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Original Research Article

Understanding the Application of Selective Serotonin Reuptake Inhibitors (SSRIs) in the Management of Premature Ejaculation

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Abstract

Background: Premature ejaculation (PE) is one of the most common sexual dysfunctions affecting men. Among the available treatments, selective serotonin reuptake inhibitors (SSRIs) have gained considerable attention.
Objectives: This study aimed to conduct a bibliometric analysis of SSRIs and PE research (SPR), focusing on performance indicators, co-word analysis, and thematic evolution.
Materials and Methods: Data were retrieved from the Scopus database, identifying 538 documents, which were filtered down to 340 relevant publications. Bibliometric tools such as VOSviewer and Bibliometrix were employed for analysis and visualization, while Sankey diagrams and thematic maps illustrated thematic shifts and research collaborations over time.
Results: SPR publications from 1980 to 2024 revealed stable scholarly engagement, with an average of 45.36 citations per document. The analysis highlighted key contributors, including prolific authors, institutions, and countries, that have shaped the SPR landscape. Research themes encompassed anti-depressants, sexual dysfunction, and treatment approaches. Notably, post-2010 trends introduced emerging themes such as pre-ejaculation, depression, SSRIs, and pharmacokinetics. The evolution of these topics indicates an increasingly nuanced understanding of PE and its pharmacological management.
Conclusion: Overall, this study highlights the dynamic nature of SPR, showcasing its scientific productivity and valuable contributions to psychiatric pharmacology and sexual medicine.

Keywords

SSRIs, premature ejaculation, bibliometric analysis, co-word analysis, VOSviewer, R-package

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Introduction

Premature ejaculation (PE) is a prevalent sexual disorder that primarily affects males. PE is a prevalent sexual disorder that primarily affects males. Recent global estimates from 2024 suggest that approximately 20%–30% of men may experience PE at some point in their lives, making it one of the most common male sexual dysfunctions.[1] Historically, this disease entity has been plagued by considerable uncertainties regarding its description and the underlying mechanisms.[2] It was not until 2014 that the initial standardized evidence-based definition of PE was created.[3] Patients presenting with PE are evaluated by obtaining a comprehensive medical history to identify any comorbidities that may increase their susceptibility to this clinical condition or change the available treatment options, such as endocrine, urological, or psychorelational/psychosexual disorders.[3] A comprehensive sexual history is crucial for evaluating the frequency and characteristics of sexual encounters and for identifying any sexual comorbidities, such as erectile dysfunction (ED), which may make PE either simple (occurring without other sexual dysfunctions) or complicated (occurring with other sexual dysfunctions).[4–7] The guidelines from the International Society for Sexual Medicine on PE suggest inquiring patients reporting such a presentation about the duration between penetration and ejaculation, their capacity to postpone ejaculation, and the psychological effects of this condition.[8]

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Various treatments for PE are commercially available and actively used in numerous countries,[2,9] According to the British Association of Sexual Health and HIV, recommended treatment methods include behavioral therapy, tricyclic anti-depressants (TCAs), selective serotonin reuptake inhibitors (SSRIs), local anesthetic agents, and phosphodiesterase type 5 (PDE5) inhibitors. Extensive research has demonstrated that SSRIs and medications with SSRI-like side effects are both safe and efficacious for treating PE.[10–16] These studies examined alternative treatment options for PE and emphasized their mechanism(s) of action, efficacy, benefits, and constraints. These studies also suggested that the ejaculation-delaying effects of these SSRIs may be generalized to men with less rapid ejaculation, as paroxetine significantly increased the Intravaginal ejaculation latency time (IELT) in both groups, irrespective of their baseline IELT, indicating the potential application of these medications across varying ejaculation profiles.[5,9,16,17] A study consisting of two double-blind, placebo-controlled studies concluded that paroxetine, fluoxetine, and sertraline significantly delayed ejaculation compared with placebo in men with lifelong rapid ejaculation, with paroxetine showing the strongest effect, followed by fluoxetine and sertraline, while fluvoxamine exhibited less significant delay.[16]

Bibliometric analysis is a highly recognized and reliable approach for examining rich scientific data, allowing for the investigation of evolutionary subtleties within a particular discipline and revealing new topics.[18,19] Nevertheless, the use of this approach in the examination of SSRIs and PE is somewhat recent and incomplete. This study intends to fill these gaps by conducting a bibliometric analysis of SSRIs and PE research (SPR). The analysis concentrates on measures of performance, analysis of co-words, and the detection of developing themes in this field of research.

Materials and Methods

Data Mining

The Scopus database was chosen for its extensive health science coverage.[20] The search strategy used was: TITLE (dapoxetine OR "serotonin reuptake inhibitor" OR fluoxetine OR fluvoxamine OR paroxetine OR sertraline OR escitalopram) AND TITLE-ABS-KEY ("PE" OR ejaculation), yielding 538 documents. Filters were applied to include only English-language original articles, narrowing the dataset to 340. This Boolean search combined drug-specific and clinical terms to capture relevant literature on SSRIs and PE. The final dataset, focused on original research, was exported in comma-separated values (CSV) and bibliography text (BibTeX) formats for analysis.

Data Analysis and Visualization

This study conducted a comprehensive bibliometric evaluation using VOSviewer and Bibliometrix to assess the development, collaboration, and research trends in the field.[21,22] Key metrics included author and institutional productivity, geographic distribution, citation patterns, annual growth, document age, and thematic focus. VOSviewer enabled visualization of co-authorship and citation networks, with total link strength (TLS) indicating the influence of entities within the network. A Sankey diagram illustrated the relationships among top authors, countries, and journals, highlighting major contributors and collaboration patterns. Thematic mapping assessed topic importance (centrality) and development (density), providing insights into research structure and emerging areas. These tools together identified key trends, gaps, and opportunities for future research.

Results

Analysis of SPR from 1980 to 2024 identified 340 documents, with an annual growth rate of 5.12% and an average of 45.36 citations per document. The mean document age was 13.7 years, with citation peaks in 2003 and 2015, and publication peaks in 2006 and 2010, reflecting sustained research interest and evolving focus (Figure 1A). Waldinger, led with 16 publications, followed by Olivier (14), and others like Bose, Tesfaye, and Zwinderman with seven each. Leading institutions included Universiteit Utrecht (15), Leijenburg Hospital and H. Lundbeck A/S (13 each), and Yale School of Medicine and GlaxoSmithKline, USA (11 each). Top journals included the *Journal of Sexual Medicine* (19), *Andrologia* (16, and *Journal of Clinical Psychopharmacology* (14). A Sankey diagram (Figure 1B) visualized key relationships among top authors (AU), countries (AU_CO), and journals (SO), showing the Netherlands' strength in publishing in high-impact journals. This was created using Bibliometrix in R from Scopus data.

The United States topped country contributions with 109 publications, followed by China (36), Turkey (29), and Egypt (28) (Table 1, Figure 2A). The bibliometric analysis of SPR revealed the United States as the leading collaborator (TLS = 64), followed by the United Kingdom, France, Denmark, and Australia (Figure 2B). These countries accounted for 24.04% of international co-authorships. In citations, the United States led with 4,283, followed by the Netherlands (782), Denmark (549), and others (Figure 2C). Collaboration patterns varied significantly. The United States had 47 single-country and 15 multi-country publications, reflecting strong international engagement. In contrast, China, Turkey, and Egypt had fewer international collaborations. The Netherlands had a high MCP ratio (0.786), with the United Kingdom and France also showing strong international collaboration (Figure 3).

Highly cited SPR documents addressed the efficacy of SSRIs in depression, post-stroke therapy, and PE, with a focus on escitalopram, paroxetine, and SSRI-induced sexual dysfunction (Table 2). Co-word analysis identified key terms such as "PE," "dapoxetine," "paroxetine," "escitalopram," and "pharmacokinetics" (Figure 4A). Thematic mapping revealed basic themes (anti-depressants, sexual dysfunction),

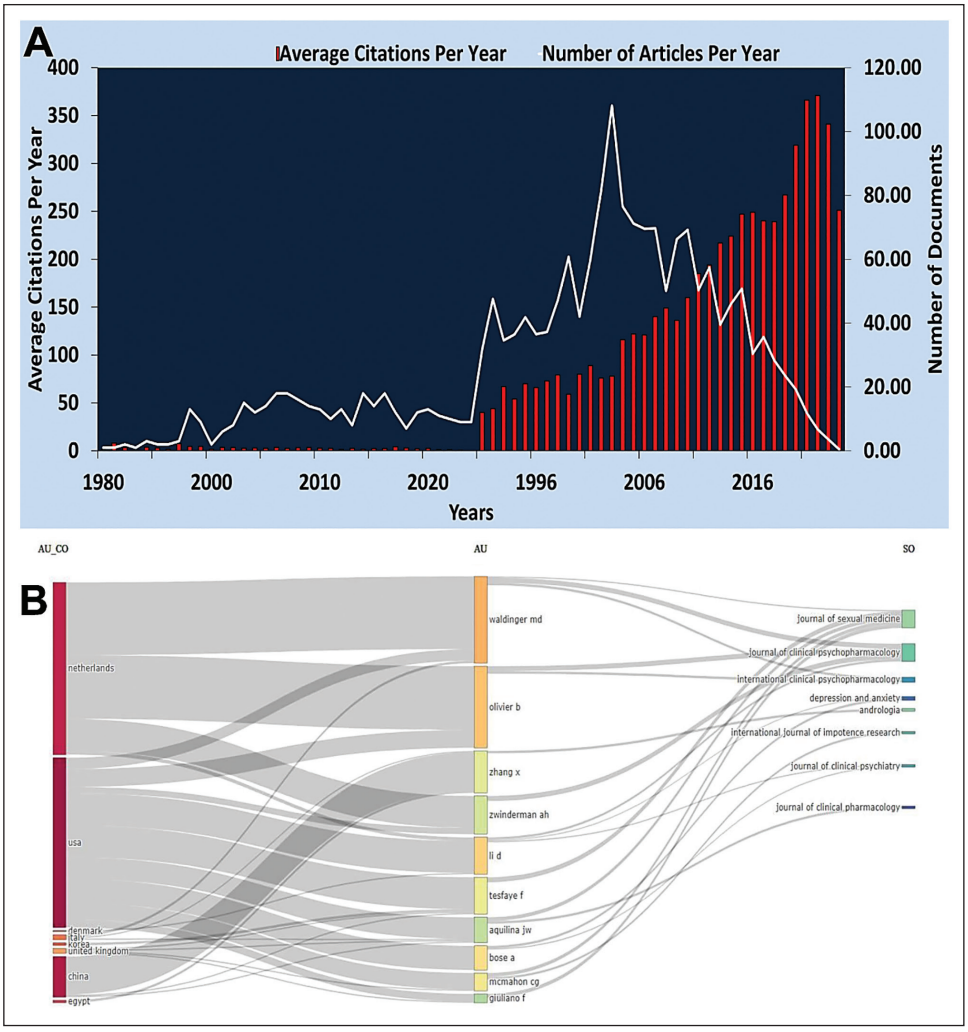


Figure 1. (A) Annual Production and Citation in Selective Serotonin Reuptake Inhibitors (SSRIs) and Premature Ejaculation (PE) Research. (B) Sankey Diagram. The Flow of Values or Quantities Between Entities is Depicted in the Diagram.

Table 1. Most Productive Authors, Affiliations, Countries, and Sources.

#S	Authors	*N*	Affiliations	*N*	Countries	*N*	Sources	*N*
1st	Waldinger, M.D.	16	Universiteit Utrecht	15	United States	109	*Journal of Sexual Medicine*	19
2nd	Olivier, B.	14	Leijenburg Hospital	13	China	36	*Andrologia*	16
3rd	Bose, A.	7	H. Lundbeck A/S	13	Turkey	29	*Journal of Clinical Psychopharmacology*	14
4th	Tesfaye, F.	7	Yale School of Medicine	11	Egypt	28	*International Journal of Impotence Research*	12
5th	Zwinderman, A.H.	7	GlaxoSmithKline, USA	11	Netherlands	28	*Journal of Clinical Psychiatry*	12
6th	Aquilina, J.W.	6	Forest Laboratories, Inc	10	United Kingdom	22	*International Clinical Psychopharmacology*	7
7th	Giuliano, F.	6	ALZA Corporation	10	Denmark	19	*Journal of Clinical Pharmacology*	7
8th	McMahon, C.G.	6	Johnson & Johnson Pharmaceutical Research & Development, Raritan	10	France	17	*Current Medical Research and Opinion*	6
9th	Modi, N.B.	6	Rudolf Magnus Institute of Neuroscience	9	Iran	15	*Depression and Anxiety*	6
10th	Jiang, H.	5	Cairo University	9	Italy	15	*Journal of Urology*	6

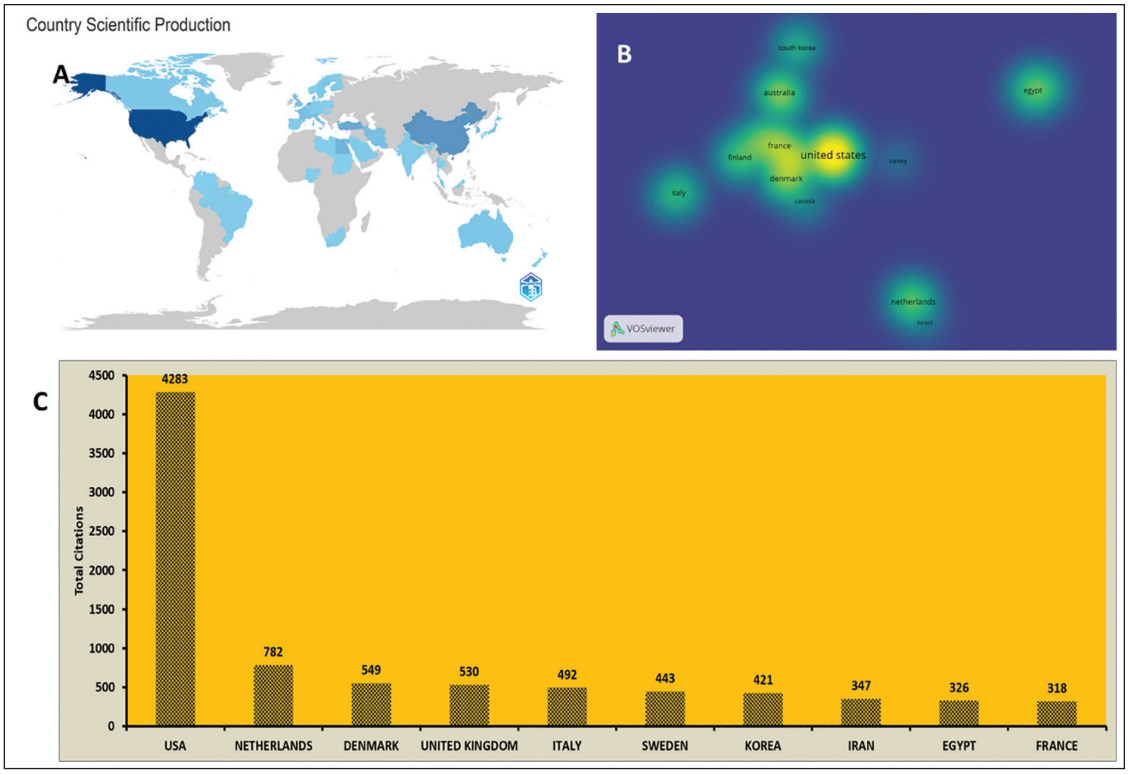


Figure 2. Most Productive (A), Collaborative (B), and Cited Countries.

Table 2. Highly Cited Discourse.

DOI	Years	Source	Total Citations	Citation Average
10.1080/00926239708403923	1997	*Journal of Sex and Marital Therapy*	518	18.50
10.1001/jama.280.8.708	1998	*JAMA*	361	13.37
10.1097/00004714-199808000-00004	1998	*Journal of Clinical Psychopharmacology*	354	13.11
10.1176/ajp.151.9.1377	1994	*American Journal of Psychiatry*	307	9.90
10.1001/jama.299.20.2391	2008	*JAMA*	300	17.65
10.1016/S0140-6736(06)69373-2	2006	*Lancet*	284	14.95
10.2165/00003495-199141020-00007	1991	*Drugs*	280	8.24
10.1016/S0149-2918(00)88317-4	1999	*Clinical Therapeutics*	247	9.50
10.1186/s12888-016-1173-2	2017	*BMC Psychiatry*	232	29.00
10.1097/00004850-200205000-00001	2002	*International Clinical Psychopharmacology*	229	9.96

motor themes (obsessive-compulsive disorder [OCD], panic disorder), niche topics (remission, cost-effectiveness), and an emerging focus on SSRIs.

Thematic evolution analysis (Figure 4B) of SPR revealed a major shift around 2010. From 1980 to 2010, themes focused on ED, paroxetine, and general anti-depressants. Between 2011 and 2024, research emphasized depression, ejaculation, serotonin, pharmacokinetics, and targeted use of escitalopram and SSRIs. This transition was driven by dapoxetine's approval, advances in understanding serotonergic regulation, and updated diagnostic criteria recognizing PE as distinct from ED. These changes reflect a more refined, interdisciplinary approach to SPR, emphasizing precision pharmacological interventions and improved patient outcomes.

Figure 4C highlights emerging themes in SPR, focusing on pharmacological interventions such as dapoxetine hydrochloride, tadalafil, and SSRIs for treating sexual disorders. Meta-analysis also emerged as a key methodological theme, reflecting efforts to synthesize existing evidence. Central topics include the study and treatment of prevalent sexual disorders like PE and ED, with emphasis on diverse therapeutic strategies.

Author co-citation analysis, which measures how frequently two authors are cited together, was used to explore the

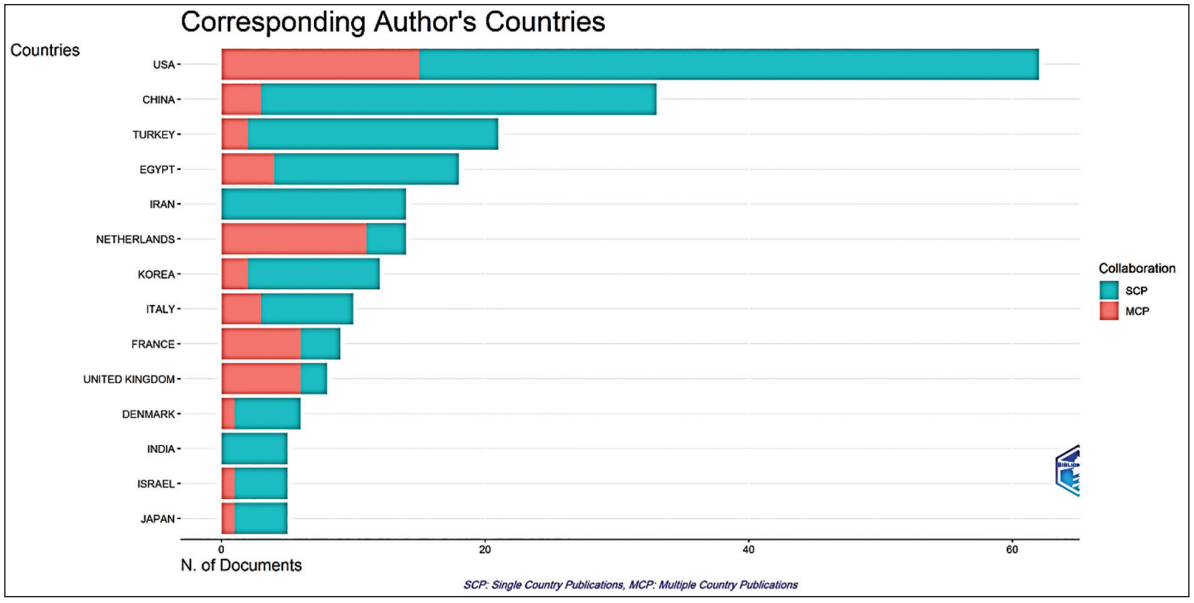


Figure 3. Distribution of Countries Based on Their National (SCP) and International Co-authorship.

Note: MCP, multiple countries publications (orange colour); SCP, single countries publications (green colour).

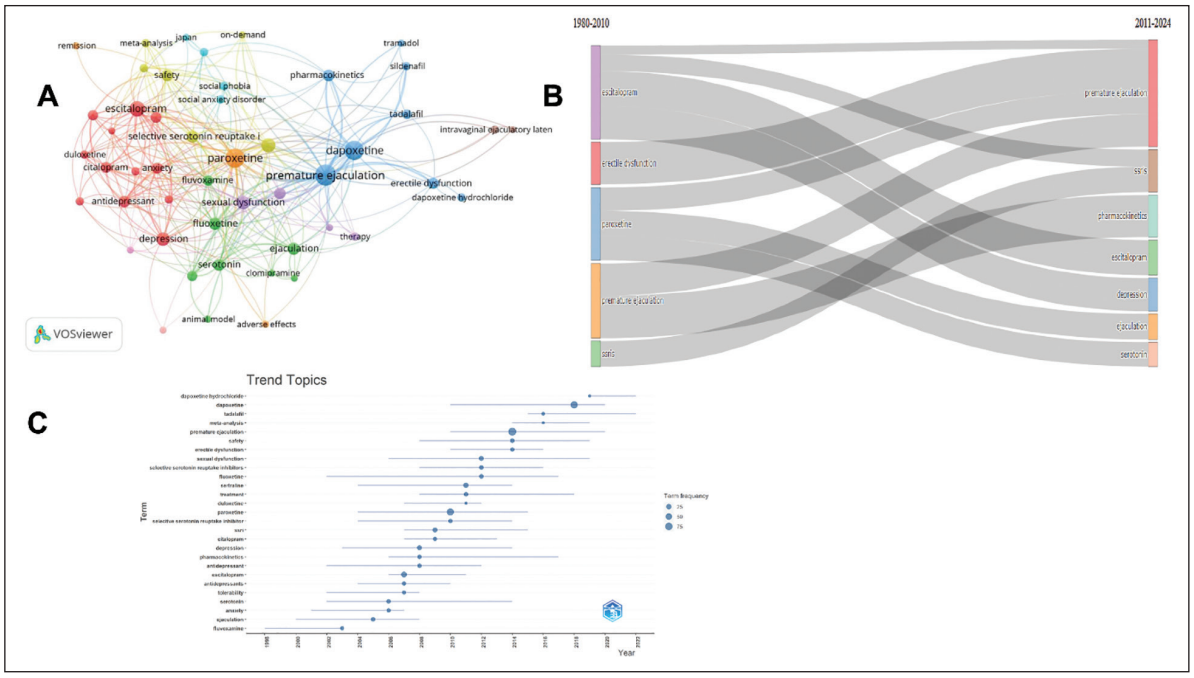
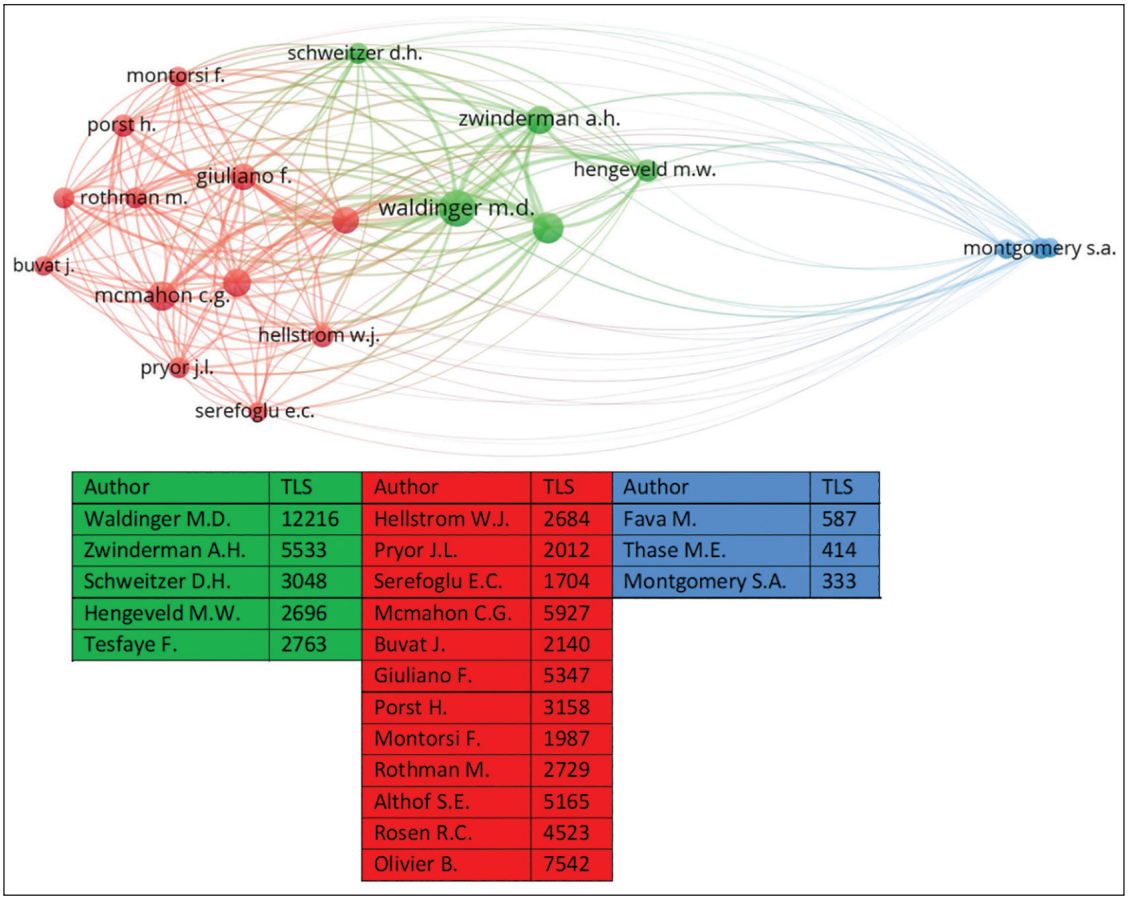


Figure 4. (A) Conceptual Mapping Based on Co-word Analysis. (B) Thematic Evolution Analysis. (C) Emerging Themes.

intellectual structure of the field. Using VOSviewer, three distinct author clusters were identified in Figure 5. The red cluster included Olivier B., McMahon C.G., and Giuliano F.; the green cluster featured Waldinger M.D., Zwinderman A.H., and Schweitzer D.H.; and the blue cluster included Fava M., Thase M.E., and Montgomery S.A. These clusters illustrate key scholarly networks and provide insights into the interconnected research contributions shaping SSRIs and PE literature.

Discussion

This study aimed to analyze the use of SSRIs in treating PE through performance metrics, co-word analysis, and the identification of emerging themes. This is the first of its kind, offering unique insights into this aspect of SPR. With 340 articles rising yearly at 5.12%, the study of SPR from 1980 to 2024 shows continuous intellectual interest. The average



Author	TLS	Author	TLS	Author	TLS
Waldinger M.D.	12216	Hellstrom W.J.	2684	Fava M.	587
Zwinderman A.H.	5533	Pryor J.L.	2012	Thase M.E.	414
Schweitzer D.H.	3048	Serefoglu E.C.	1704	Montgomery S.A.	333
Hengeveld M.W.	2696	Mcmahon C.G.	5927		
Tesfaye F.	2763	Buvat J.	2140		
		Giuliano F.	5347		
		Porst H.	3158		
		Montorsi F.	1987		
		Rothman M.	2729		
		Althof S.E.	5165		
		Rosen R.C.	4523		
		Olivier B.	7542		

Figure 5. Author Co-citation Mapping. Based on the Provided Author Co-citation Analysis Data and Clusters, The Mapping of Authors Based on Their Co-citations Revealed Three Distinct Clusters. These Clusters Were Identified Using VOSviewer Software.

document age was 13.7 years with 45.36 citations per document. While document publishing peaked in 2006 and 2010, fluctuating citation numbers peaked around 2003 and 2015. This information shows an ongoing interest in this field of study, with different citation styles reflecting changing research objectives and influences. This study expansion, however, has been quite limited in quantity over the last 50 years and has been seen in previous bibliometric studies pertaining to sexual health.[23–25]

In SPR, Waldinger, M.D. stands out with 16 publications, focusing on critical topics, such as on-demand treatment of PE with clomipramine and paroxetine, the effects of antidepressants such as mirtazapine and paroxetine on ejaculation, comparisons between fluvoxamine and paroxetine in sexual inhibitory effects, and investigations into SSRIs' impact of SSRIs on ejaculation with medications such as paroxetine and citalopram. His work also explored the effects of paroxetine, sertraline, and nefazodone on ejaculation, SSRI-induced sexual dysfunction, the interplay between serotonin, serotonergic receptors, SSRIs, and sexual behavior, and the ejaculation-retarding properties of paroxetine in primary PE.[5,9,10,14,15,26–28] Waldinger's research contributions have significantly advanced our understanding of the field, particularly regarding the effects of SSRIs on ejaculation and sexual function.

Sankey diagrams traditionally illustrate the flow of energy or materials using quantitative data, representing directed and weighted graphs where inflow weights at each node equal the outflows, ensuring flow conservation. They help visualize processes and explore relationships in complex systems.[21] The three-field plot was employed to assess correlations among sources, countries, affiliations, keywords, authors, and references.[29] Notably, not all journals focus on this specific scientific area, yet the Sankey approach highlights authors with major publications in top-ranked journals. The Netherlands' strong performance in prestigious journals reflects its broader academic impact across multiple disciplines, a trend previously noted in scholarly discourse.[30,31]

Engaging in research cooperation has several advantages. Collaborative research has the potential to accelerate the pace of study, enhance efficiency, generate novel findings and insights, and foster stronger collaboration among partners.[32] The objective of this study was to analyze and compare the performance of research partnerships in the SPR field. Partnerships accounted for 24.04% of international co-authorship in this discipline. The United States leads the SPR

collaboration with 64 TLS values (Figure 2B). Because of its strong research infrastructure, large financing for research, varied multidisciplinary approach, presence of eminent specialists, and focus on innovation[33]—which promotes both nationally and internationally, the United States leads to cooperative activities within SPR. Several bibliometric studies on sexual medicine have reported the leading position of the United States in scientific collaboration.[23–25]

Escitalopram belongs to the class of SSRIs and is classified as an anti-depressant. It is mainly used for depression and anxiety-related conditions, including generalized anxiety disorder and social phobia. Escitalopram increases the concentration of serotonin, a neurotransmitter in the brain that influences mood and emotion. Compared to other medications of this type, this medicine is optimal in terms of effectiveness and tolerability, as it produces minimal adverse reactions. Like all medications, it has possible side effects and drug interactions, which make it necessary to take it according to recommendations and seek medical advice.[11,12,34] Escitalopram is an anti-depressant that is sometimes prescribed "off-label" to treat PE. This indication is believed to be related to its ability to increase serotonin levels, which may work on lengthening the time taken to ejaculate. Medical supervision should be provided because of the heterogeneity. There is a need to seek release from or give up PE that involves working with a health professional.[35] The administration of sertraline, fluvoxamine, and escitalopram in randomized controlled trials (RCTs) did not provide promising results. Although two case studies suggested that paroxetine may decrease headache days, more extensive randomized and placebo-controlled clinical trials are necessary to establish more reliable findings.[11,12,34,35]

Co-citation measures the semantic link between two publications based on how often they are cited together, assuming that frequently co-cited authors share a closer intellectual connection.[18,21,22] Using VOSviewer, three author clusters were identified. The red cluster, led by Olivier, McMahon, and Giuliano, focused on SSRIs' effects on sexual behavior and PE, including animal studies, serotonin transporter polymorphisms, chronic treatment outcomes, on-demand therapy, and SSRI-induced sexual dysfunction.[36–41] The green cluster was led by Waldinger, Zwinderman, and Schweitzer, while the blue cluster, led by Fava, Thase, and Montgomery, concentrated on antidepressant efficacy in bipolar depression, major depressive disorder (MDD), and dysthymia. This included studies on cognitive therapy versus medication, remission rates, sex-age interactions, blood pressure effects, and relapse risk after cognitive behavioral therapy (CBT).[42–51] Author co-citation analysis thus reveals the intellectual structure and interconnected research themes within SSRIs and PE studies.

This study is limited by its exclusive use of the Scopus database, potentially omitting relevant SPR articles. Unverified author identities and affiliations may affect performance metrics, while co-word analysis could oversimplify thematic trends. Excluding non-English publications may also introduce language bias. Future studies should use multiple databases, verify author data, and include qualitative approaches for a more comprehensive view.

Future Directions and Clinical Relevance

This bibliometric analysis provided a comprehensive overview of global research trends related to SSRIs in the management of PE. While grounded in statistical evaluation, the findings offer valuable insights for guiding future experimental and clinical studies. The growing focus on SSRIs—particularly dapoxetine and paroxetine—highlights their clinical significance in sexual medicine; however, the lack of large-scale RCTs necessitates further investigation into their long-term safety, comparative efficacy, dosing strategies, and integration with behavioral therapies. The emergence of themes such as pharmacokinetics and serotonin modulation underscores the potential for personalized treatment approaches. Additionally, the observed gaps in international collaboration present an opportunity to foster global research partnerships that can enhance standardization and equity in clinical care. Bridging these bibliometric findings with real-world clinical applications will be essential to advance therapeutic outcomes and improve the quality of life for individuals affected by PE.

Conclusion

This bibliometric analysis offers the first data-driven overview of global research on SSRIs in managing PE from 1980 to 2024. Analyzing 340 publications with an average of 45.36 citations per document, it highlights strong scientific interest and evolving research depth. Key contributors like Waldinger and Olivier, and US institutions have shaped the field. Since 2010, thematic shifts have moved toward serotonin pathways, pharmacokinetics, and specific SSRIs like dapoxetine and escitalopram. Co-word analyses reveal a transition from general sexual dysfunction to focused pharmacological studies. Despite global relevance, international collaboration remains limited, pointing to a gap in cross-border research. These findings guide future clinical trials and underscore SSRIs' growing role in sexual medicine.

Abbreviations

AU: Author; **AU_CO:** Author's country; **BibTeX:** Bibliography text format; **BMC:** BioMed central; **CSV:** Comma-separated values; **ED:** Erectile dysfunction; **FA:** Focus area; **IELT:** Intravaginal ejaculation latency time; ***JAMA:*** *Journal of the American Medical Association*; **MCP:** Multiple-country publications; **MCP_Ratio:** Multiple-country publication ratio; **PDE5:** Phosphodiesterase type 5; **PE:** Premature ejaculation; **RCTs:** Randomized controlled trials; **SCP:** Single-country publications; **SO:** Source; **SPR:** SSRIs and PE research; **SSRIi:** Selective serotonin reuptake inhibitor intervention; **SSRIs:** Selective serotonin reuptake inhibitors; **TCAs:** Tricyclic anti-depressants; **TLS:** Total link strength; **VOS:** Visualization of similarities.

Declaration of Conflicting Interests

The author declares no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Ethical Approval and Informed Consent

As this is a systematic and narrative review of published clinical trials, no new human participants were involved, and therefore ethical approval and informed consent were not applicable.

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