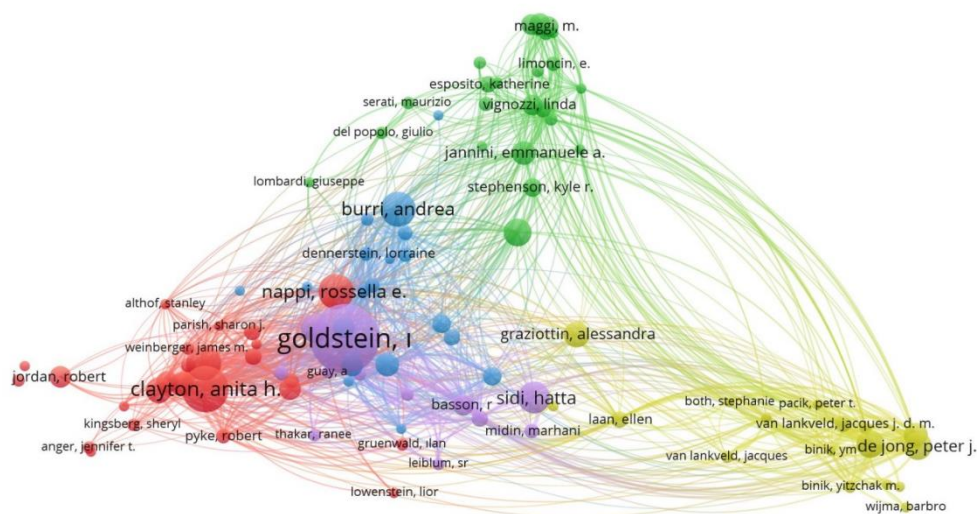


Figure 5. Network visualization map of co-citation analysis of active authors

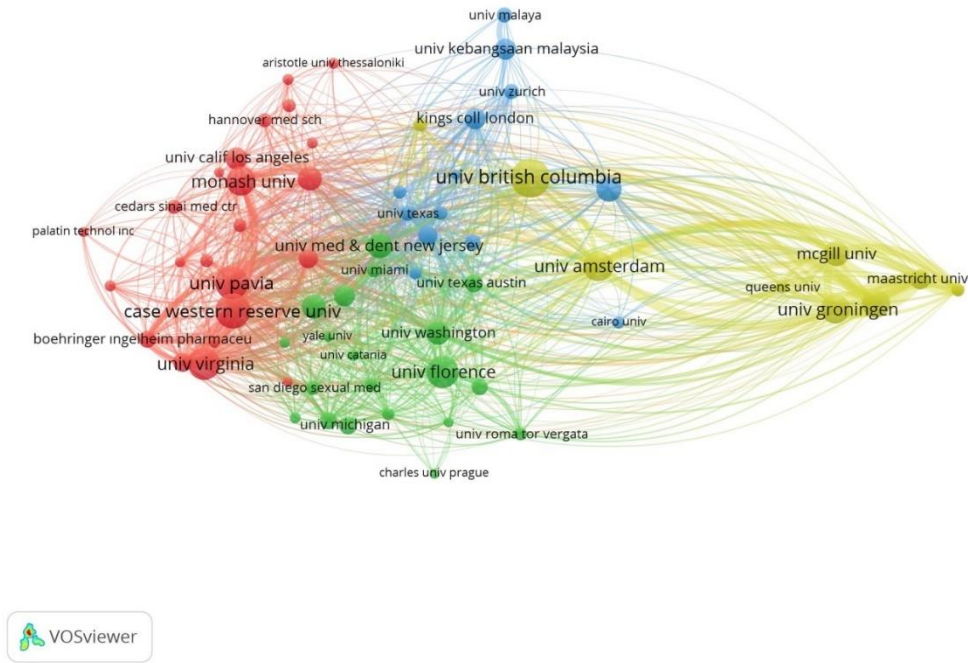


Figure 6: Network visualization of the cooperation analysis of the institutes

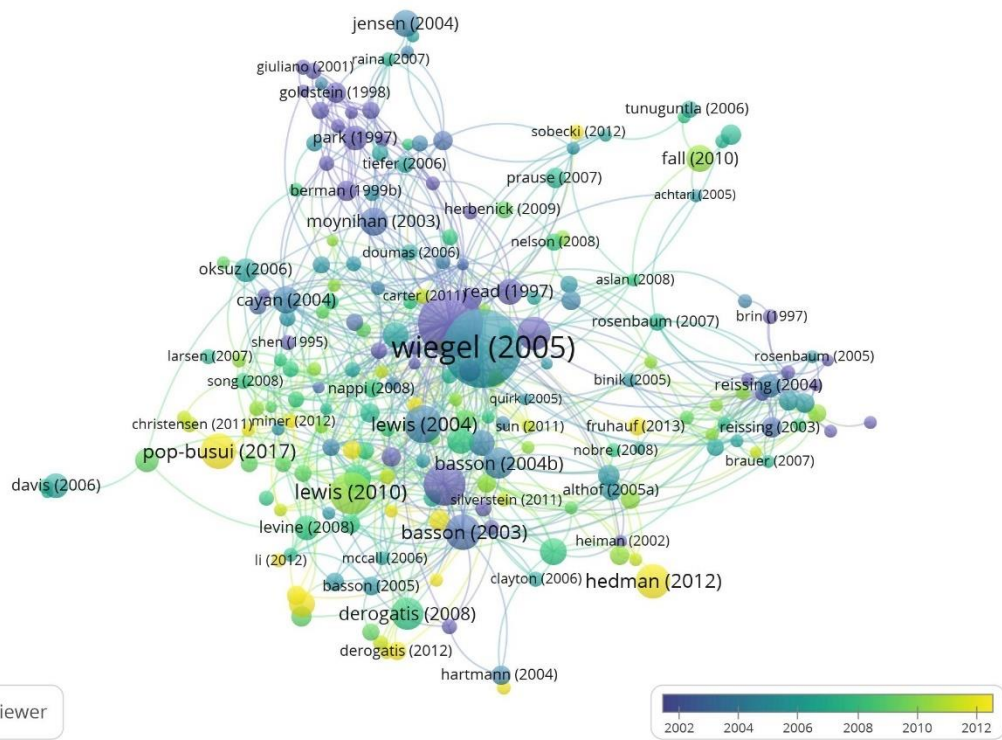


Figure 7: Network visualization map of co-citation analysis of most cited documents

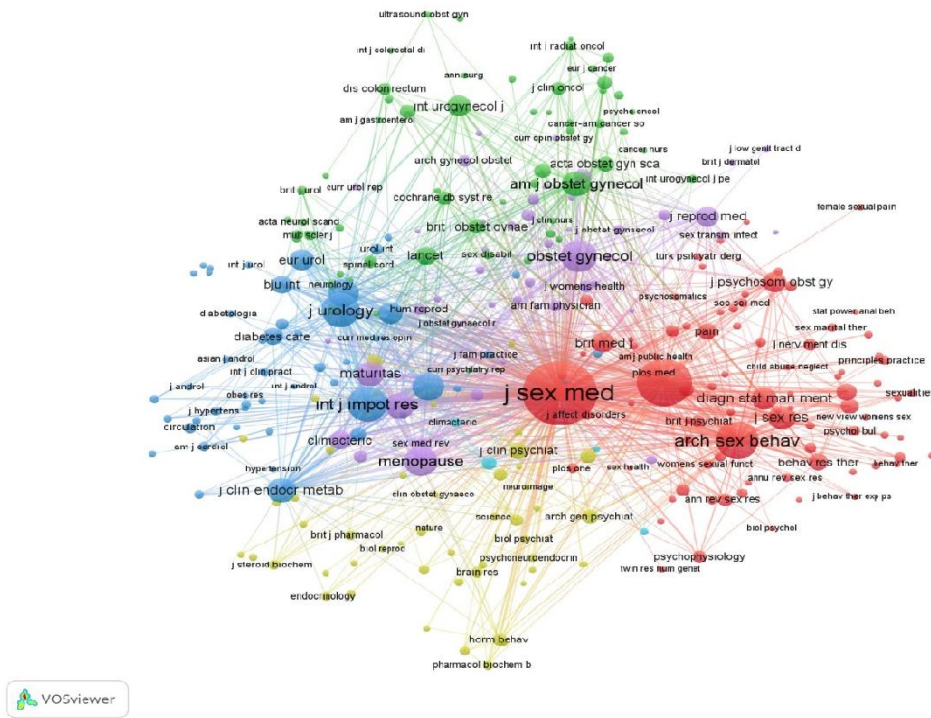


Figure 8. Network visualization of productivity of journals

Table 6: The first fifteen journal source by number of publications and citations on vaginismus and female sexual dysfunction.

Journal Name	No	% of 2212	C
Journal of Sexual Medicine	560	25.3	10,879
Journal of Sex Marital Therapy	86	3.8	3169
International Journal of Impotence Research	73	3.3	2239
Journal of Urology	61	2.9	1250
International Urogynecology Journal	44	1.9	475
Archives of Sexual Behavior	43	1.9	1319
Fertility and Sterility	31	1.4	1084
Menopause	31	1.4	775
Sexual and Relationship Therapy	25	1.1	154
Obstetrics and Gynecology	24	1.0	224
Journal of Sex Research	21	0.9	325
Sexual Medicine	21	0.9	98
Climacteric	19	0.8	528
International Journal of Sexual Health	17	0.7	16
Maturitas	17	0.7	570

No: Number of publications; C: Citations (Without Self Citations)

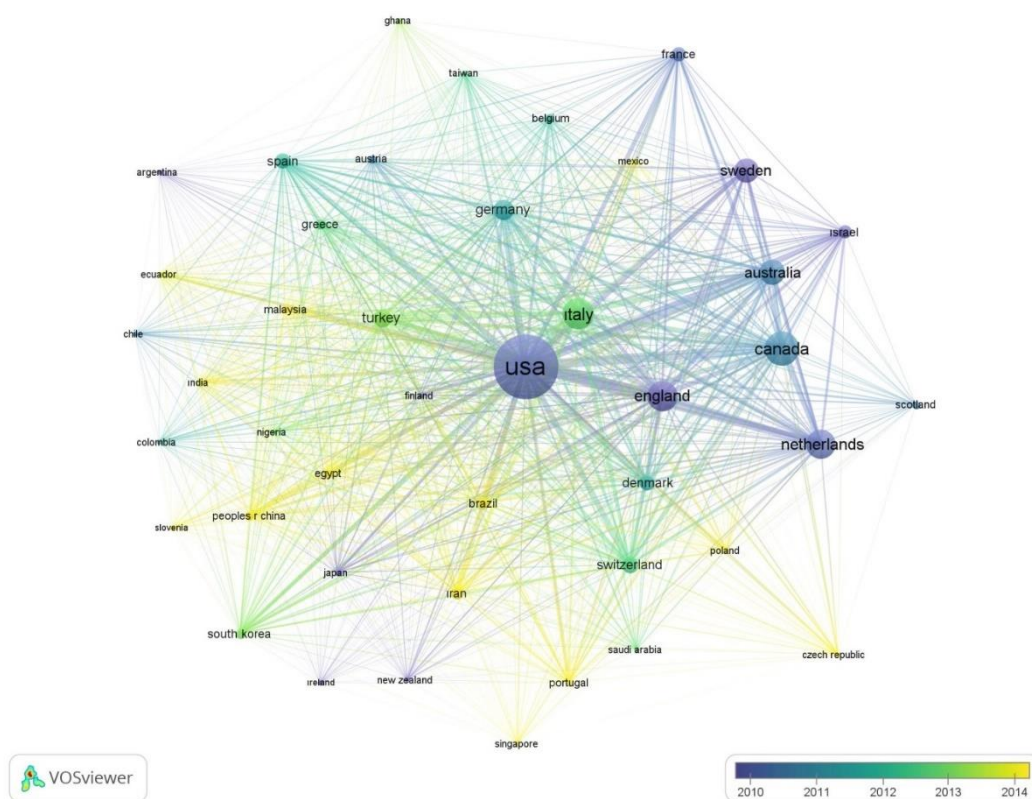


Figure 9: Network of co-contributing / collaborative countries about vaginismus and female sexual disorders

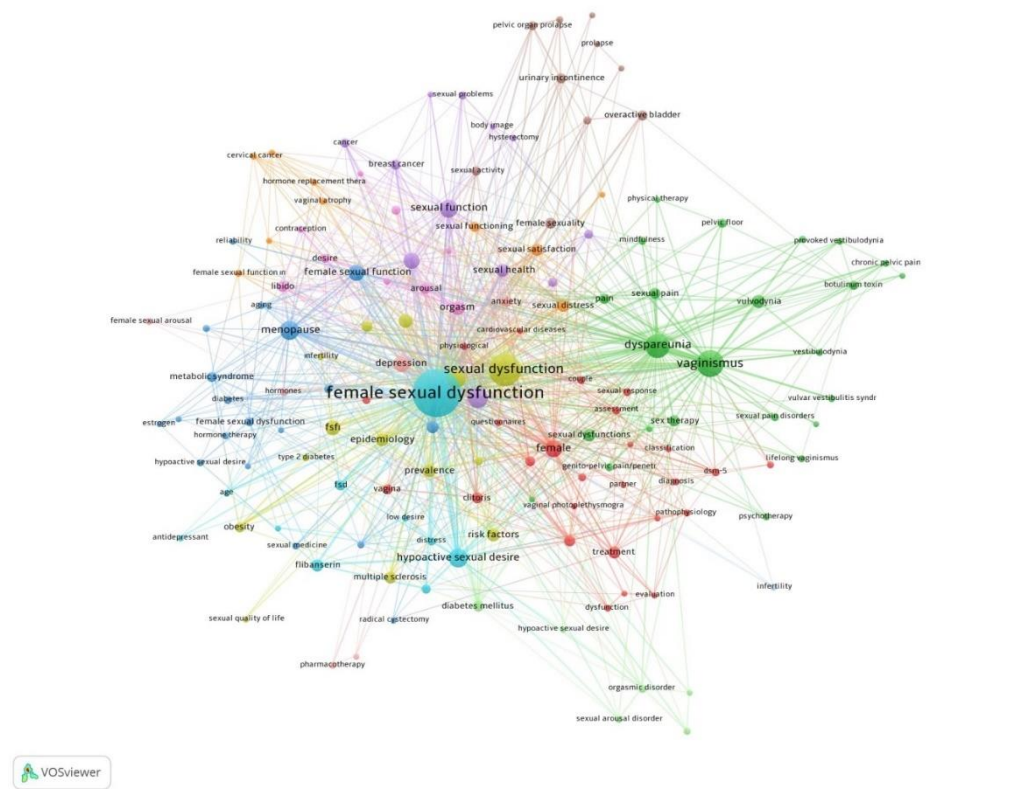


Figure 10: Network visualization map of relationships between the most commonly used trends and keywords

DISCUSSION

As a result of our research, we obtained 2212 documents, and we found that documents about vaginismus and FSD increased since 1995. The majority of the documents we obtained were original articles and most of them were written in English. The number of article publications about vaginismus and FSD tended to increase since 1980 with 2019 being the most productive year. Our research has shown the most popular journals, most productive writers and trending research topics on vaginismus and FSD. To examine the development of events in a particular area, bibliometric analysis was designed as it includes quantitative evaluations using both geometric and statistical methods (22).

The bibliometric analysis that we prepared with a holistic approach will enable obstetricians, urologists, and psychiatrists to understand the publishing trends in vaginismus and FSD more easily. Our research has shown that most of the publications about vaginismus and FSD are in the fields of urology, gynecology and psychology. The classification of sexual dysfunction in women was made in the form of desire, arousal, orgasm, and pain, and then different forms of classification were described (23). Female Sexual Function Index (FSFI), which evaluates the female sexual function, was developed in the 2000s. It consists of 19 items and includes desire (items 1e2), arousal (3e6), lubrication (7e10), orgasm (11e13), satisfaction (14e16), and pain (17e19), (24). Over time, FSFI has become the standard that measures women's sexual function, and many articles have been written that examine its compatibility. The most cited article was titled "The Female Sexual Function Index (FSFI): Cross-validation and development of clinical cutoff scores" (25). FSFI was also used when examining the effects of different diseases on female sexual function. Articles examining the effects of rectal cancer and diabetes on female sexual function, which we found in our study, are among the most cited (26,27).

Vaginismus, one of the female sexual dysfunctions, is at the center of frequently used keywords. In our study, we found the association of the words vaginismus and dyspareunia. Diagnostic and Statistical Manual of Mental Disorders (DSM-V) was the first document to catalog the terms vaginismus and dyspareunia (28). DSM-V combined vaginismus and dyspareunia under the name of genito-pelvic pain / penetration disorder (GPPPD). Approximately 14-34% of premenopausal women and 6.5-45% of postmenopausal women are affected by GPPPD (29). Knowing the GPPPD etiology facilitates treatment and a multidisciplinary treatment strategy should be applied. There is a wide range of medical treatments ranging from topical anesthetics to corticosteroids. Cognitive and behavioral therapies are successful treatment options in which couples participate (30). Gynecologists and family therapists should offer the couple the options of GPPPD treatment (31).

Our research is a scientific analysis that reveals scientific trends about FSD and vaginismus on a global scale. Clinical studies, guideline and indexes that measure female sexual function are at the center of the publications in our research. The most effective journals covering the publications of gynecology, urology family therapy and psychiatry disciplines were presented in the research. In the following years, we think that psychiatric studies on FSD and vaginismus will increase further. We anticipate that the studies evaluating the effect of female genital cosmetology on sexual functions will increase.

It is the first scientometric analysis about FSD and vaginismus and gives the reader comprehensive information about the future of this subject. It seems that FSD and vaginismus have not yet been adequately accommodated in the practice of obstetrics and urology, but articles have been increasing rapidly for several years. Studies about FSD and vaginismus have increased over the past decade, and non-invasive psychiatric interventions appear to be popular. With our

analysis, both clinicians and researchers will be able to easily determine which articles about FSD and vaginismus are strong and which topics are more cited.

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