



## BRIEF REPORT

# Bibliometric and visual analysis of the top 100 most cited articles on long-acting injectable antipsychotics

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### ABSTRACT

**Objective:** Recently, there has been a notable increase in interest in long-acting injectable antipsychotics (LAIs) and in the number of studies conducted in psychopharmacology. This study aims to identify and analyze the 100 most cited articles on LAIs.

**Method:** The Web of Science (WOS) Core Collection database was analyzed using VOSviewer software to identify published articles on the subject. Information such as titles, authors, journals and publishers, number of citations, and years of publication was examined. The publications were then ranked according to the number of citations, and the top 100 most cited articles were subjected to further analysis.

**Results:** The total number of citations ranged from 65 to 1,044. The most cited article is the 'International Consensus Study of Antipsychotic Dosing' in 2010, published in The American Journal of Psychiatry, with 1,044 citations. The Journal of Clinical Psychiatry contributed the greatest number of articles to the top 100 most cited articles, with 20 articles, followed by The British Journal of Psychiatry and Schizophrenia Research, which contributed eight and seven articles, respectively. The oldest publication in the top 100 was published in 1998, and the two most recent articles were published in 2022.

**Conclusion:** This analysis allows researchers and clinicians to gain insight into the most recent and impactful work in this field, particularly in identifying potential avenues for future academic research.

**Keywords:** Bibliometric analysis, citation, long-acting injectable antipsychotic, VOSviewer

## INTRODUCTION

Long-acting injectable antipsychotics (LAIs) have been continuously developed and widely used since the early 1960s due to their advantages in the treatment of psychiatric disorders such as schizophrenia and bipolar disorder (1). Bibliometric analyses provide a statistical and quantitative

review of articles in a specific field of study, allowing researchers to gain insight into the existing literature and identify potential areas for further research (2). This type of analysis can provide researchers with insight into the most recent and influential studies in the field, particularly in identifying potential avenues for future academic research. Bibliometric analysis has recently gained significant attention in the field

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of psychiatry, too (3–5). A recent study conducted in 2025 examined changes in research trends on LAIAs over the past 40 years through bibliometric analysis (5). The present study aimed to identify and analyze the 100 most cited articles on LAIAs using bibliometric analysis, specifically to identify potential avenues for future academic research.

## METHOD

The Clarivate Analytics WoS Core Collection database was examined on December 12, 2024 using VOSviewer v1.6.20 (2). The search term “long-acting injectable antipsychotic” was selected. The publications were then ranked based on their citation count, and the top 100 cited articles were subjected to further analysis. In the event of two or more articles having the same number of citations, the more recent article was given priority. The full texts of each article were downloaded, and two authors reviewed each in detail. In cases where the two authors could not agree, the opinion of a third author was sought. Articles outside the field of psychiatry and not related to LAIAs were excluded. The publications were subjected to a systematic and rigorous evaluation process and were stratified according to several key criteria, including publication year, type, authors, countries, and journal of publication. Additionally, the evaluation process involved a comprehensive analysis of the publications’ indexing status and total and annual citations (including self-citations). Furthermore, the frequency of keywords from the articles and co-authorships was evaluated, and a visual network analysis was conducted.

The data are presented using descriptive analysis. Data analysis was performed using SPSS v22.0. This study was approved by the Pamukkale University Ethics Committee with the decision dated 12.11.2024 and numbered 19.

## RESULTS

The number of studies related to LAIAs has been increasing at a steady rate each year, with 1,420 articles published in the field of psychiatry in the WoS Core Collection between 1985 and 2024. The total number of citations ranged from 65 to 1,044. The mean number of citations was 149.24. The annual number of citations ranged from 3.33 to 90. The top 50 cited articles are shown in Appendix 1. The most cited article was the 2010 study International Consensus Study of Antipsychotic Dosing by Gardner et al.(6), published

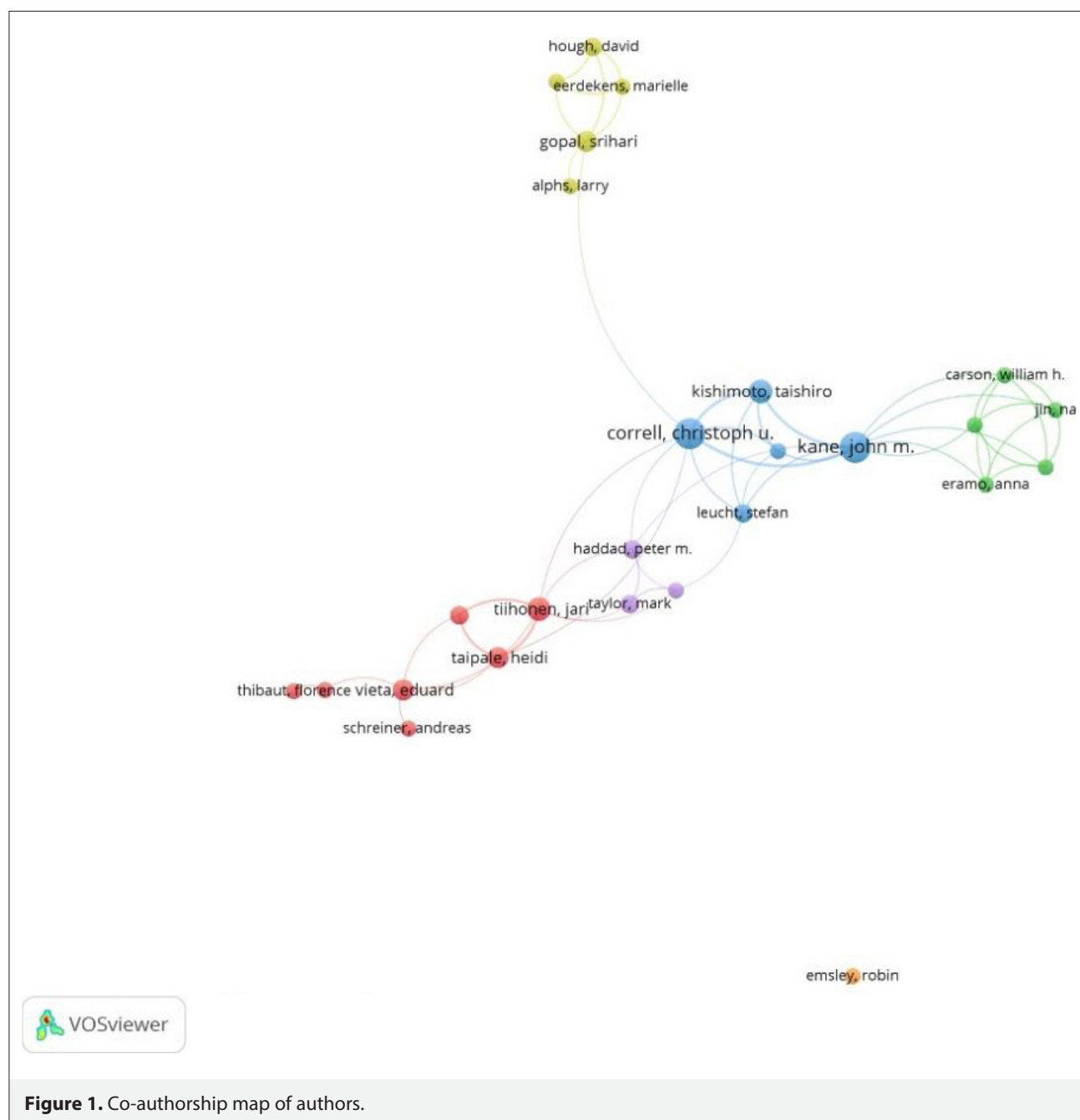
in *The American Journal of Psychiatry*, with 1,044 citations. The article with the highest annual citation rate was *Mortality in People with Schizophrenia: A Systematic Review and Meta-Analysis of Relative Risk and Aggravating or Attenuating Factors* by Correll et al. (2022) (7), with 90 citations per year. The second most cited article was the 2010 study *The 2009 Schizophrenia PORT Psychopharmacological Treatment Recommendations and Summary Statements* by Buchanan et al. (8), published in *Schizophrenia Bulletin*, with 675 citations.

Additionally, the third most cited article was the 2011 study *A Nationwide Cohort Study of Oral and Depot Antipsychotics After First Hospitalization for Schizophrenia* by Tiihonen et al. (9), published in *The American Journal of Psychiatry*, with 499 citations.

The three most contributing authors, as evidenced by the number of their publications in the top 100, are John M. Kane (n=14), Christoph U. Correll (n=11), and Mariëlle Eerdekens (n=7). An evaluation of the top five countries reveals that approximately 60 publications originated from the United States of America (USA), 23 from Germany, 19 from the United Kingdom, 14 from Belgium, and 12 from Spain. A visualization of the co-authorship map of the authors is provided in Figure 1.

The initial 100 articles span a period from 1998 to the present, and the two most recent ones were published in 2022. Two peaks were observed in 2010 and 2013, with the highest number of publications occurring in these two years. This appears to be due to the significant and increasing interest in LAIs since 1985, especially after the introduction of second-generation antipsychotics in the 2000s (3). The total number of publications and citations in the top 100 cited articles by year is shown in Figure 2. Of the top 100 cited articles, 68 were original research articles, 30 were review articles, and two were editorial material. The most frequently used trending keywords among these studies were “schizophrenia, long-acting injectable, antipsychotics, relapse, psychosis, paliperidone palmitate, adherence, atypical antipsychotics.” A map of the co-occurrence of author keywords extracted from the top 100 cited articles is presented in Figure 3.

The *Journal of Clinical Psychiatry* contributed the greatest number of articles to the top 100 most cited articles, with 20 articles, followed by *The British Journal of Psychiatry and Schizophrenia Research*, which contributed eight and seven articles, respectively. Of the publications in the top 100, 75 are included in both the Science Citation Index Expanded (SCI-E)



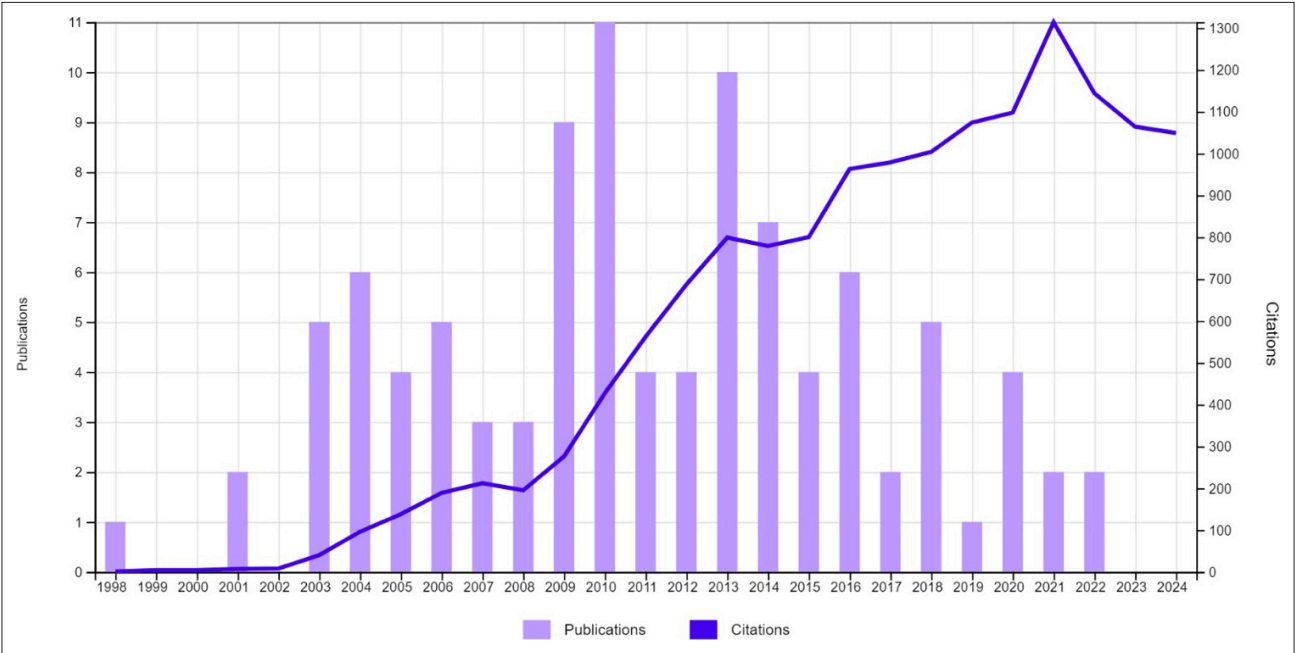
and the Social Science Citation Index (SSCI), 23 are included only in SCI-E, one is included only in SSCI, and one is included in the Emerging Sources Citation Index (ESCI).

## DISCUSSION

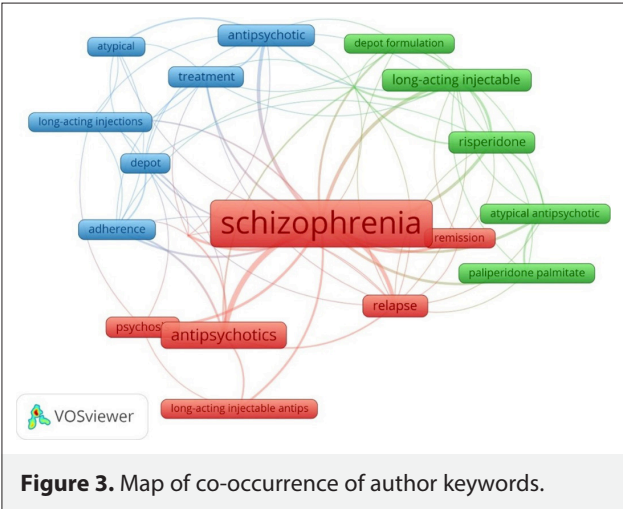
While the number of citations an article receives does not directly determine its value, it can provide a historical perspective on its place in the scientific field and allow for analysis of its impact. In this study, we employed bibliometric analysis in conjunction with

network visualization to identify the top 100 most influential papers in the field of LAIA based on global citation frequency.

The advent of LAIAs represents a revolutionary improvement in treatment adherence, patient comfort, and healthcare outcomes (1). It is therefore unsurprising that the results of this study demonstrate a consistent and gradual increase in the number of studies on LAIAs. The findings indicate that the USA has the highest number of publications and citations on LAIAs, followed by the United Kingdom and Germany among European countries. It may



**Figure 2.** Total number of publications and citations by year for the top 100 cited articles.



**Figure 3.** Map of co-occurrence of author keywords.

therefore be assumed that these countries exert the greatest influence and engage in the most extensive cooperation on this issue on a global scale (5). Results from analyses conducted in Italy, Singapore, and Indonesia on atypical antipsychotics and schizophrenia similarly indicate that the countries contributing the most to the literature align with those identified in our study (10–12). This can be attributed to the fact that the USA and European countries have robust pharmaceutical industries, such as Janssen Pharmaceutica (risperidone LAI and paliperidone LAI) and Lundbeck/Otsuka Pharmaceutical (aripiprazole LAI), which play a key role in the advancement of LAIAs. It can also be explained by the fact that the

governments of the USA and European countries allocate some of the highest budgets for scientific research and provide substantial support to scientists, both academically and financially (13).

The Journal of Clinical Psychiatry and Schizophrenia Bulletin, two of the three journals that contributed the most to the top 100 in our study, have also retained leading positions in other studies on antipsychotics and schizophrenia (10–12). The observation that three of the initial 14 authors who contributed the most to the top 100 most cited articles are women corroborates the findings of the study on gender inequality in researchers conducted by Vijayakumar et al. (14) in 2023 in the field of schizophrenia. It may be necessary to implement measures to promote gender equality in academic publishing, particularly in the field of psychiatry, to foster a more inclusive scientific community.

The observation that John M. Kane, the author with the highest number of publications in the top 100, is also among the most frequently cited authors in two analyses on schizophrenia may indicate that the author is a prominent and leading figure in the field of schizophrenia and psychopharmacology (3, 15).

The keywords “schizophrenia, long-acting injectable, antipsychotics, relapse, psychosis, paliperidone palmitate, adherence, atypical antipsychotics” identified in our study suggest that LAIAs may be preferred for relapse prevention and improving treatment adherence in severe mental disorders such as schizophrenia or bipolar disorder.

In terms of the limitations of this study, it should be noted that the literature database used was solely the WoS Core Collection. It is possible that information from other databases, such as PubMed, may have been omitted. Secondly, although older publications are more likely to receive a greater number of citations, it is encouraging to note that many newer studies also appear in the top 100 in our study. We attempted to address this potential disadvantage by including annual citation rates. Lastly, it is possible that some studies may have been overlooked if they did not include the search term “long-acting injectable antipsychotics,” as this term was used to search the database.

This analysis can enable researchers and clinicians to gain insight into the most recent and influential work in this field, particularly in identifying potential avenues for future academic research.

**Ethical Approval:** The Pamukkale University Non-interventional Clinical Research Ethics Committee granted approval for this study (date: 12.11.2024, number: 19).

**Conflict of Interest:** The authors declare that there is no conflict of interest.

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Category 1	Concept/Design	S.B.T., D.A., A.N.I.K.
	Data acquisition	D.A.
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Category 2	Drafting manuscript	S.B.T.
	Critical revision of manuscript	S.B.T., D.A., A.N.I.K.
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**Appendix 1: Top 50 cited articles**

Rank	Article Title	Journal	Year	Total citations	Annual citations
1	International Consensus Study of Antipsychotic Dosing	American Journal of Psychiatry	2010	1044	69.6
2	The 2009 Schizophrenia PORT Psychopharmacological Treatment Recommendations and Summary Statements	Schizophrenia Bulletin	2010	675	45
3	A Nationwide Cohort Study of Oral and Depot Antipsychotics After First Hospitalization for Schizophrenia	American Journal of Psychiatry	2011	499	35.64
4	Canadian Network for Mood and Anxiety Treatments (CANMAT) and International Society for Bipolar Disorders (ISBD) collaborative update of CANMAT guidelines for the management of patients with bipolar disorder: update 2009	Bipolar Disorders	2009	455	28.44
5	Long-Acting Injectable Versus Oral Antipsychotics in Schizophrenia: A Systematic Review and Meta-Analysis of Mirror-image Studies	Journal of Clinical Psychiatry	2013	364	30.33
6	Non-adherence to medication in patients with psychotic disorders: epidemiology, contributing factors and management strategies	World Psychiatry	2013	359	29.92
7	The nature of relapse in schizophrenia	BMC Psychiatry	2013	318	26.50
8	World Federation of Societies of Biological Psychiatry (WFSBP) Guidelines for Biological Treatment of Schizophrenia, Part 2: Update 2012 on the long-term treatment of schizophrenia and management of antipsychotic-induced side effects	World Journal of Biological Psychiatry	2013	307	25.58
9	Long-Acting Injectable vs Oral Antipsychotics for Relapse Prevention in Schizophrenia: A Meta-Analysis of Randomized Trials	Schizophrenia Bulletin	2014	285	25.91
10	The World Federation of Societies of Biological Psychiatry (WFSBP) Guidelines for the Biological Treatment of Bipolar Disorders: Update 2012 on the long-term treatment of bipolar disorder	World Journal of Biological Psychiatry	2013	284	23.67
11	The Use of Long-Acting Injectable Antipsychotics in Schizophrenia: Evaluating the Evidence	Journal of Clinical Psychiatry	2016	283	31.44
12	Expert consensus guideline series - Optimizing pharmacologic treatment of psychotic disorders - introduction: Methods, commentary, and summary	Journal of Clinical Psychiatry	2003	278	12.64
13	Mortality in people with schizophrenia: a systematic review and meta-analysis of relative risk and aggravating or attenuating factors	World Psychiatry	2022	270	90
14	Guidelines for depot antipsychotic treatment in schizophrenia	European Neuropsychopharmacology	1998	264	9.78
15	The Effects of Novel and Newly Approved Antipsychotics on Serum Prolactin Levels: A Comprehensive Review	CNS Drugs	2014	260	23.64
16	Systematic meta-review of depot antipsychotic drugs for people with schizophrenia	British Journal of Psychiatry	2001	238	9.92
17	The role of long-acting injectable antipsychotics in schizophrenia: a critical appraisal	Therapeutic Advances in Psychopharmacology	2014	220	20
18	Paliperidone palmitate maintenance treatment in delaying the time-to-relapse in patients with schizophrenia: A randomized, double-blind, placebo-controlled study	Schizophrenia Research	2010	213	14.2
19	Long-acting injectable versus oral antipsychotics for the maintenance treatment of schizophrenia: a systematic review and comparative meta-analysis of randomised, cohort, and pre-post studies	Lancet Psychiatry	2021	193	48.25

**Appendix 1 (cont): Top 50 cited articles**

Rank	Article Title	Journal	Year	Total citations	Annual citations
20	Antipsychotics and mortality in a nationwide cohort of 29,823 patients with schizophrenia	Schizophrenia Research	2018	191	27.29
21	Antipsychotic-induced Dopamine Supersensitivity Psychosis: Pharmacology, Criteria, and Therapy	Psychotherapy and Psychosomatics	2017	178	22.25
22	Partial compliance and patient consequences in schizophrenia: Our patients can do better	Journal of Clinical Psychiatry	2003	173	7.86
23	Clozapine use in patients with schizophrenia and the risk of diabetes, hyperlipidemia, and hypertension - A claims-based approach	Archives of General Psychiatry	2001	151	6.29
24	Efficacy and Effectiveness of Depot Versus Oral Antipsychotics in Schizophrenia: Synthesizing Results Across Different Research Designs	Journal of Clinical Psychiatry	2013	150	12.5
25	Guidelines for the use and management of long-acting injectable antipsychotics in serious mental illness	BMC Psychiatry	2013	146	12.17
26	Paliperidone palmitate, a potential long-acting treatment for patients with schizophrenia. Results of a randomized, double-blind, placebo-controlled efficacy and safety study	International Journal of Neuropsychopharmacology	2010	144	9.60
27	Dose-Response Meta-Analysis of Antipsychotic Drugs for Acute Schizophrenia	American Journal of Psychiatry	2020	140	28
28	Attitudes of psychiatrists toward antipsychotic depot medication	Journal of Clinical Psychiatry	2006	133	7
29	The concepts of remission and recovery in schizophrenia	Pharmacopsychiatry	2006	132	6.95
30	World Federation of Societies of Biological Psychiatry (WFSBP) guidelines for biological treatment of schizophrenia, part 2: Long-term treatment of schizophrenia	World Journal of Biological Psychiatry	2006	129	6.79
31	Partial compliance in schizophrenia and the impact on patient outcomes	Psychiatry Research	2008	127	7.47
32	The case for long-acting antipsychotic agents in the post-CATIE era	Acta Psychiatrica Scandinavica	2007	127	7.06
33	Efficacy and Safety of Paliperidone Palmitate 3-Month Formulation for Patients with Schizophrenia: A Randomized, Multicenter, Double-Blind, Noninferiority Study	International Journal of Neuropsychopharmacology	2016	126	14
34	Comparison of the effects of different routes of antipsychotic administration on pharmacokinetics and pharmacodynamics	Journal of Clinical Psychiatry	2003	125	5.68
35	Comparative Effectiveness of Antipsychotic Drugs for Rehospitalization in Schizophrenia-A Nationwide Study With 20-Year Follow-up	Schizophrenia Bulletin	2018	123	17.57
36	Long-term outcomes in patients with schizophrenia treated with risperidone long-acting injection or oral antipsychotics in Spain: Results from the electronic Schizophrenia Treatment Adherence Registry (e-STAR)	European Psychiatry	2009	122	7.63
37	Relapse and rehospitalization: Comparing oral and depot antipsychotics	Journal of Clinical Psychiatry	2003	120	5.45
38	Real-World Outcomes of Paliperidone Palmitate Compared to Daily Oral Antipsychotic Therapy in Schizophrenia: A Randomized, Open-Label, Review Board-Blinded 15-Month Study	Journal of Clinical Psychiatry	2015	119	11.90
39	Attitudes towards long-acting depot antipsychotics: A survey of patients, relatives and psychiatrists	Psychiatry Research	2010	119	7.93
40	Risperidone Long-Acting Injectable Monotherapy in the Maintenance Treatment of Bipolar I Disorder	Biological Psychiatry	2010	116	7.73

**Appendix 1 (cont): Top 50 cited articles**

<b>Rank</b>	<b>Article Title</b>	<b>Journal</b>	<b>Year</b>	<b>Total citations</b>	<b>Annual citations</b>
41	Tardive dyskinesia in the era of typical and atypical antipsychotics. Part 1: Pathophysiology and mechanisms of induction	Canadian Journal of Psychiatry	2005	115	5.75
42	Paliperidone palmitate versus oral antipsychotics in recently diagnosed schizophrenia	Schizophrenia Research	2015	114	11.40
43	Aripiprazole once-monthly for treatment of schizophrenia: double-blind, randomised, non-inferiority study	British Journal of Psychiatry	2014	113	10.27
44	Effect of Long-Acting Injectable Antipsychotics vs Usual Care on Time to First Hospitalization in Early-Phase Schizophrenia: A Randomized Clinical Trial	Jama Psychiatry	2020	112	22.40
45	An 8-week, double-blind, randomized, placebo-controlled study of olanzapine long-acting injection in acutely ill patients with schizophrenia	Journal of Clinical Psychiatry	2008	112	6.59
46	Remission in schizophrenia: Results from a 1-year study of long-acting risperidone injection	Schizophrenia Research	2005	108	5.40
47	Efficacy and safety of direct transition to risperidone long-acting injectable in patients treated with various antipsychotic therapies	International Clinical Psychopharmacology	2005	108	5.40
48	Safety and tolerability of long-acting injectable versus oral antipsychotics: A meta-analysis of randomized controlled studies comparing the same antipsychotics	Schizophrenia Research	2016	107	11.89
49	The clinical course of schizophrenia in women and men: a nation-wide cohort study	Npj Schizophrenia	2020	104	20.80
50	Medication nonadherence in bipolar disorder: a narrative review	Therapeutic Advances in Psychopharmacology	2018	104	14.86