Sağlık Akademisyenleri Dergisi
http://dergipark.gov.tr/sagakaderg

Sağ Aka Derg, 2023; 10(1): 134-145

Research Article / Araştırma

The 100 most-cited articles on pelvic organ prolapse: A bibliometric analysis

Pelvik organ prolapsusu hakkında en çok alıntı yapılan 100 makale: Bibliyometrik analiz

Ayhan Atıgan[1], Alev Atıgan[2], Soner Gök[3]

[1] Asst.Prof. Department of Obstetrics and Gynecology, Karabuk University, Medicine Faculty, Karabuk, Turkey. dratigan@hotmail.com. 0000-0002-7257-0593
[2] Asst.Prof. Department of Physical Medicine and Rehabilitation, Karabuk University, Medicine Faculty Karabuk, Turkey. alevozaydin89@hotmail.com. 0000-0003-4082-3055
[3] Asst.Prof. Department of Obstetrics and Gynecology, Pamukkale University, Medicine Faculty, Denizli, Turkey. sonerrgok@hotmail.com. 0000-0001-8940-1879

Key Words:
Pelvic Organ Prolapse, Bibliometric Analysis, Web Of Science, Urogynecology, Citation Analysis

Anahtar Kelimeler:
Web of Science, Pelvik Organ Prolapsusu, Bibliyometrik Analiz, Ürojinekoloji, Atıf Analizi

Corresponding Author/Sorumlu Yazar:
Asst.Prof. Department of Obstetrics and Gynecology, Karabuk University, Medicine Faculty, Karabuk, Turkey. dratigan@hotmail.com. 0000-0002-7257-0593

DOI:
10.52880/sagakaderg.1249253

Received Date/Gönderme Tarihi:
08.02.2023

Accepted Date/Kabul Tarihi:
21.02.2023

Published Online/Yayımlanma Tarihi:
01.03.2023

ABSTRACT

Objective: This study aimed to analyze the top 100 most cited papers in the field of pelvic organ prolapse by utilizing bibliometric methods. **Method**: On the 1st of October 2022, articles with the title pelvic organ prolapse were listed in order of citation on the Web of Science database. The first 100 articles were included in the study without a publication time limit. The number of citations, number of citations/year, title, author, journal, publication year, country and institutional information of the articles were recorded. **Results**: The highest number of citations in the first 100 most cited studies was 3,081 while the lowest was 95. The mean total number of citations of the 100 most cited studies was 248.7±380.2. The annual mean number of citations of the studies ranged between 118.5 and 3.7 and the mean number of studies was 16.8±17.8. In the ranking of the most cited papers, three journals were included in the list 70 times in total, accounting for 70% of the articles. Pelvic floor exercises were mentioned in 27 articles in total. **Conclusions**: This study provides medical researchers with bibliometric information relating to pelvic organ prolapse. The United States was clearly ahead in our study in terms of first authors, institutions, and journals. Articles on incontinence had more citations per year. Pelvic organ prolapse has serious sociological and economic consequences. We anticipate an increase in research on preventive factors such as pelvic exercise in the future.

ÖZ

Amaç: Bu çalışma, pelvik organ prolapsusu alanında en çok atıf alan ilk 100 makaleyi bibliyometrik yöntemler kullanarak analiz etmeyi amaçladı. **Yöntem**: 1 Ekim 2022 tarihinde pelvik organ prolapsusu başlıklı makaleler Web of Science veri tabanında atıf sırasına göre listelenmiştir. İlk 100 makale yayın süresi sınırlaması olmaksızın çalışmaya dahil edildi. Makalelerin atıf sayısı, atıf sayısı/yıl, başlık, yazar, dergi, yayın yılı, ülke ve kurum bilgileri kaydedildi. **Bulgular**: En çok atıf yapılan ilk 100 çalışma içerisinde en yüksek atıf sayısı 3.081, en düşük atıf ise 95 idi. En çok atıf yapılan ilk 100 çalışmanın ortalama toplam atıf sayısı 248,7±380,2 idi. Çalışmaların yıllık ortalama atıf sayısı 118,5 ile 3,7 arasında değişmekte olup, çalışma başına ortalama 16,8±17,8'dir. En çok atıf alan makaleler sıralamasında, makalelerin %70'ini oluşturan üç dergi toplamda 70 kez listeye dahil oldu. Toplam 27 makalede pelvik taban egzersizlerinden bahsedilmiştir. **Sonuçlar**: Bu çalışma tıp araştırmacılarına pelvik organ prolapsusu ile ilgili bibliyometrik bilgi sağlamaktadır. Amerika Birleşik Devletleri, ilk yazarlar, kurumlar ve dergiler açısından çalışmamızda açık bir şekilde öndeydi. İnkontinans ile ilgili makaleler her yıl daha fazla atıf almıştır. Pelvik organ sarkmasının ciddi sosyolojik ve ekonomik sonuçları vardır. Gelecekte pelvik egzersiz gibi önleyici faktörler üzerine yapılan araştırmaların artacağını öngörüyoruz.

INTRODUCTION

Pelvic organ prolapse (POP) is the sagging of the pelvic organs and protrusion of the vagina orifice in the advanced stage. Women frequently experience the medical condition that includes at least one of uterus (cervix), apical vaginal prolapse, anterior, posterior, and lateral vaginal wall prolapse (American College, 2019). According to the anatomical region where the sagging occurs, it is named as cystocele, enterocele and rectocele. POP is observed in half of the women on the gynecological examination table (Weintraub et al., 2020). One or more discomforts, such as a sense of slipping and fullness inside the vagina and a sense of voiding dysfunction, are frequently experienced by women with POP. These symptoms significantly lower quality of life and may cause issues with social functioning,

Reference | Atıf : Atıgan, A., Atıgan, A. & Gök, S. (2023). The 100 most-cited articles on pelvic organ prolapse: A bibliometric analysis *Sağlık Akademisyenleri Dergisi*, 10(1), 134-145

mental health, and sexuality (American College, 2019). Considering these effects, it is an important public health problem. Today, although awareness of the pelvic floor has increased, we are only at the beginning of the road.

Science advances by the creation of new articles by adding one more piece of information and referencing the previous article. In this case, emphasizing the knowledge of the previous article is called citation (Gupta et al., 2020). Although the quantity of citations does not completely reflect an article's quality, it is our main indicator of its effectiveness in that field. Citations reveal the success of the authors and journals, the institution with which they are affiliated, and even the country, and have significant benefits (Chen et al., 2016). Bibliometric analysis examines citation to evaluate research performance (Brandt et al., 2019). When the literature is examined, there are original research studies that examine the most cited articles in gynecological diseases as well as in various medical fields (Gupta et al., 2020; Chen et al., 2016; Brandt et al., 2019; Xiao et al., 2022; Brandt et al., 2010; Garfield, 1987). In the literature, it is observed that such bibliometric studies originate from the article that Garfield reviewed the most cited articles using the Web of Sciences database (Garfield, 1987). Towards the end of the twentieth century, urogynecological education began as a subdivision of gynecological diseases (Gupta et al., 2020).

There is no bibliometric analysis for POP in the literature as of yet. We aimed to use a bibliometric approach to evaluate the top 100 articles in the POP research area with the most citations.

METHODS

On October 1, 2022, published articles on pelvic organ prolapse from January 1975 to October 2022 (ie without date limitation) were retrieved by searching the Web of Science (WOS) database. Searches were made with the user profile of Karabuk University. Searches were performed without selecting any other restrictive additional features by typing "pelvic organ prolapse" in the cited title search pane. A total of 3935 articles were found titled Pelvic organ prolapse. These articles were sorted by citation count from most to least. In-depth analysis was done on the top 100 articles with the most citations. PubMed data was also used when examining these articles and determining the type of article. All studies were written in English. There was no exclusion criteria from the study.

Two researchers (AA and AA) compiled detailed article data. Items were categorized as original research, multicenter study, review, randomized controlled trial, clinical trial, comparative study, special contribution, meta analysis by using PubMed. The publication date of the article, the first author's name, and the first author's institution were noted. The article's overall citation count and yearly citation were calculated. In addition, the total number of citations received by the authors whose more than one article was cited was collected. The journals and institutions cited in more than one article were also identified. Additionally, the article's specific mention of anterior compartment and posterior compartment prolapse was assessed. It was also evaluated whether urinary and fecal incontinence accompanying POP and whether surgical approaches to POP were presented. Pelvic floor exercise (kegel exercise) or training questioned at article level. The majority of first authors and journals originated from America (USA; United State of America). For the purposes of statistical analysis, they were split into two groups: Americans and non-Americans. In addition, papers were divided into groups according to median citation value and median publication date.

Since this study was a bibliometric analysis and handled publicly available information, the study was initiated without the need for an ethics committee decision.

Statistical Analysis

The SPSS 21.0 (Statistical Package for Social Sciences, Chicago, IL, USA) program was used to conduct the statistical analyses. Categorical variables were presented as numbers, while continuous variables were presented as mean ± standard deviation (SD). The Kolmogorov-Smirnov test was used to determine whether the data were normally distributed. For group comparisons, the Kruskal-Wallis test and the Mann-Whitney U test were applied. In all statistical comparisons, $p<0.05$ was regarded as significant.

RESULTS

In the top cited study 3,081 citations were made, while 95 were the fewest study. The mean total of citations was 248.7±380.2. The annual mean citations of the studies ranged between 118.5 and 3.7 and the mean number of studies was 16.8±17.8 (Table 1).

Table 2 shows the first authors who have at least two articles in the top list. Three authors were listed with five papers. Among the candidates who were included in the list more than once, the most cited author with total 3314 citations was an author who was included in the list three times. The total was 229 with the least citations.

In the ranking of the most cited papers, three journals were included in the list 70 times in total, accounting for 70% of the articles (Table 3). The three journals with

Table 1: The top 100 most cited papers on pelvic organ prolapse

Rank	Title		Journal name	First Author	Total citation count	Citation per year
1	The standardization of terminology of female pelvic organ prolapse and pelvic floor dysfunction	Bump, RC	AM J OBSTET GYNECOL	1996	3081	118,5
2	Epidemiology of surgically managed pelvic organ prolapse and urinary incontinence	Olsen, AL	OBSTET GYNECOL	1997	2296	91,8
3	Pelvic organ prolapse in the Women's Health Initiative: Gravity and gravidity	Hendrix, SL	AM J OBSTET GYNECOL	2002	779	38,9
4	Fourth International Consultation on Incontinence Recommendations of the International Scientific Committee: Evaluation and Treatment of Urinary Incontinence, Pelvic Organ Prolapse, and Fecal Incontinence	Abrams, P	NEUROUROL URODYNAM	2010	674	56,1
5	Lifetime Risk of Stress Urinary Incontinence or Pelvic Organ Prolapse Surgery	Wu, JM	OBSTET GYNECOL	2014	595	74,3
6	Surgical management of pelvic organ prolapse in women	Maher, C	COCHRANE DB SYST REV	2013	566	62,8
7	Pelvic organ prolapse	Jelovsek, JE	LANCET	2007	530	35,3
8	A short form of the pelvic organ prolapse/ urinary incontinence sexual questionnaire (PISQ-12)	Rogers, RG	INT UROGYNECOL J	2004	512	28,4
9	Lifetime Risk of Undergoing Surgery for Pelvic Organ Prolapse"	Smith, FJ	OBSTET GYNECOL	2010	480	40,0
10	Comparison of levator ani muscle defects and function in women with and without pelvic organ prolapse	DeLancey, JOL	OBSTET GYNECOL	2007	474	31,6
11	Anterior Colporrhaphy versus Transvaginal Mesh for Pelvic-Organ Prolapse	Altman, D	NEW ENGL J MED	2011	416	37,8
12	Cost of pelvic organ prolapse surgery in the United States	Subak, LL	OBSTET GYNECOL	2001	382	18,1
13	Procedures for pelvic organ prolapse in the United States, 1979-1997	Boyles, SH	AM J OBSTET GYNECOL	2003	380	20,0
14	Correlation of symptoms with location and severity of pelvic organ prolapse	Ellerkmann, RM	AM J OBSTET GYNECOL	2001	359	17,1
15	Levator trauma is associated with pelvic organ prolapse	Dietz, HP	BJOG-INT J OBSTET GY	2008	349	24,9
16	Defining Success After Surgery for Pelvic Organ Prolapse	Barber, MD	OBSTET GYNECOL	2009	347	26,7
17	Long-term Outcomes Following Abdominal Sacrocolpopexy for Pelvic Organ Prolapse	Nygaard, I	JAMA-J AM MED ASSOC	2013	340	37,7
18	Surgical management of pelvic organ prolapse in women	Maher, C	COCHRANE DB SYST REV	2010	309	25,7
19	Epidemiology and outcome assessment of pelvic organ prolapse	Barber, MD	INT UROGYNECOL J	2013	308	34,2
20	Women seeking treatment for advanced pelvic organ protapse have decreased body image and quality of life	Jelovsek, JE	AM J OBSTET GYNECOL	2006	288	18,0
21	A transvaginal approach to repair of apical and other associated sites of pelvic organ prolapse with uterosacral ligaments	Shull, BL	AM J OBSTET GYNECOL	2000	282	12,8

Table 1 (continue): The top 100 most cited papers on pelvic organ prolapse

Rank	Title		Journal name	First Author	Total citation count	Citation per year
22	Correlation of symptoms with degree of pelvic organ support in a general population of women: What is pelvic organ prolapse?	Swift, SE	AM J OBSTET GYNECOL	2003	256	13,4
23	Sexual function in women with urinary incontinence and pelvic organ prolapse	Barber, MD	OBSTET GYNECOL	2002	253	12,6
24	A new instrument to measure sexual function in women with urinary incontinence or pelvic organ prolapse	Rogers, RG	AM J OBSTET GYNECOL	2001	227	10,8
25	Pelvic organ prolapse in older women: Prevalence and risk factors	Nygaard, I	OBSTET GYNECOL	2004	225	12,5
26	Epidemiologic evaluation of reoperation for surgically treated pelvic organ prolapse and urinary incontinence	Clark, AL	AM J OBSTET GYNECOL	2003	222	11,7
27	Interobserver and intraobserver reliability of the proposed International Continence Society, Society of Gynecologic Surgeons, and American Urogynecologic Society pelvic organ prolapse classification system	Hall, AF	AM J OBSTET GYNECOL	1996	221	8,5
28	Risk factors for pelvic organ prolapse and its recurrence: a systematic review	Vergeldt, TFM	INT UROGYNECOL J	2015	214	30,5
29	Sexual function and vaginal anatomy in women before and after surgery for pelvic organ prolapse and urinary incontinence	Weber, AM	AM J OBSTET GYNECOL	2000	214	9,7
30	Symptomatic pelvic organ prolapse - Prevalence and risk factors in a population-based, racially diverse cohort	Rortveit, G	OBSTET GYNECOL	2007	207	13,8
31	Progression and remission of pelvic organ prolapse: A longitudinal study of menopausal women	Handa, VL	AM J OBSTET GYNECOL	2004	200	11,1
32	Transvaginal mesh technique for pelvic organ prolapse repair: mesh exposure management and risk factors	Collinet, P	INT UROGYNECOL J	2006	190	11,9
33	Surgical management of pelvic organ prolapse in women: A short version Cochrane review	Maher, C	NEUROUROL URODYNAM	2008	185	13,2
34	Surgical management of pelvic organ prolapse in women: the updated summary version Cochrane review	Maher, C	INT UROGYNECOL J	2011	184	16,7
35	An International Urogynecological Association (IUGA)/International Continence Society (ICS) joint report on the terminology for female pelvic organ prolapse (POP)	Haylen, BT	INT UROGYNECOL J	2016	178	29,6
36	Ultrasound in the quantification of female pelvic organ prolapse	Dietz, HP	ULTRASOUND OBST GYN	2001	178	8,4
37	Bilateral uterosacral ligament vaginal vault suspension with site-specific endopelvic fascia defect repair for treatment of pelvic organ prolapse	Barber, MD	AM J OBSTET GYNECOL	2000	178	8,1
38	Pelvic organ prolapse surgery in the United States, 1997	Brown, JS	AM J OBSTET GYNECOL	2002	173	8,6
39	Female pelvic organ prolapse: A comparison of triphasic dynamic MR imaging and triphasic fluoroscopic cystocolpoproctography	Kelvin, FM	AM J ROENTGENOL	2000	170	7,7

Table 1 (continue): The top 100 most cited papers on pelvic organ prolapse

Rank	Title		Journal name	First Author	Total citation count	Citation per year
40	Patient satisfaction and changes in prolapse and urinary symptoms in women who were fitted successfully with a pessary for pelvic organ prolapse	Clemons, JL	AM J OBSTET GYNECOL	2004	164	9,1
41	Sexual function in women with and without urinary incontinence and/or pelvic organ prolapse	Rogers, RG	INT UROGYNECOL J	2001	161	7,6
42	Pelvic organ prolapse	Weber, AM	OBSTET GYNECOL	2005	160	9,4
43	Prevalence and risk factors for pelvic organ prolapse 20 years after childbirth: a national cohort study in singleton primiparae after vaginal or caesarean delivery	Gyhagen, M	BJOG-INT J OBSTET GY	2013	159	17,6
44	Sexual function among women with urinary incontinence and pelvic organ prolapse	Handa, VL	AM J OBSTET GYNECOL	2004	158	8,7
45	Conservative prevention and management of pelvic organ prolapse in women	Hagen, S	COCHRANE DB SYST REV	2011	157	14,3
46	Protecting the pelvic floor: Obstetric management to prevent incontinence and pelvic organ prolapse	Handa, VL	OBSTET GYNECOL	1996	157	6,0
47	Pelvic Organ Prolapse Quantification System (POP-Q) - a new era in pelvic prolapse staging.	Persu, C	J Med Life	2011	155	14,1
48	The prevalence of pelvic organ prolapse symptoms and signs and their relation with bladder and bowel disorders in a general female population	Slieker-ten Hove, MCP	INT UROGYNECOL J	2009	153	11,7
49	Tissue mechanics, animal models, and pelvic organ prolapse: A review	Abramowitch, SD	EUR J OBSTET GYN	2009	153	11,7
50	Changes in connective tissue in patients with pelvic organ prolapse-a review of the current literature	Kerkhof, MH	INT UROGYNECOL J	2009	151	11,6
51	Pelvic organ prolapse and incontinence in developing countries: review of prevalence and risk factors	Walker, GJA	INT UROGYNECOL J	2011	151	13,7
52	Lifetime risk of surgical management for pelvic organ prolapse or urinary incontinence	Fialkow, MF	INT UROGYNECOL J	2008	151	10,8
53	Size of the urogenital hiatus in the levator ani muscles in normal women and women with pelvic organ prolapse	DeLancey, JOL	OBSTET GYNECOL	1998	147	6,1
54	Effect of vaginal pessaries on symptoms associated with pelvic organ prolapse	Fernando, RJ	OBSTET GYNECOL	2006	143	8,9
55	Can pelvic floor muscle training reverse pelvic organ prolapse and reduce prolapse symptoms? An assessor-blinded, randomized, controlled trial	Braekken, IH	AM J OBSTET GYNECOL	2010	139	11,6
56	Reoperation 10 years after surgically managed pelvic organ prolapse and urinary incontinence	Denman, MA	AM J OBSTET GYNECOL	2008	139	9,9
57	Surgical management of pelvic organ prolapse in women (Withdrawn Paper. 2007, art.no. CD004014)	Maher, C	COCHRANE DB SYST REV	2007	138	9,2
58	Obesity and retropubic surgery for stress incontinence: Is there really an increased risk of intraoperative complications?	Rogers, RG	AM J OBSTET GYNECOL	2006	137	8,6
59	RACIAL COMPARISONS AND CONTRASTS IN URINARY-INCONTINENCE AND PELVIC ORGAN PROLAPSE	BUMP, RC	OBSTET GYNECOL	1993	137	4,7

Table 1 (continue): The top 100 most cited papers on pelvic organ prolapse

Rank	Title		Journal name	First Author	Total citation count	Citation per year
60	Pelvic symptoms in women with pelvic organ prolapse	Burrows, LJ	OBSTET GYNECOL	2004	135	7,5
61	Retrospective multicentre study of the new minimally invasive mesh repair devices for pelvic organ prolapse	Abdel-Fattah, M	BJOG-INT J OBSTET GY	2008	134	9,6
62	Urinary incontinence and pelvic organ prolapse in women with Marfan or Ehlers-Danlos syndrome	Carley, ME	AM J OBSTET GYNECOL	2000	129	5,8
63	Graft Use in Transvaginal Pelvic Organ Prolapse Repair A Systematic Review	Sung, VW	OBSTET GYNECOL	2008	128	9,1
64	Pelvic organ prolapse in fibulin-5 knockout mice - Pregnancy-induced changes in elastic fiber homeostasis in mouse vagina	Drewes, PG	AM J PATHOL	2007	128	8,5
65	Responsiveness of the Pelvic Floor Distress Inventory (PFDI) and Pelvic Floor Impact Questionnaire (PFIQ) in women undergoing vaginal surgery and pessary treatment for pelvic organ prolapse	Barber, MD	AM J OBSTET GYNECOL	2006	127	7,9
66	Individualised pelvic floor muscle training in women with pelvic organ prolapse (POPPY): a multicentre randomised controlled trial	Hagen, S	LANCET	2014	123	15,3
67	Symptoms, bother and POPQ in women referred with pelvic organ prolapse	Mouritsen, L	INT UROGYNECOL J	2003	120	6,3
68	Pelvic Organ Prolapse and Overactive Bladder	de Boer, TA	NEUROUROL URODYNAM	2010	120	10,0
69	Morphometric analysis of smooth muscle in the anterior vaginal wall of women with pelvic organ prolapse	Boreham, MK	AM J OBSTET GYNECOL	2002	120	6,0
70	Fecal incontinence in women with urinary incontinence and pelvic organ prolapse	Jackson, SL	OBSTET GYNECOL	1997	119	4,7
71	Laparoscopic sacrocolpopexy with two separate meshes along the anterior and posterior vaginal walls for multicompartment pelvic organ prolapse	Gadonneix, P	J AM ASSOC GYN LAP	2004	118	6,5
72	Consensus Statement of the European Urology Association and the European Urogynaecological Association on the Use of Implanted Materials for Treating Pelvic Organ Prolapse and Stress Urinary Incontinence	Chapple, CR	EUR UROL	2017	118	23,6
73	An International Urogynecological Association (IUGA)/International Continence Society (ICS) joint report on the terminology for female pelvic organ prolapse (POP) (vol 27, pg 165, 2016)	Haylen, BT	INT UROGYNECOL J	2016	117	19,5
74	Assessment and grading of pelvic organ prolapse by use of dynamic magnetic resonance imaging	Singh, K	AM J OBSTET GYNECOL	2001	110	5,2
75	Prevalence of symptomatic pelvic organ prolapse in a Swedish population	Tegerstedt, G	INT UROGYNECOL J	2005	109	6,4
76	Risk factors associated with an unsuccessful pessary fitting trial in women with pelvic organ prolapse	Clemons, JL	AM J OBSTET GYNECOL	2004	109	6,0
77	Relationship between stress urinary incontinence and pelvic organ prolapse	Bai, SW	INT UROGYNECOL J	2002	108	5,4

Table 1 (continue): The top 100 most cited papers on pelvic organ prolapse

Rank	Title		Journal name	First Author	Total citation count	Citation per year
78	Symptomatic Pelvic Organ Prolapse at Midlife, Quality of Life, and Risk Factors	Fritel, X	OBSTET GYNECOL	2009	107	8,2
79	Risk factors for the recurrence of pelvic organ prolapse after vaginal surgery: a review at 5 years after surgery	Diez-Itza, I	INT UROGYNECOL J	2007	107	7,1
80	Epidemiology of urinary (UI) and faecal (FI) incontinence and pelvic organ prolapse (POP)	Hunskaar, S	INCONTINENCE, VOLS 1 AND 2	2005	104	6,1
81	Patient preferences for uterine preservation and hysterectomy in women with pelvic organ prolapse	Korbly, NB	AM J OBSTET GYNECOL	2013	104	11,5
82	A new measure of sexual function in women with pelvic floor disorders (PFD): the Pelvic Organ Prolapse/Incontinence Sexual Questionnaire, IUGA-Revised (PISQ-IR)	Rogers, RG	INT UROGYNECOL J	2013	103	11,4
83	Robot-assisted Sacrocolpopexy for Pelvic Organ Prolapse: A Systematic Review and Meta-analysis of Comparative Studies	Serati, M	EUR UROL	2014	101	12,6
84	Pelvic floor muscle training in treatment of female stress urinary incontinence, pelvic organ prolapse and sexual dysfunction	Bo, K	WORLD J UROL	2012	100	10,0
85	Uterine preservation vs hysterectomy in pelvic organ prolapse surgery: a systematic review with meta-analysis and clinical practice guidelines	Meriwether, KV	AM J OBSTET GYNECOL	2018	100	25,0
86	Perioperative morbidity using transvaginal mesh in pelvic organ prolapse repair	Altman, D	OBSTET GYNECOL	2007	99	6,6
87	Uterosacral ligament in postmenopausal women with or without pelvic organ prolapse	Gabriel, B	INT UROGYNECOL J	2005	98	5,7
88	Epidemiology of urinary (UI) and faecal (FI) incontinence and pelvic organ prolapse (POP)	Milsom, I	INCONTINENCE	2009	98	7,5
89	Genetic influence on Stress Urinary Incontinence and Pelvic Organ Prolapse	Altman, D	EUR UROL	2008	98	7,0
90	Is there a pelvic organ prolapse threshold that predicts pelvic floor symptoms?	Gutman, RE	AM J OBSTET GYNECOL	2008	98	7,0
91	Surgical strategies for women with pelvic organ prolapse and urinary stress incontinence	Borstad, E	INT UROGYNECOL J	2010	97	8,1
92	Biomechanical properties of the vaginal wall: effect of pregnancy, elastic fiber deficiency, and pelvic organ prolapse	Rahn, DD	AM J OBSTET GYNECOL	2008	97	6,9
93	Effect of Uterosacral Ligament Suspension vs Sacrospinous Ligament Fixation With or Without Perioperative Behavioral Therapy for Pelvic Organ Vaginal Prolapse on Surgical Outcomes and Prolapse Symptoms at 5 Years in the OPTIMAL Randomized Clinical Trial	Jelovsek, JE	JAMA-J AM MED ASSOC	2018	96	24,0
94	Extracellular matrix proteases contribute to progression of pelvic organ prolapse in mice and humans	Budatha, M	J CLIN INVEST	2011	96	8,7
95	Pregnancy, labor, delivery, and pelvic organ prolapse	Sze, EHM	OBSTET GYNECOL	2002	96	4,8

Table 1 (continue): The top 100 most cited papers on pelvic organ prolapse

Rank	Title		Journal name	First Author	Total citation count	Citation per year
96	Randomized prospective comparison of needle colposuspension versus endopelvic fascia plication for potential stress incontinence prophylaxis in women undergoing vaginal reconstruction for stage III or IV pelvic organ prolapse	Bump, RC	AM J OBSTET GYNECOL	1996	96	3,7
97	6th International Consultation on Incontinence. Recommendations of the International Scientific Committee: EVALUATION AND TREATMENT OF URINARY INCONTINENCE, PELVIC ORGAN PROLAPSE AND FAECAL INCONTINENCE	Abrams, P	NEUROUROL URODYNAM	2018	95	23,7
98	Primary and repeat surgical treatment for female pelvic organ prolapse and incontinence in parous women in the UK: a register linkage study	Abdel-fattah, M	BMJ OPEN	2011	95	8,6
99	Racial Differences in Pelvic Organ Prolapse	Whitcomb, EL	OBSTET GYNECOL	2009	95	7,3
100	The age distribution, rates, and types of surgery for pelvic organ prolapse in the USA	Shah, AD	INT UROGYNECOL J	2008	95	6,8

Table 2: First named authors with more than one article in the top 100 most cited articles

Author name	Number of Publications	Total citation
Abdel-Fattah, M	2	229
Abrams, P	2	769
Altman, D	3	613
Barber, MD	5	1213
Bump, RC	3	3314
Clemons, JL	2	273
DeLancey, JOL	2	621
Dietz, HP	2	527
Hagen, S	2	280
Handa, VL	3	515
Haylen, BT	2	295
Jelovsek, JE	3	914
Maher, C	5	1382
Nygaard, I	2	565
Rogers, RG	5	1140
Weber, AM	2	374

Table 3: Journals with more than one article in the top 100 most cited articles

Journal Name	Number of Publications
Am J Obstet Gynecol	29
Obstet Gynecol	21
Int Urogynecol J	20
Neurourol Urodynam	4
Cochrane Db Syst Rev	4
BJOG- Int J Obstet Gy	3
Eur Urol	3
JAMA- J Am Med Assoc	2
Lancet	2

the most papers were Am J Obstet Gynecol (29 papers), Obstet Gynecol (21 papers), and Int Urogynecol J (20 papers).

When the first authors were matched with their institutions, the top three institutions were the Cleveland Clinic (USA) (9 papers), the University of Texas (USA) (6 papers), and Royal Brisbane and Wesley Hospitals (Australia) (5 papers). In total, more than one article from 20 institutions was among the top 100 most cited articles on POP (Table 4).

Table 5 presents statistical data on article contents and features. Whether the article mentioned anterior compartment (in 82 articles), posterior compartment (in 81 articles), urinary or fecal incontinence (in 95 articles), surgical approaches (in 91 articles), pelvic floor exercises (in 27 articles) did not show a statistically significant difference in the number of citations to the article (p values were 0.816, 0.482, 0.265, 0.647, 0.437, respectively). When the annual citation numbers of these parameters were evaluated, only incontinence was statistically different (17,36±18,17 vs 7,40±2,61; p=0,026). The majority of first-name authors (56%) (Figure 1) and journals (82%) were from the USA, but this was not statistically significant in terms of citation counts (304,05±490,20 vs 178,45±128,60 (p=0,057); 260,65±414,06 vs 194,78±146,47 (p=0,404)). At the same time, the number of annual citations was not statistically different. First name author's affiliation with USA 56%, Europe 23%, Australia 10%, United Kingdom 10%, Korea 1% respectively presented in Figure 1. While there was no difference between the types of publications in terms of the total number of citations, the annual number of citations was statistically significantly different (p=0,078, p= 0,002; respectively). When divided into two groups according to the median citation count,

Table 4: Institutions with more than one article in the top 100 most cited articles

Institution Name	Number of Publications
Bristol Urological Institute	2
Brown University	3
Cleveland Clinic	9
Duke University	3
Glasgow Caledonian University	2
Gothenburg University	2
John Hopkins University	4
Karolinke Institutet	3
Norwegian School of Sport Sciences	2
Oregon Health Sciences University	3
Radboud University	2
Royal Brisbane and Wesley Hospitals	5
University of Bergen	2
University of California	4
University of Michigan	2
University of New Mexico	4
University of New South Wales	2
University of Pittsburgh	2
University of Texas	6
Virginia Commonwealth University	2

Table 5: Features of article content with more than one article in the top 100 most cited articles

Features	Mentioned	N	Citation Mean±SD	p	Cite per year Mean±SD	P
Anterior compartment	Yes	82	257,46±413,69	0,816	17,16±18,07	0,282
	No	18	209,28±157,15		15,47±17,19	
Posterior compartment	Yes	81	260,04±415,76	0,482	17,24±18,15	0,201
	No	19	200,84±155,21		15,22±16,83	
Incontinence	Yes	95	254,73±389,20	0,265	17,36±18,17	0,026*
	No	5	136,00±51,21		7,40±2,61	
Surgery	Yes	91	224,01±261,23	0,647	16,42±15,12	0,281
	No	9	499,33±971,71		21,26±36,65	
Pelvic floor muscle exercise	Yes	27	181,67±132,61	0,437	15,28±11,24	0,497
	No	73	273,62±436,08		17,44±19,77	
Author Country	America	56	304,05±490,20	0,057	17,55±21,03	0,503
	Non- America	44	178,45±128,60		15,97±12,88	
Journal Country	America	82	260,65±414,06	0,404	16,82±18,67	0,296
	Non- America	18	194,78±146,47		17,03±13,92	
Type publication	Original research	53	310,49±502,13	0,078	17,44±21,27	0,002*
	Multicenter study	3	112,33±18,93		9,23±2,47	
	Review	21	221,24±166,51		19,99±15,86	
	Randomized controlled trial	6	201,83±139,50		22,41±13,00	
	Clinical trial	3	150,67±88,69		9,23±4,82	
	Comporative study	11	125,64±31,20		7,10±1,72	
	Special Contribution	2	147,50±43,14		24,55±7,14	
	Meta analysis	1	100,00		25,00	
Citation status by median level (median number of citations: 151)	High	52			23,76±22,16	0,000*
	Low	48			9,38±5,28	
Publication date by median level (median publication date: 2007)	Newer (≥2007)	54	199,09±148,89	0,190	19,08±14,71	0,178
	Older (<2007)	46	307,13±534,40		14,25±20,80	

the annual citation count of the group with more than the median citation count was statistically significantly higher (23.76±22.16 vs 9.38±5.28; p=0.000). When the median publication date was divided into two groups, there was no statistically significant difference in the number of citations and annual citations in the group before the median publication date compared to the group after the median publication date (307.13±534.40 vs 199.09±148.89; p=0.190; 19.08±14.71 vs 14.25±20.80; p=0.178, respectively).

DISCUSSION

POP is a common urogynecological condition in which many factors play a role in its etiology. Anatomical, physiological, genetic, lifestyle and reproductive factors predispose a woman to have pelvic floor dysfunction (Vergeldt et al., 2015). Bibliometric analysis can compare articles based on citations and investigate the characteristic features of published papers with detailed (Gupta et al., 2020; Chen et al., 2016; Brandt et al., 2019; Xiao et al., 2022; Brandt et al., 2010; Garfield, 1987). Bibliometric studies are more objective as they offer quantitative values compared to traditional reviews in which literature data are cursorily discussed. There was no previous bibliometric analysis in the literature that comprehensively reviewed POP articles.

It takes special names according to the region where the pelvic organ prolapse occurs. The anterior compartment is more concerned with urinary complaints and is called a cystocele (Maher et al., 2013). The posterior compartment is mostly associated with bowel (enterocele) or rectal (rectocele) complaints (Woodley et al., 2017). In our study, both the anterior and posterior compartments were covered approximately equally in four out of five articles. Although there was no statistically significant difference, the articles that mentioned these special nomenclature had higher citation scores.

There was no statistically significant difference in the number of citations or annual citations received by the articles, depending on the age of the article being older than the median. However, the annual citation count of the articles that have more citations than the median value was statistically significantly higher. The total number of citations for the top ten most cited articles was roughly 40% of the total number of citations for the top 100 cited articles. "The standardization of terminology of female pelvic organ prolapse and pelvic floor dysfunction" by Bump et al., (1996) published in AM J OBSTET GYNECOL in 1996 had the highest number of citations and the highest number of citations per year. At the same time, when the total number of citations of all authors is considered, Bump RC had the most citations as the first-name author, despite the fact that there were authors with more studies included in the top 100 studies. In the recent bibliometric study on endometrial carcinoma, it was stated that the United States constituted the overwhelming majority of the articles (Xiao et al., 2022). American journals and first-name authors from the United States accounted for a larger proportion of the top 100 most cited articles. However, there was no statistically significant difference in the mean number of citations or citations per year when non-American journals and first-name authors were compared.

In the urogynecology study of Gupta et al. (2020), more than half of the 100 most cited articles were urinary incontinence articles. POP articles were about one-fifth of urogynecology studies (Gupta et al., 2020). In our study, the relationship with urinary incontinence was mentioned in almost all POP articles. Articles on incontinence had more citations per year in our study. In particular, the frequency of POP will increase as the average life expectancy increases. Currently, one in ten women in the population undergoes lifetime POP surgery and the rate of reoperation is higher (Vergeldt et al., 2015). Surgical approaches were discussed in almost all papers in our study. Therefore, it is necessary to manage patient information very well in order to prevent the development and recurrence of POP. In fact, there are things that need to be explained, starting with the healthy population. It is available in the literature that pelvic floor exercises (Kegel exercises), which were first described in 1948, can prevent urinary incontinence and pelvic organ prolapse (Kegel, 1948; Ashton-Miller and DeLancey, 2007). Pelvic floor muscle training was mentioned in roughly a quarter of the articles in our study. It can be said that this number is quite unsatisfactory when looking at other parameters. Furthermore, articles that mentioned exercise had fewer mean citations. In fact, treatments for pelvic organ prolapse are a huge economic burden (Sung et al.,2010). Therefore, preventable methods should be emphasized before treatment. We believed that the scientific community did not place enough emphasis on pelvic floor muscle training.

In the study of Khajuria et al., articles were classified according to the study design (Khajuria et al., 2021). However, statistical analysis was not performed. In our current study, the studies were classified and it was evaluated whether there was a difference between them according to the number of citations. While there was no difference in the total number of citations, the number of citations per year was found to be statistically significant in our study.

Limitation

Similar limitations as in all other bibliometric studies are also present in our study. The number of citations may vary between databases. In our study, WOS data

was taken into account and confirmed via PubMed. It is insufficient to look only at the number of citations to show the quality of an article.

CONCLUSION

We analyzed the most cited articles on POP, which is usually the keyword of urogynecology articles. The oldest one among the top 100 most cited studies is not even thirty years old yet. From this point of view, we can liken the POP issue like a greening sapling, with increased quality of life and long life expectancy. Because it is a significant public health issue, we believe that articles on exercise and lifestyle changes will be prominent in the future.

REFERENCES

1. American College of Obstetricians and Gynecologists and the American Urogynecologic Society. (2019). INTERIM UPDATE: This Practice Bulletin is updated as highlighted to reflect the US Food and Drug Administration order to stop the sale of transvaginal synthetic mesh products for the repair of pelvic organ prolapse.. Pelvic Organ Prolapse. Female Pelvic Med Reconstr Surg. 25(6):397-408. doi: 10.1097/SPV.0000000000000794.
2. Weintraub A.Y., Glinter H., & Marcus-Braun N. (2020). Narrative review of the epidemiology, diagnosis and pathophysiology of pelvic organ prolapse. Int Braz J Urol. 46(1):5-14. doi: 10.1590/S1677-5538.IBJU.2018.0581.
3. Gupta A., Kennedy B., Meriwether K.V., Francis S.L., Cardenas-Trowers O., & Stewart J.R. (2020). Citation classics: the 100 most cited articles in Urogynecology. Int Urogynecol J. 31(2):249-266. doi: 10.1007/s00192-019-04021-9.
4. Chen X.L., Chen Z.R., Cao Z.L., Han K., Tong Y.W., Xiang X.H., & Hu C.X. (2016). The 100 most cited articles in ectopic pregnancy: a bibliometric analysis. Springerplus. 5(1):1815. doi: 10.1186/s40064-016-3503-8.
5. Brandt J.S., Hadaya O., Schuster M., Rosen T., Sauer M.V., & Ananth C.V. (2019). A Bibliometric Analysis of Top-Cited Journal Articles in Obstetrics and Gynecology. JAMA Netw Open. 2(12):e1918007. doi: 10.1001/jamanetworkopen.2019.18007.
6. Xiao P., Yao C., & Wang G. (2022). The top 100 most cited papers on endometrial carcinoma: A bibliometric analysis. Front Oncol. 12:987980. doi: 10.3389/fonc.2022.987980.
7. Brandt J.S., Downing A.C., Howard D.L., Kofinas J.D., & Chasen S.T. (2010). Citation classics in obstetrics and gynecology: the 100 most frequently cited journal articles in the last 50 years. Am J Obstet Gynecol. 203(4):355.e1-7. doi: 10.1016/j.ajog.2010.07.025.
8. Garfield E. (1987). 100 citation classics from the Journal of the American Medical Association. JAMA. 257(1):52-59.
9. Vergeldt T.F., Weemhoff M., IntHout J., & Kluivers K.B. (2015). Risk factors for pelvic organ prolapse and its recurrence: a systematic review. Int Urogynecol J. 26(11):1559-1573. doi:10.1007/s00192-015-2695-2698
10. Maher C., Feiner B., Baessler K., & Schmid C. (2013). Surgical management of pelvic organ prolapse in women. Cochrane Database Syst Rev. 30;(4):CD004014.
11. Woodley S.J., Boyle R., Cody J.D., Mørkved S., & Hay-Smith E.J.C. (2017). Pelvic floor muscle training for prevention and treatment of urinary and faecal incontinence in antenatal and postnatal women. Cochrane Database Syst Rev. 22;12:CD007471.
12. Bump R.C., Mattiasson A., Bø K., Brubaker L.P., DeLancey J.O., Klarskov P., Shull B.L., & Smith A.R. (1996). The standardization of terminology of female pelvic organ prolapse and pelvic floor dysfunction. Am J Obstet Gynecol. 175(1):10-17. doi: 10.1016/s0002-9378(96)70243-0.
13. Kegel A.H. (1948). Progressive resistance exercise in the functional restoration of the perineal muscles. Am J Obstet Gynecol. 56(2):238-248.
14. Ashton-Miller J.A., & DeLancey J.O. (2007). Functional anatomy of the female pelvic floor. Ann N Y Acad Sci. 1101:266-296.
15. Sung V.W., Washington B., & Raker C.A. (2010). Costs of ambulatory care related to female pelvic floor disorders in the United States. Am J Obstet Gynecol. 202(5):483.e1-4
16. Khajuria A., Charles W.N., Dutt A., & Hoyos A. (2021). The 100 Most-cited Articles in Abdominoplasty: A Bibliometric Analysis. Plast Reconstr Surg Glob Open. 9(3):e3426. doi: 10.1097/GOX.0000000000003426.